Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	133,615	229,943	354,455	488,294	649,632	708,582	879,385
0515 Multiple Kill Vehicles (MKV)	130,773	0	0	0	0	0	0
WX15 Multiple Kill Vehicles (MKV) Capability Development	0	228,362	344,152	471,156	630,980	687,988	853,155
0602 Program-Wide Support	2,842	0	0	0	0	0	0
ZX40 Program-Wide Support	0	1,581	10,303	17,138	18,652	20,594	26,230

A. Mission Description and Budget Item Justification

Our mission is to provide kill vehicles to the Ballistic Missile Defense System to counter ballistic missile threats in the boost and midcourse phases of flight. The multiple kill vehicle payload will counter complex ballistic missile threats during their midcourse phase of flight with multiple kill vehicles launched from a single interceptor missile. The unique capability to engage many targets with a single interceptor makes multiple kill vehicle payloads a cost effective solution for pacing the evolving threat by reducing the interceptor, silo, and associated infrastructure costs needed to field a single-kill vehicle interceptor force.

The rapidly evolving and emerging threat drives all midcourse defense weapon systems to pursue multiple kill capability as soon as practical. Our recent systems engineering and analysis work concluded that a suite of modular and common technologies support kill vehicle designs for the Ground Based Midcourse, Kinetic Energy Interceptors, and Aegis Ballistic Missile Defense weapon system elements. The Agency takes advantage of kill vehicle modularity and commonality opportunities by managing all kill vehicle development from a single program office.

A.1 System Element Description

Multiple kill capability is an integral component of a broad Ballistic Missile Defense System strategy for defeating our adversaries. In this strategy, the multiple kill vehicle payload will exploit data from Ballistic Missile Defense System sensors and the Command, Control, Battle Management and Communication system to identify, seek out, and destroy all lethal objects within the threat cluster.

We will provide multiple kill capability to all boost and midcourse interceptor elements: Ground-Based Midcourse Defense, Kinetic Energy Interceptors, and Aegis Ballistic Missile Defense. We will optimize commonality and modularity of kill vehicle components to develop large multiple kill vehicle payloads for Ground Based Midcourse Defense and midcourse Kinetic Energy Interceptors and affect spiral development of small multiple kill vehicle payloads for a Standard Missile-3 Blk IIB missile for Aegis Ballistic Missile Defense. The modular design approach cost-effectively maintains a kinetic kill vehicle alternative for the boost phase intercept mission. We are also taking advantage of opportunities to optimize commonality of the Standard Missile-3 Cooperative Development unitary kill vehicle with concurrently developed multiple kill vehicle payloads.

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The Missile Defense Agency strategy is to manage all future kill vehicle development under a single program office using a flexible, decision-based approach with knowledge points and key component and development test events early in the program. We will acquire multiple kill vehicle payloads focusing on low technical and schedule risk using a parallel path approach with two payload providers. The parallel paths may use different technologies and design approaches, but both adhere to the Agency's goal of delivering common, modular multiple kill vehicle payloads for integration with all Ballistic Missile Defense System midcourse interceptors. The strategy emphasizes open architecture and common standards and interfaces across kill vehicle payloads to gain cost efficiencies and facilitate future spiral upgrades.

A.2 System Element Budget Justification and Contribution to the Ballistic Missile Defense System (BMDS)

Adversary warhead technologies, techniques and designs continue to evolve. During midcourse flight, the enemy may attempt to disguise their warhead or deploy decoys and other types of debris around their warhead in an effort to confuse the Ballistic Missile Defense System sensors. These countermeasures make it harder for the Ballistic Missile Defense System sensors to determine which object is the lethal object within the cluster of threat objects. As a result, engaging all the potential threat objects might require launching multiple interceptors to counter the threat.

Multiple kill vehicle payloads do not require the Ballistic Missile Defense System to pinpoint a single lethal object within a threat cluster. Instead of pairing one kill vehicle with one interceptor missile, the multiple kill vehicle payloads allow a single interceptor missile to deliver several kill vehicles that can attack multiple threat objects within the threat cluster. The multiple kill vehicle payload will receive the best available targeting data transmitted to it in flight by the Ballistic Missile Defense System to attack and destroy a large number of objects in the threat cluster. Multiple kill capability dramatically increases the probability of destroying these lethal objects in the threat cluster.

Using multiple kill vehicles to engage multiple targets from a single interceptor is also cost effective. The interceptor, silo and associated infrastructure costs to field multiple kill vehicle payloads are significantly less than that for a single kill vehicle interceptor force of equivalent capability. We will capitalize on past investment in interceptors, launchers, and fire control systems by adding common, multiple kill payloads to the weapon system interceptors. With this approach, we expect to achieve cost efficiencies by reducing the number of independent kill vehicle development efforts among the weapon systems and mission areas.

A.3 Major System Element Goals

- Successfully complete Component Development and Testing events to support knowledge points for the current design configuration.
- Knowledge Point # 1: Kill Vehicle selection for SM-3 Block IIA with Japan (Complete)
- Knowledge Point # 2: Demonstrate Volume Kill Capability (2QFY11) - Gain confidence in the payload's major subsystems capabilities and engagement management performance with real algorithms, computers, and seekers.

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- Knowledge Point # 3: Confirm Affordability of Volume Kill Capability (2QFY10) - Gain budgeting and funding confidence through understanding of the production processes, payload manufacturing throughput, and component quality capabilities. In addition, validate cost data to support contractor's proposed production cost commitments.
- Knowledge Point # 4: Demonstrate Multiple Kill Vehicle Integrated System Capability from Mid-Course Interceptor (3QFY15) Integrate payload into the Ballistic Missile Defense System test bed and demonstrated kill capabilities on a mid-course interceptor. Decide to proceed to payload procurement and fielding.

