MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

COST (*In Thousands*)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	335338	373447	489181	1145680	899806	1007660	Continuing	Continuing
5041 Space-based Infrared System (SBIRS) Low	0	245656	293878	394999	1080000	875999	985699	Continuing	Continuing
5049 Russian-American Observation Satellite Program	0	54461	69130	83423	54512	11493	11494	Continuing	Continuing
5050 System Engineering and Integration	0	10000	0	0	0	0	0	Continuing	Continuing
5060 Test and Evaluation	0	14762	0	0	0	0	0	Continuing	Continuing
5090 Program Operations	0	10459	10439	10759	11168	12314	10467	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Sensors Program Element is responsible for the research and development of technologies and capabilities that enhance ballistic missile detection, midcourse tracking and discrimination. This Program Element includes five projects: Space-Based Infrared System (SBIRS) Low, Russian-American Observation Satellite (RAMOS) Program, System Engineering and Integration, Test and Evaluation, and Program Operations.

FY 2002 funding was appropriated in a Satellite Sensor Technology line for use in technology efforts including Space-Based Infrared System (SBIRS) Low. Although this budget provides funding to develop a constellation of SBIRS-Low satellites with anticipated first launch in 2008, the Department is reviewing the program and conducting trades between technology development and SBIRS-Low acquisition. Per the Congressional direction, by May 15, 2002, the Department will provide a plan for developing space-based sensors to best support the BMD system. The SBIRS Low project supports the Program Definition phase of SBIRS Low. SBIRS Low will provide an initial test capability, which will grow with proven advancements in technology.

The RAMOS Program project engages U.S. and Russian developers in early warning satellite technology, providing a forum for information exchange through the joint definition and execution of space experiments.

The sensors System Engineering & Integration project supports the Space-Based Infrared System Low/Ballistic Missile Defense Project integration. Activities include concept definition, risk reduction, date collection and phenomenology and experiments

The Test and Evaluation project includes developing an advanced radar technology testbed and prove out leap-ahead technologies.

The Program Operations project supports the management of the Sensors Segment.

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The Flow down of BMD System capability specifications resulting from Missile Defense National Team efforts in BM/C^2 and Systems Engineering & Integration will guide the integration of SBIRS Low into the BMD System, the BMDS BM/C^2 architecture, and the BMD testbed.

B. Program Change Summary	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY 2002 PB)		495600	
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressional General Reductions		-160262	
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming			
e. Rescissions			
Adjustments to Budget Years Since FY 2002 PB		-160262	373447
Current Budget Submit (FY 2003 Budget Estimates)		335338	373447

Change Summary Explanation:
FY 2003 Funding was not included during the FY 2002 Amended President's Budget Submission.

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5041

COST (*In Thousands*)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5041 Space-based Infrared System (SBIRS) Low	0	245656	293878	394999	1080000	875999	985699	Continuing	Continuing

A. Mission Description and Budget Item Justification

FY 2002 funding was appropriated in a Satellite Sensor Technology line for use in technology efforts including Space-Based Infrared System (SBIRS) Low. Although this budget provides funding to develop a constellation of SBIRS-Low satellites with anticipated first launch in 2008, the Department is reviewing the program and conducting trades between technology development and SBIRS-Low acquisition. Per the Congressional direction, by May 15, 2002, the Department will provide a plan for developing space-based sensors to best support the BMD system.

SBIRS Low is an element of the Ballistic Missile Defense (BMD) System and will provide a space based infrared capability to acquire, track and discriminate ballistic missiles. SBIRS Low will follow a capability based acquisition strategy to first develop an adjunct to the BMD System testbed. Following spiral development, the capability of SBIRS Low will evolve and be integrated into the Ballistic Missile Defense System two year Blocks. SBIRS Low will incorporate new technologies to enhance detection; improve reporting of Intercontinental Ballistic Missile, Submarine Launch Ballistic Missile and tactical ballistic missiles; and provide critical mid-course tracking, discrimination and hit assessment data for the BMD System.

SBIRS Low's primary mission is missile defense. It provides initial warning of a ballistic missile attack on the US, its deployed forces or its allies. SBIRS Low satellites provide continuous tracking from launch to intercept or reentry. Functions include booster detection, post boost vehicle tracking, midcourse object tracking, resolved object discrimination and intercept hit assessment. This system will pass data to boost, midcourse and terminal defense systems. The data will be used to cue radars over-the-horizon and provide interceptor handovers. The design and development of the first satellites and accompanying ground system is planned for the later FYDP years, which includes significant hardware purchases.

The Flow down of BMD System capability specifications resulting from Missile Defense National Team efforts in BM/C^2 and Systems Engineering & Integration will guide the integration of SBIRS Low into the BMD System, the BMDS BM/C^2 architecture, and the BMD testbed.

FY 2001 Accomplishments:

- 0 Project was funded under Program Element 0604442F (Space-Based Infrared System Low).

Total 0

FY 2002 Planned Program:

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2002
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors
	PROJECT 5041

- 195656 **Space-Based Infrared System Low Program** Definition contract will include efforts to restructure the SBIRS Low program, to include design risk reduction activities and software development. FY 2002 actions will mitigate risk through ground simulations and hardware-in-the-loop demonstrations and, pending a decision on the acquisition strategy, would also include holding the Preliminary Design Review (PDR).
- 15779 Provide **Program Definition Support** (Includes studies, interface definition, and modeling and simulation)
- 11183 Accomplish other **risk reduction** activities (Includes cryocoolers, batteries, algorithms, radiation hardened parts, phenomenology, optical filters, Midcourse Space Experiment data reduction, contamination control, focal plane arrays (visible and long-wave), and survivability)
- 23038 Support **Program Office** activities

Total 245656

FY 2003 Planned Program:

- 226162 **Space-Based Infrared System Low** Program Definition contract will continue efforts to mature the SBIRS Low design and to enhance risk reduction and software development. FY 2003 actions will also include mitigating risk through ground simulations, hardware-in-the-loop demonstrations and preparing for Critical Design Review (CDR).
- 38145 Providing **Program Definition Support** (Includes studies, integration into the BMD System, and modeling and simulation)
- 7383 Accomplishing other **risk reduction** activities (Includes cryocoolers, batteries, algorithms, radiation hardened parts, phenomenology, optical filters, Midcourse