A.4 Major Events Schedule and Description

Major Event	Project	Timeframe	Description
Other			
Program Milestones			
KP #1 SM-3 Block IIA Kill Vehicle Selection	WX15	2Q FY 2008	• Decide to continue with either unitary or multiple kill vehicle development and fielding with our Japanese partners on the Aegis BMD Standard Missile-3 Block IIA • Complete: The US and Japan jointly decided to continue development of a unitary kill vehicle payload for the SM-3 Blk IIA. In parallel, the US will pursue spiral development of a multiple kill vehicle for SM-3 Blk IIB.
KP #3 Confirm Affordability of Vol. Kill Capability	WX15	2Q FY 2010	• Gain budgeting and funding confidence through understanding of the production process, payload manufacturing throughput, and component quality capabilities
KP #2 Demonstrate Volume Kill Capability	WX15	2Q FY 2011	• Gain confidence in the payload`s major subsystems capabilities and engagement management performance with real algorithms, computers, and seekers
System Engineering			
System Requirements Reviews	WX15	1Q FY 2009	• Identify, conduct and complete system trades to establish payload requirements, and integration requirements across midcourse interceptor elements
Preliminary Design Reviews	WX15	3Q FY 2010	• Technical review of the basic design approach for configuration items to assure compliance with program requirements.
Critical Design Reviews	WX15	1Q FY 2012	• Technical review of the detail design of the selected configuration.
Flight Test			
System Test and Evaluation			
Conduct Flight Testing	WX15	4Q FY 2011 - 4Q FY 2013	• Begin flight testing the multiple kill vehicle payload

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B. Program Change Summary	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008 PB)	144,362	271,151	352,741
Current President's Budget (FY 2009 PB)	133,615	229,943	354,455
Total Adjustments	-10,747	-41,208	1,714
Congressional Specific Program Adjustments	0	-39,622	0
Congressional Undistributed Adjustments	0	-1,586	0
Reprogrammings	-8,522	0	0
SBIR/STTR Transfer	-2,225	0	0
Adjustments to Budget Years	0	0	1,714

FY07 decrease of $10.747 million includes SBIR/STTR transfer of $2.225 million and MDA reprogrammings of $8.522 million.

FY08 decrease of $41.208 million includes Congressional Specific Program Adjustments of $39.622 million and Congressional Undistributed Adjustments of $1.586 million.

FY09 increase of $1.714 million for MDA programmatic changes to support program requirements.

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0515 Multiple Kill Vehicles (MKV)	130,773	0	0	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: Beginning in FY08 the funding for the Multiple Kill Vehicle (MKV)element appears under Project WX15.

A. Mission Description and Budget Item Justification

The rapidly evolving and emerging threat is driving all midcourse defense weapon systems to pursue multiple kill capability as soon as practical. Our recent systems engineering and analysis work concluded that a suite of modular and common technologies support multiple kill vehicle designs for the Ground Based Midcourse, Kinetic Energy Interceptors, and Aegis Ballistic Missile Defense weapon system elements.

In FY07, we continued kill vehicle payload system engineering by working with the Ballistic Missile Defense System Engineer and the midcourse weapon system elements to identify, conduct, and complete system trades to establish payload concepts for integration across midcourse interceptor elements. We also developed digital simulations to begin proving out multiple kill capability against expected threats.

We are managing kill vehicle development under a flexible, decision-based approach using knowledge points and key component development and test events early in the program. In FY07, we initiated Component Development and Test activities designed to reduce risk and to support our knowledge point decisions. We began developing engagement management algorithms, key payload components (sensors, divert and attitude control systems), and a hover test bed to prove out these key technologies and inform the Missile Defense Agency Knowledge Point decisions. This early component development and testing will mitigate technical, schedule and cost risk and prove out the multiple kill capability prior to major funding commitments.

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
Payload Development	55,886	0	0
RDT&E Articles (Quantity)	0	0	0

In FY07, we focused our payload development efforts on the engagement management capability, sensor, and divert and attitude control system components of the multiple kill vehicle payload. We also began developing a hover test bed that we will use to integrate and test key components of the payload.

The ability to manage multiple kill vehicle engagements is critical to the success of the multiple kill vehicle payload. We will develop the engagement management algorithms using a digital simulation test bed with hardware in the loop to demonstrate and test this capability. To

capitalize on Agency investments, we are working with the Hercules Project to incorporate applicable software and algorithm development work into the program. The engagement management simulation will comply with Missile Defense Agency's Open Architecture System Interface Standard.

Another key component of the multiple kill vehicle payload is the divert and attitude control system. In FY07, we developed and tested a low risk, high performance liquid fueled divert and attitude control system. The divert and attitude control systems enable the payload components to maneuver into the path of the target cluster and the specific objects they are directed to intercept.

In FY07 we began developing a ground based hover test bed to integrate and test key components of the divert and attitude control systems in an observable, recoverable and repeatable ground based free flight environment. The hover test bed will accommodate the evolution of the test articles; including more complex tests using newly developed tactically representative hardware.

The multiple kill vehicle mission requires a long range sensor that distinguishes objects in the threat cluster to support target assignment and engagement management. In FY07, we began developing pathfinder seekers to demonstrate we can manage kill vehicle engagements using the seeker data. Initial long range seeker component development and test activities will capitalize on Agency investments in two-color infrared technology and build on proven test constructs and facilities.

FY07 Accomplishments

- Developed a low risk, high performance liquid fueled divert and attitude control system
- Initiated development of engagement management test bed
- Designed and developed engagement management algorithms
- Developed processes and procedures to successfully integrate and test hover vehicles at the National Hover Test Facility
- Initiated development of carrier vehicle divert and attitude control system for hover test
- Developed hardware and software for pathfinder hover test vehicle
- Began building the pathfinder hover test vehicle
- Initiated development of large format 2-color focal plane arrays
- Procured canister and gimbal for carrier vehicle captive carry testing
- Designed carrier vehicle seeker telescope
- Initiated manufacturing of carrier vehicle seeker telescopes

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	FY 2007	FY 2008	FY 2009
System Engineering	57,483	0	0
RDT&E Articles (Quantity)	0	0	0

During the System Concept Review in FY06, we developed a system payload configuration and a program plan that we used to develop requirements and mature the design. In FY07, we continued to work with the Ballistic Missile Defense System Engineer and midcourse elements to identify, plan, and begin system trades to establish payload requirements for integration across midcourse interceptor elements. These trades will lead to FY09 Payload System Requirements Reviews with the midcourse elements.

FY07 Accomplishments

- Developed System Requirements Review plan
- Began necessary top level Ballistic Missile Defense System level system trades to establish payload requirements for integration across midcourse interceptor elements
- Matured a Joint Systems Engineering Management Plan for integrating the Multiple Kill Vehicle with Ground Based Midcourse Defense, Kinetic Energy Interceptors, and Aegis Ballistic Missile Defense
- Performed Multiple Kill Vehicle payload system trade studies to establish and balance carrier vehicle and kill vehicle performance parameters
- Updated and executed Risk Management Plan
- Developed and verified all digital, open architecture framework and model implementation
- Developed medium fidelity digital simulation
- Defined requirements for large format 2-color infrared focal plane array
- Defined requirements for hover test bed

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	FY 2007	FY 2008	FY 2009
System Test and Evaluation	13,964	0	0
RDT&E Articles (Quantity)	0	0	0

Systems Test and Evaluation consists of integration and test activities, component development test activities, and payload ground and flight testing. We are working with the Ground Based Midcourse, Kinetic Energy Interceptors, and Aegis Ballistic Missile Defense to align an integrated kill vehicle test program.

In FY07, we began developing a hover test bed designed to accommodate the evolution of our carrier and kill vehicles. We also completed a static hot fire test of the carrier vehicle integrated propulsion system at the National Hover Test Facility at Edwards Air Force Base, California. This test proved out propulsion technology we plan to use during hover tests.

FY07 Accomplishments

- Conducted test readiness reviews to prepare for the static hot fire test
- Conducted divert and attitude control system static hot fire tests
- Initiated development of Special Test Equipment for hover test bed
- Began building seeker gimbal, canister and flight support equipment for captive carry testing
- Completed Program Master Test Plan
- Began Development Master Test Plan
- Began flight test planning with Ground Based Midcourse Defense element and Western Range

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	FY 2007	FY 2008	FY 2009
Program Operations	3,440	0	0
RDT&E Articles (Quantity)	0	0	0

Program Operations is leading an integrated Missile Defense Agency team approach using resources from government, industry, and academia. Program Operations is responsible for managing a team of government, Federally Funded Research and Development Centers and contractor staff to provide a comprehensive approach for managing the program office.

FY07 Accomplishments

- Provided government and contractor program staff for the overall management of the program; including: system engineering, testing, acquisition management, business management, financial management, contract administration, cost and schedule performance assessment, cost estimation and analysis, data management, quality assurance, and mission assurance

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C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0207998C BRAC	0	103,219	159,938	61,931	8,724	0	0	333,812
PE 0603175C Ballistic Missile Defense Technology	183,849	108,423	118,718	115,234	120,152	127,012	130,358	903,746
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,082,454	1,045,276	1,019,073	795,659	719,847	548,283	439,752	5,650,344
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,985,140	2,243,213	2,209,262	2,276,848	1,385,258	946,437	1,103,532	13,149,690
PE 0603883C Ballistic Missile Defense Boost Defense Segment	622,218	510,241	421,229	423,927	652,642	799,792	991,839	4,421,888
PE 0603884C Ballistic Missile Defense Sensors	514,989	586,121	1,221,143	1,184,280	1,099,649	1,077,632	823,583	6,507,397
PE 0603886C Ballistic Missile Defense System Interceptors	341,358	340,107	386,817	500,966	708,803	815,433	553,136	3,646,620
PE 0603888C Ballistic Missile Defense Test and Targets	584,615	621,861	673,691	672,976	690,938	708,991	719,209	4,672,281
PE 0603890C Ballistic Missile Defense System Core	425,889	413,934	432,262	482,947	605,219	561,947	571,498	3,493,696
PE 0603891C Special Programs - MDA	347,377	196,892	288,315	304,234	538,050	818,136	786,349	3,279,353
PE 0603892C Ballistic Missile Defense Aegis	1,125,426	1,126,337	1,157,783	1,234,220	1,078,539	1,066,712	1,102,542	7,891,559
PE 0603893C Space Tracking & Surveillance System	311,402	231,528	242,441	266,509	560,130	735,727	938,191	3,285,928
PE 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
PE 0603896C BMD C2BMC	249,179	447,616	289,277	287,194	270,762	256,767	259,159	2,059,954
PE 0603897C BMD Hercules	46,268	52,462	55,955	55,289	56,400	51,902	52,784	371,060
PE 0603898C BMD Joint Warfighter Support	49,833	49,394	69,982	73,997	77,205	80,168	81,948	482,527
PE 0603904C Missile Defense Integration & Operations Center	104,389	78,557	96,404	100,437	100,366	101,512	102,840	684,505
PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
PE 0605502C Small Business Innovative Research - MDA	142,510	0	0	0	0	0	0	142,510
PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

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D. Acquisition Strategy

We will execute a capability-based acquisition strategy to deliver kill vehicles to the Ballistic Missile Defense System. The evolutionary acquisition strategy emphasizes use of proven technologies, early development of key components and capabilities, realistic knowledge-point testing and demonstrations, and spiral technology insertion. The knowledge points will demonstrate and test capabilities that are critical for multiple kill vehicle success.

The Missile Defense Agency will manage all future kill vehicle development under a single program office using a flexible, decision-based approach with knowledge points and key component and development test events early in the program. We will acquire multiple kill vehicle payloads focusing on low technical and schedule risk using a parallel path approach with two payload providers. The parallel paths may use different technologies and design approaches, but both adhere to the Agency's goal of delivering common, modular multiple kill vehicle payloads for integration with all Ballistic Missile Defense System midcourse interceptors. The strategy emphasizes open architecture and common standards and interfaces across kill vehicle payloads to gain cost efficiencies and facilitate future spiral upgrades.

Several factors drove the Agency to update the kill vehicle acquisition strategy, including: (1) Expanding multiple kill capability to include both land- and sea-based options; (2) Optimizing commonality and modularity of kill vehicle components; (3) Consolidating BMDS multiple and unitary kill vehicle design and development efforts; and (4) Lowering schedule and technical risks. We also decided that investing in a single development and test path for all our weapon spiral upgrades was too high risk. The kill vehicle acquisition focus is to drive the payload solutions to the same technologies we have been developing and testing for many years in unitary kill vehicle programs. This high level of kill vehicle modularity and commonality across all the weapon systems enables us to make focused investments on parallel path developments that reduce risk and costs through an integrated, cross-element management approach.

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I. Product Development Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Development								
Payload Development	CPAF	Lockheed Martin/ Sunnyvale, CA & Dallas, TX	69,219	0	N/A	0	N/A	69,219
Subtotal Product Development			69,219	0		0		69219

Remarks

II. Support Costs Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Development								
Payload Development SETA	CPFF	AeroThermo/ Huntsville, AL	818	0	N/A	0	N/A	818
Payload Development SETA	CPFF	Gray Research/ Huntsville, AL	78	0	N/A	0	N/A	78
Payload Development SETA	CPFF	Teledyne Solutions/ Huntsville, AL	699	0	N/A	0	N/A	699
Payload Development SETA	CPFF	Computer Sciences Corp/ Huntsville, AL	475	0	N/A	0	N/A	475
Payload Development Risk Reduction	MIPR	DRS (NVL)/ Ft. Belvoir, VA	3,539	0	N/A	0	N/A	3,539
Payload Development Risk Reduction	MIPR	RVS (NVL)/ Ft. Belvoir, VA	3,547	0	N/A	0	N/A	3,547

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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Development FFRDC	FFRDC	Space Dynamics Laboratory/ Logan, UT	1,035	0	N/A	0	N/A	1,035
Payload Development	CPFF	Millennium Engineering Inc/ Huntsville, AL	2,875	0	N/A	0	N/A	2,875
Payload Development	CPFF	IBSI/ Clearwater, FL	120	0	N/A	0	N/A	120
System Engineering								
Systems Engineering SETA	CPFF	Sparta/ Arlington, VA	3,308	0	N/A	0	N/A	3,308
Systems Engineering SETA	CPFF	Computer Sciences Corp/ Arlington, VA	3,247	0	N/A	0	N/A	3,247
Systems Engineering SETA	CPFF	Gray Research/ Huntsville, AL	209	0	N/A	0	N/A	209
Systems Engineering SETA	CPAF	ITT/ Huntsville, AL	567	0	N/A	0	N/A	567
Systems Engineering SETA	CPFF	Teledyne Solutions/ Huntsville, AL	255	0	N/A	0	N/A	255
Systems Engineering FFRDC	FFRDC	Sandia/ Albuquerque, NM	549	0	N/A	0	N/A	549
Systems Engineering FFRDC	FFRDC	MIT Lincoln Lab/ Lexington, MA	4,140	0	N/A	0	N/A	4,140
Systems Engineering FFRDC	FFRDC	JHU Applied Physics Laboratory/ Laurel, MD	2,908	0	N/A	0	N/A	2,908

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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Engineering	CPAF	Lockheed Martin/ Sunnyvale, CA	57,189	0	N/A	0	N/A	57,189
Payload Engineering	CPAF	Boeing/ Seattle, WA	1,461	0	N/A	0	N/A	1,461
Systems Engineering	MIPR	Naval Research Lab/ Washington, DC	63	0	N/A	0	N/A	63
Systems Engineering	MIPR	Naval Surface Warfare Center/ Washington, DC	183	0	N/A	0	N/A	183
Systems Engineering	CPFF	Sparta/ Huntsville, AL	25	0	N/A	0	N/A	25
Systems Engineering	CPFF	Millennium Engineering, Inc/ Huntsville, AL	580	0	N/A	0	N/A	580
Systems Engineering	CPFF	Joint Spectrum Center/ Annapolis, MD	52	0	N/A	0	N/A	52
Systems Engineering	CPFF	MTSI/ Arlington, VA	68	0	N/A	0	N/A	68
Subtotal Support Costs			87,990	0		0		87990

Remarks

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III. Test and Evaluation Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
System Test and Evaluation								
System Test and Evaluation - Facilities	MIPR	NHTF, Pacific Missile Range & Vandenberg AFB/ HI &CA	3,051	0	N/A	0	N/A	3,051
System Test and Evaluation	CPAF	Lockheed Martin/ Sunnyvale, CA & Dallas, TX	12,234	0	N/A	0	N/A	12,234
System Test and Evaluation SETA	CPFF	Sparta/ Arlington, VA	435	0	N/A	0	N/A	435
System Test and Evaluation - Facilities	MIPR	White Sands Test Facility/ Albuquerque, NM	63	0	N/A	0	N/A	63
Subtotal Test and Evaluation			15,783	0		0		15783

Remarks

IV. Management Services Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Program Operations								
Program Operations - Gov`t Personnel and Travel		SMDC/ Huntsville, AL	3,564	0	N/A	0	N/A	3,564
Program Operations - Gov`t Personnel and Travel		NCR/ Arlington, VA	573	0	N/A	0	N/A	573

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Program Operations SETA	CPFF	SAIC/ Huntsville, AL	313	0	N/A	0	N/A	313
Program Operations SETA	CPFF	Gray Research/ Huntsville, AL	183	0	N/A	0	N/A	183
Program Operations SETA	CPFF	AeroThermo/ Huntsville, AL	753	0	N/A	0	N/A	753
Program Operations Security	CPFF	Qinetiq/ Arlington, VA	43	0	N/A	0	N/A	43
Program Operations	CPFF	Sparta/ Arlington, VA	226	0	N/A	0	N/A	226
Program Operations	CPFF	CSC/ Arlington, VA	104	0	N/A	0	N/A	104
Subtotal Management Services			5,759	0		0		5759

Remarks

Project Total Cost			178,751	0		0		178,751

Remarks

Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile

Date: **February 2008**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**

R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

Fiscal Year	2007				2008				2009				2010				2011				2012				2013			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Payload Development																												
Engagement Management Development																												
Carrier vehicle seeker development																												
CV divert and attitude control system development																												
System Engineering																												
Modeling and Simulation Development																												
System Test and Evaluation																												
Master Test Planning/Range Documentation																												
Conduct engineering and development testing																												

Legend

	Significant Event (complete)		Significant Event (planned)
	Milestone Decision (complete)		Milestone Decision (planned)
	Element Test (complete)		Element Test (planned)
	System Level Test (complete)		System Level Test (planned)
	Complete Activity		Planned Activity

Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Payload Development							
Engagement Management Development	1Q-4Q						
Carrier vehicle seeker development	1Q-4Q						
CV divert and attitude control system development	1Q-4Q						
Conducted carrier vehicle DACS hot fire	4Q						
System Engineering							
Modeling and Simulation Development	3Q-4Q						
System Test and Evaluation							
Master Test Planning/Range Documentation	3Q-4Q						
Program Master Test Plan	3Q						
Conduct engineering and development testing	3Q-4Q						

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
WX15 Multiple Kill Vehicles (MKV) Capability Development	0	228,362	344,152	471,156	630,980	687,988	853,155
RDT&E Articles Qty	0	0	0	0	7	11	22

Note: In FY07 the funding for the Multiple Kill Vehicle (MKV) element appeared under Project 0515.

A. Mission Description and Budget Item Justification

The rapidly evolving and emerging threat is driving all midcourse defense weapon systems to pursue multiple kill capability as soon as practical. Our recent systems engineering and analysis work concluded that a suite of modular and common technologies support multiple kill vehicle designs for the Ground Based Midcourse, Kinetic Energy Interceptors, and Aegis Ballistic Missile Defense weapon system elements.

Multiple kill vehicle's unique capability to engage many targets with a single interceptor makes it a cost effective solution for pacing the evolving threat. The resulting reduction in interceptor, silo and associated infrastructure costs to field multiple kill vehicle is thus significantly less than that for a single-kill vehicle interceptor force of equivalent capability.

We will continue multiple kill vehicle payload system engineering by working with the Ballistic Missile Defense System Engineer and the midcourse weapon system elements to identify, conduct, and complete system trades to establish payload requirements for integration across midcourse interceptor elements. We will also continue developing digital simulations to prove out multiple kill capability against expected threats.

The multiple kill vehicle test program progresses from digital simulations to Ballistic Missile Defense System level flight tests in the Pacific Test Bed. In FY07, we initiated this test progression by executing Component Development and Test activities designed to reduce risk and to support our knowledge point decisions. We will coordinate test planning with our weapon element partners to align an integrated multiple kill vehicle test program.

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
Payload Development	0	146,031	221,147
RDT&E Articles (Quantity)	0	0	0

We focus our payload development efforts on the engagement management capability, sensor, and divert and attitude control system components of the multiple kill vehicle payload. We also began developing a hover test bed that we will use to integrate and test key components of the payload. The ability to manage multiple engagements is critical to the success of the multiple kill vehicle payload. Proving the engagement management capability contributes to our Agency Knowledge Point decisions. We will develop a digital simulation test bed with hardware in the loop to demonstrate and test the engagement management capability.

The sensor is a key component of the multiple kill vehicle payload. Successful seeker component development and test establishes our confidence in the multiple kill vehicle payload's capability to acquire and track threat objects early enough to perform the maneuvers necessary for a successful intercept. We will develop an airborne captive carry test bed to develop, demonstrate and test this seeker capability. The goal is to test the airborne seeker assembly against live targets of opportunity starting in FY09.

Another key component of the multiple kill vehicle payload is the propulsion system. The divert and attitude control systems enable the payload components to maneuver into the path of the target cluster and the specific objects they are directed to intercept. Demonstrating the performance of a divert and attitude control system contributes to our Agency Knowledge Point decisions. We will develop a ground based hover test bed to integrate and test key components of the divert and attitude control systems in an observable, recoverable and repeatable ground based free flight environment. The hover test bed will support both static firing of the divert and attitude control systems and hover test. The National Hover Test Facility at Edwards Air Force Base, California is responsible for overseeing the execution of both static testing and hover testing.

FY08 Planned Program

- Continue development of engagement management test bed
- Develop and fabricate pathfinder breadboard hardware
- Finish building the pathfinder test vehicle
- Integrate pathfinder test vehicle with hover test bed
- Integrate component development special test equipment
- Continue divert and attitude control system component development
- Fabricate and test seeker gimbal system for airborne captive carry testing

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

- Deliver two seeker telescopes
- Develop and deliver seeker large format 2-color infrared focal plane arrays
- Integrate all-reflective seeker telescope and seeker components

FY09 Planned Program
- Continue development of engagement management test bed
- Continue developing pathfinder breadboard hardware
- Develop and fabricate pathfinder seeker signal processor hardware and software
- Integrate one seeker assembly into closed loop captive carry gimbaled-canister system
- Integrate one pathfinder seeker into engagement management test bed

	FY 2007	FY 2008	FY 2009
Systems Engineering	0	63,233	99,571
RDT&E Articles (Quantity)	0	0	0

During the System Concept Review in FY06, we developed a system payload configuration and a program plan that we used to begin developing requirements and maturing the design. In FY07, we continued to work with the Ballistic Missile Defense System Engineer and midcourse elements to identify and conduct system trades to establish payload requirements for integration across midcourse interceptor elements. These trades will lead to FY09 Payload System Requirements Reviews with the midcourse elements. In FY08 and FY09, we will continue to decompose the payload system requirements, perform component trade studies, and allocate requirements to the component and subcomponent levels leading to preliminary design review in FY10. We will also perform the system engineering required to optimize commonality and modularity of kill vehicle components for multiple kill vehicle payloads for Ground Based Midcourse Defense and Kinetic Energy Interceptors, and also we set the foundation for multiple kill vehicle payloads for Aegis Ballistic Missile Defense.

FY08 Planned Program
- Develop payload requirements
- Mature the functional and physical architectures
- Update open architecture system interface standard simulation framework
- Update and execute Risk Management Plan

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE **0603894C Multiple Kill Vehicle**

FY09 Planned Program

- Involve warfighter in system engineering and development of concept of operations
- Complete System Requirements Reviews
- Initiate performance verification of component and subcomponent engineering models and update performance requirements
- Continue to decompose the payload system requirements
- Perform component trade studies
- Allocate requirements to the component and subcomponent levels
- Update and execute Risk Management Plan
- Develop high fidelity digital simulation

	FY 2007	FY 2008	FY 2009
System Test and Evaluation	0	10,604	14,381
RDT&E Articles (Quantity)	0	0	0

Systems Test and Evaluation consists of integration and test activities, component development test activities, and payload ground and flight testing. We are working with the Ground Based Midcourse, Kinetic Energy Interceptors, and Aegis Ballistic Missile Defense to align an integrated multiple kill vehicle test program.

In Payload Development, we design and develop divert and attitude control systems and develop a ground based hover test bed to integrate and test key components of the divert and attitude control systems in an observable, recoverable and repeatable ground based free flight environment. The hover test bed will support both static firing of the divert and attitude control systems and hover testing. We will conduct static fire and hover testing to assess propulsion system performance, hardware and software integration, and flight hardware performance. The National Hover Test Facility at Edwards Air Force Base, California is responsible for overseeing the execution of these tests.

In Payload Development, we also design and produce two seeker test assemblies. In FY09, we intend to integrate one of these assemblies into an Agency airborne platform for captive carry testing. We perform captive carry testing to assess seeker acquisition, tracking, correlation and weapon target assignment algorithms against live target missiles. We will use the second seeker assembly in the Engagement Management digital simulation test bed.

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

FY08 Planned Program
- Deliver Development Master Test Plan
- Deliver Integrated Master Test Plan
- Conduct divert and attitude control system hover tests
- Deliver 2-color seeker assembly to hardware in-the-loop test bed
- Draft Payload integration and Test Plan
- Program Introduction document for flight test ranges

FY09 Planned Program
- Integrate 2-color seeker, gimbal, canister and flight support equipment onto an Agency airborne sensor platform
- Conduct divert and attitude control system static hot fire tests
- Initiate captive carry flight test against live targets of opportunity
- Develop flight test plans with Western Test Range (Vandenberg Air Force Base)

	FY 2007	FY 2008	FY 2009
Program Operations	0	8,494	9,053
RDT&E Articles (Quantity)	0	0	0

Program Operations is leading an integrated Missile Defense Agency team approach using resources from government, industry, and academia. Program Operations is responsible for managing a team of government, Federally Funded Research and Development Centers and contractor staff to provide a comprehensive approach for managing the program office.

FY08 Planned Program
- Provide government and contractor program staff for the overall management of the program; including: system engineering, testing, acquisition management, business management, financial management, contract administration, cost and schedule performance assessment, cost estimation and analysis, data management, quality assurance, and mission assurance.

FY09 Planned Program
- Provide government and contractor program staff for the overall management of the program; including: system engineering, testing, acquisition management, business management, financial management, contract administration, cost and schedule performance assessment, cost estimation and analysis, data management, quality assurance, and mission assurance.

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0207998C BRAC	0	103,219	159,938	61,931	8,724	0	0	333,812
PE 0603175C Ballistic Missile Defense Technology	183,849	108,423	118,718	115,234	120,152	127,012	130,358	903,746
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,082,454	1,045,276	1,019,073	795,659	719,847	548,283	439,752	5,650,344
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,985,140	2,243,213	2,209,262	2,276,848	1,385,258	946,437	1,103,532	13,149,690
PE 0603883C Ballistic Missile Defense Boost Defense Segment	622,218	510,241	421,229	423,927	652,642	799,792	991,839	4,421,888
PE 0603884C Ballistic Missile Defense Sensors	514,989	586,121	1,221,143	1,184,280	1,099,649	1,077,632	823,583	6,507,397
PE 0603886C Ballistic Missile Defense System Interceptors	341,358	340,107	386,817	500,966	708,803	815,433	553,136	3,646,620
PE 0603888C Ballistic Missile Defense Test and Targets	584,615	621,861	673,691	672,976	690,938	708,991	719,209	4,672,281
PE 0603890C Ballistic Missile Defense System Core	425,889	413,934	432,262	482,947	605,219	561,947	571,498	3,493,696
PE 0603891C Special Programs - MDA	347,377	196,892	288,315	304,234	538,050	818,136	786,349	3,279,353
PE 0603892C Ballistic Missile Defense Aegis	1,125,426	1,126,337	1,157,783	1,234,220	1,078,539	1,066,712	1,102,542	7,891,559
PE 0603893C Space Tracking & Surveillance System	311,402	231,528	242,441	266,509	560,130	735,727	938,191	3,285,928
PE 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
PE 0603896C BMD C2BMC	249,179	447,616	289,277	287,194	270,762	256,767	259,159	2,059,954
PE 0603897C BMD Hercules	46,268	52,462	55,955	55,289	56,400	51,902	52,784	371,060
PE 0603898C BMD Joint Warfighter Support	49,833	49,394	69,982	73,997	77,205	80,168	81,948	482,527
PE 0603904C Missile Defense Integration & Operations Center	104,389	78,557	96,404	100,437	100,366	101,512	102,840	684,505
PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
PE 0605502C Small Business Innovative Research - MDA	142,510	0	0	0	0	0	0	142,510
PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

D. Acquisition Strategy

We will execute a capability-based acquisition strategy to deliver kill vehicles to the Ballistic Missile Defense System. The evolutionary acquisition strategy emphasizes use of proven technologies, early development of key components and capabilities, realistic knowledge-point testing and demonstrations, and spiral technology insertion. The knowledge points will demonstrate and test capabilities that are critical for multiple kill vehicle success.

The Missile Defense Agency will manage all future kill vehicle development under a single program office using a flexible, decision-based approach with knowledge points and key component and development test events early in the program. We will acquire multiple kill vehicle payloads focusing on low technical and schedule risk using a parallel path approach with two payload providers. The parallel paths may use different technologies and design approaches, but both will still adhere to the Agency's goal of delivering a common, modular multiple kill vehicle payloads for integration with all Ballistic Missile Defense System midcourse interceptors. The strategy emphasizes open architecture and common standards and interfaces across kill vehicle payloads to gain cost efficiencies and facilitate future spiral upgrades.

Several factors drove the Agency to update the kill vehicle acquisition strategy, including: (1) Expanding multiple kill capability to include both land- and sea-based options; (2) Optimizing commonality and modularity of kill vehicle components; (3) Consolidating BMDS multiple and unitary kill vehicle design and development efforts; and (4) Lowering schedule and technical risks. We also decided that investing in a single development and test path for all our weapon spiral upgrades was too high risk. The kill vehicle acquisition focus is to drive the payload solutions to the same technologies we have been developing and testing for many years in unitary kill vehicle programs. This high level of kill vehicle modularity and commonality across all the weapon systems enables us to make focused investments on parallel path developments that reduce risk and costs through an integrated, cross-element management approach.

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

I. Product Development Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Development								
Payload Development	CPAF	Lockheed Martin/ Sunnyvale, CA	0	111,633	1Q	128,452	1Q	240,085
Payload Development	CPAF	Raytheon/ Tucson, AZ	0	0	4Q	84,359	1Q	84,359
Subtotal Product Development			0	111,633		212,811		324444

Remarks

II. Support Costs Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Development								
Payload Development SETA	CPFF	ITT/ Huntsville, AL	0	1,624	1Q	1,362	1Q	2,986
Payload Development Labs	MIPR	DRS (NVL)/ Ft. Belvoir, VA	0	2,701	1Q	2,213	1Q	4,914
Payload Development Labs	MIPR	RVS (NVL)/ Ft. Belvoir, VA	0	3,424	1Q	2,871	1Q	6,295
Payload Development FFRDC	FFRDC	Space Dynamics Laboratory/ Logan, UT	0	1,697	1Q	1,046	1Q	2,743
Payload Development SETA	CPFF	MEI/ Huntsville, AL	0	794	1Q	665	1Q	1,459

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Development Labs	MIPR	NVL/ Ft. Belvoir, VA	0	213	1Q	179	N/A	392
Payload Development		KV DACS/ Competitive	0	21,303	3/4Q	0	N/A	21,303
Payload Development		Lithium Battery Development/ TBD	0	2,642	1Q	0	N/A	2,642
Systems Engineering								
Systems Engineering SETA	CPFF	Sparta/ Arlington, VA	0	8,261	1Q	9,293	1Q	17,554
Systems Engineering SETA	CPFF	Computer Sciences Corp/ Arlington, VA	0	6,523	1Q	7,478	1Q	14,001
Systems Engineering SETA	CPAF	Joint Spectrum Center/ Huntsville, AL	0	331	1Q	204	1Q	535
Systems Engineering SETA	CPFF	Lawrence Livermore National Laboratory/CA	0	72	1Q	44	1Q	116
Systems Engineering FFRDC	FFRDC	Sandia/ Albuquerque, NM	0	1,310	1Q	807	1Q	2,117
Systems Engineering FFRDC	FFRDC	MIT Lincoln Lab/ Lexington, MA	0	5,403	1Q	3,330	1Q	8,733
Systems Engineering FFRDC	FFRDC	JHU Applied Physics Laboratory/ Laurel, MD	0	3,893	1Q	2,399	1Q	6,292
Payload Engineering	CPAF	Lockheed Martin/ Sunnyvale, CA	0	28,093	1Q	50,915	1Q	79,008

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Payload Engineering	CPAF	Raytheon/ Tucson, AZ	0	0	1Q	14,445	1Q	14,445
Systems Engineering	CPAF	Boeing/ Huntsville, AL	0	9,347	1Q	10,656	N/A	20,003
Subtotal Support Costs			0	97,631		107,907		205538

Remarks

In FY08, for our Kill Vehicle Divert Attitude and Control System development (KV DACS), we will select vendors to design, develop, and demonstrate a fully integrated pathfinder Divert Attitude and Control System via component and integrated system functional testing.

III. Test and Evaluation Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
System Test and Evaluation								
System Test and Evaluation Facilities	MIPR	NHTF, Pacific Missile Range & Vandenberg AFB/ HI & CA	0	7,246	1Q	3,707	1Q	10,953
System Test and Evaluation SETA	CPFF	Sparta/ Arlington, VA	0	3,358	1Q	3,007	1Q	6,365
System Test and Evaluation	CPAF	Raytheon/ Tucson, AZ	0	0	N/A	7,667	1Q	7,667
Subtotal Test and Evaluation			0	10,604		14,381		24985

Remarks

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

IV. Management Services Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Program Operations								
Program Operations - Gov`t Personnel and Travel		MDA/Arlington, VA/Huntsville, AL	0	3,179	1Q	3,194	1Q	6,373
Program Operations SETA	CPFF	SAIC/ Huntsville, AL	0	514	1Q	536	1Q	1,050
Program Operations SETA	CPFF	Paradigm Technologies, Inc/ Arlington, VA	0	2,021	1Q	2,217	1Q	4,238
Program Operations SETA	CPFF	Sparta/ Arlington, VA	0	781	1Q	872	1Q	1,653
Program Operations	CPFF	CSC/ Huntsville, AL	0	771	1Q	862	1Q	1,633
Program Operations	CPFF	Qinetiq/ Arlington, VA	0	176	1Q	196	1Q	372
Program Operations	CPFF	CACI/ Huntsville, AL	0	411	1Q	460	1Q	871
Program Operations	CPFF	EMC/ Arlington, VA	0	579	1Q	647	1Q	1,226
Program Operations	MIPR	Defense Acquisition University/ Ft. Belvoir, VA	0	62	1Q	69	1Q	131
Subtotal Management Services			0	8,494		9,053		17547

Remarks

Project Total Cost			0	228,362		344,152		572,514

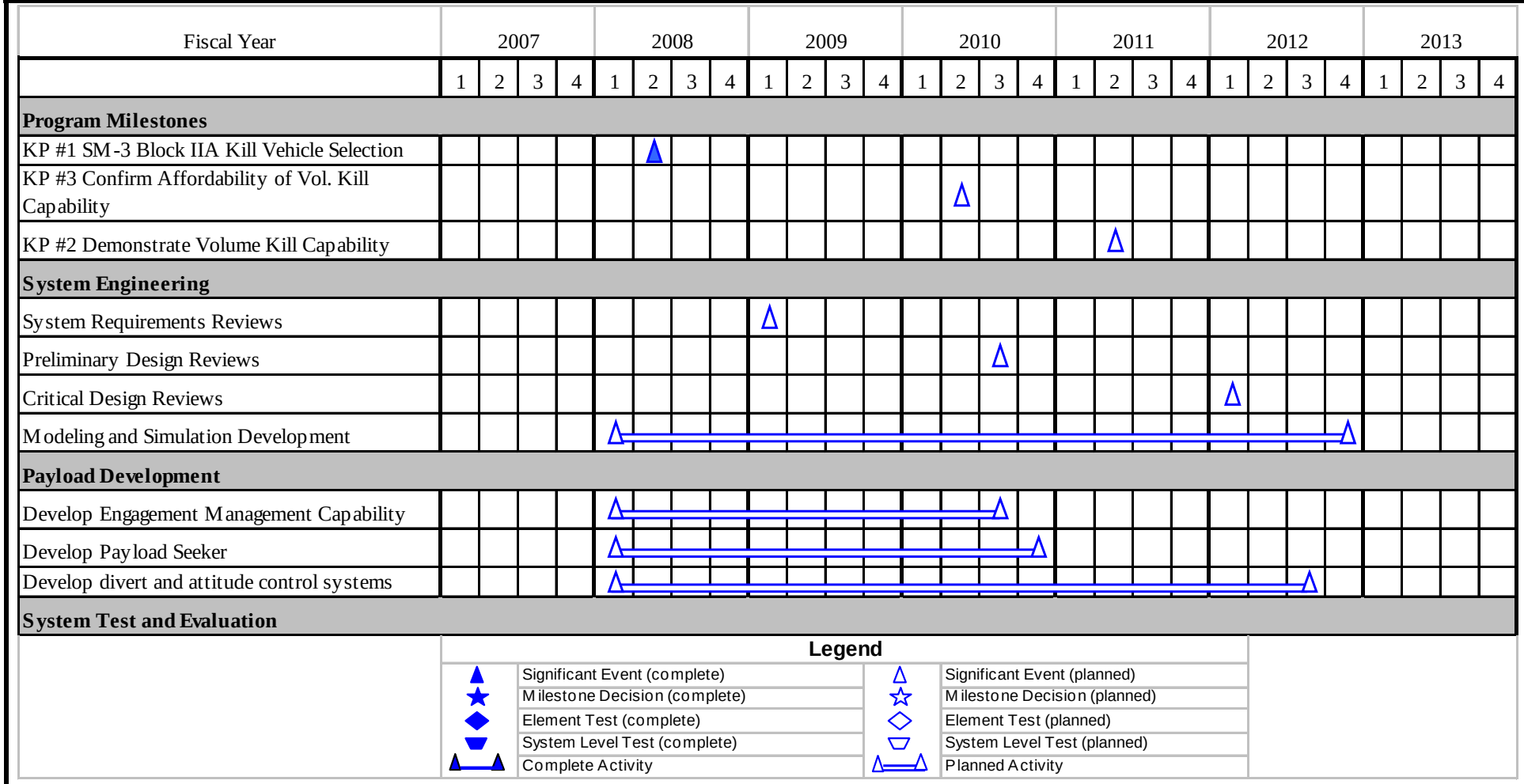
Remarks

Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile

Date: **February 2008**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**

R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**



Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile

Date
February 2008

APPROPRIATION/BUDGET ACTIVITY
RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)

R-1 NOMENCLATURE
0603894C Multiple Kill Vehicle

Fiscal Year	2007				2008				2009				2010				2011				2012				2013			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Test and Evaluation																												
Master Test Planning/Range Documentation					△																▲							
Conduct engineering and development testing					△																			▲				
Conduct Flight Testing																				△								▲

Legend

▲	Significant Event (complete)	△	Significant Event (planned)
★	Milestone Decision (complete)	☆	Milestone Decision (planned)
◆	Element Test (complete)	◇	Element Test (planned)
▼	System Level Test (complete)	▽	System Level Test (planned)
▲——▲	Complete Activity	△——△	Planned Activity

Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Program Milestones							
KP #1 SM-3 Block IIA Kill Vehicle Selection		2Q					
KP #3 Confirm Affordability of Vol. Kill Capability				2Q			
KP #2 Demonstrate Volume Kill Capability					2Q		
System Engineering							
System Requirements Reviews			1Q				
Preliminary Design Reviews				3Q			
Critical Design Reviews						1Q	
Modeling and Simulation Development		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	
Payload Development							
Develop Engagement Management Capability		1Q-4Q	1Q-4Q	1Q-3Q			
Develop Engagement Management test bed		1Q-4Q	1Q-4Q	1Q-3Q			
Develop Payload Seeker		1Q-4Q	1Q-4Q	1Q-4Q			
Captive carry flight test bed integration			1Q-3Q				
Develop divert and attitude control systems		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-3Q	
Develop hover test bed		1Q-4Q					
System Test and Evaluation							
Master Test Planning/Range Documentation		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q	
Complete Developmental Master Test Plan		1Q					
Complete Integrated Master Test Plan		1Q					
Universal Document System Submission		4Q					
Conduct engineering and development testing		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	
Conduct hover testing		4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	
Conduct DACS static fire testing			4Q				
Conduct captive carry seeker testing			4Q	1Q-4Q			
Conduct Flight Testing					4Q	1Q-4Q	1Q-4Q

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0602 Program-Wide Support	2,842	0	0	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0

Note : Efforts within this project continue in FY 2008 under project ZX40

A. Mission Description and Budget Item Justification

Program-Wide Support provides funding for common non-headquarters support functions across the entire program such as strategic planning, program integration, business management, cost estimating, contracting, and financial management, to include preparation of financial statements, reimbursement of financial services provided by DFAS, internal review and audit, earned-value management, and program assessment. Includes costs for both government civilians performing these functions, as well as outside services and support contractors that augment government staff in these areas. Many of these costs reside within the Missile Defense Agency Executing Agents in the Services: Army Space and Missile Defense Command, Army PEO Space and Missile Defense, Office of Naval Research, and various Air Force laboratory and acquisition activities, although some functions and costs within this program element are performed by MDA employees assigned within the National Capital Region (NCR). Other costs included herein provide facility capabilities for MDA Executing Agent locations, such as physical and technical security, legal services, travel and training, office and equipment leases, utilities and communications, supplies and maintenance, and similar operating expenses. Also includes funding for charges on canceled appropriations in accordance with Public Law 101-510, legal settlements, and foreign currency fluctuation on a limited number of foreign contracts.

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
Civilian Salaries and Support	2,842	0	0
RDT&E Articles (Quantity)	0	0	0

See Section A: Mission Description and Budget Item Justification

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0207998C BRAC	0	103,219	159,938	61,931	8,724	0	0	333,812
PE 0603175C Ballistic Missile Defense Technology	183,849	108,423	118,718	115,234	120,152	127,012	130,358	903,746
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,082,454	1,045,276	1,019,073	795,659	719,847	548,283	439,752	5,650,344
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,985,140	2,243,213	2,209,262	2,276,848	1,385,258	946,437	1,103,532	13,149,690
PE 0603883C Ballistic Missile Defense Boost Defense Segment	622,218	510,241	421,229	423,927	652,642	799,792	991,839	4,421,888
PE 0603884C Ballistic Missile Defense Sensors	514,989	586,121	1,221,143	1,184,280	1,099,649	1,077,632	823,583	6,507,397
PE 0603886C Ballistic Missile Defense System Interceptors	341,358	340,107	386,817	500,966	708,803	815,433	553,136	3,646,620
PE 0603888C Ballistic Missile Defense Test and Targets	584,615	621,861	673,691	672,976	690,938	708,991	719,209	4,672,281
PE 0603890C Ballistic Missile Defense System Core	425,889	413,934	432,262	482,947	605,219	561,947	571,498	3,493,696
PE 0603891C Special Programs - MDA	347,377	196,892	288,315	304,234	538,050	818,136	786,349	3,279,353
PE 0603892C Ballistic Missile Defense Aegis	1,125,426	1,126,337	1,157,783	1,234,220	1,078,539	1,066,712	1,102,542	7,891,559
PE 0603893C Space Tracking & Surveillance System	311,402	231,528	242,441	266,509	560,130	735,727	938,191	3,285,928
PE 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
PE 0603896C BMD C2BMC	249,179	447,616	289,277	287,194	270,762	256,767	259,159	2,059,954
PE 0603897C BMD Hercules	46,268	52,462	55,955	55,289	56,400	51,902	52,784	371,060
PE 0603898C BMD Joint Warfighter Support	49,833	49,394	69,982	73,997	77,205	80,168	81,948	482,527
PE 0603904C Missile Defense Integration & Operations Center	104,389	78,557	96,404	100,437	100,366	101,512	102,840	684,505
PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
PE 0605502C Small Business Innovative Research - MDA	142,510	0	0	0	0	0	0	142,510
PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603894C Multiple Kill Vehicle**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
ZX40 Program-Wide Support	0	1,581	10,303	17,138	18,652	20,594	26,230
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: In accordance with the Missile Defense Agency revised block structure, the content previously planned in Project 0602 for FY08-FY13 is now captured in Project ZX40.

A. Mission Description and Budget Item Justification

Program-Wide Support provides funding for common non-headquarters support functions across the entire program such as strategic planning, program integration, business management, cost estimating, contracting, and financial management, to include preparation of financial statements, reimbursement of financial services provided by DFAS, internal review and audit, earned-value management, and program assessment. Includes costs for both government civilians performing these functions, as well as outside services and support contractors that augment government staff in these areas. Many of these costs reside within the Missile Defense Agency Executing Agents in the Services: Army Space and Missile Defense Command, Army PEO Space and Missile Defense, Office of Naval Research, and various Air Force laboratory and acquisition activities, although some functions and costs within this program element are performed by MDA employees assigned within the National Capital Region (NCR). Other costs included herein provide facility capabilities for MDA Executing Agent locations, such as physical and technical security, legal services, travel and training, office and equipment leases, utilities and communications, supplies and maintenance, and similar operating expenses. Also includes funding for charges on canceled appropriations in accordance with Public Law 101-510, legal settlements, and foreign currency fluctuation on a limited number of foreign contracts.

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
Civilian Salaries and Support	0	1,581	10,303
RDT&E Articles (Quantity)	0	0	0

See Section A: Mission Description and Budget Item Justification

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603894C Multiple Kill Vehicle

C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0207998C BRAC	0	103,219	159,938	61,931	8,724	0	0	333,812
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PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
PE 0605502C Small Business Innovative Research - MDA	142,510	0	0	0	0	0	0	142,510
PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115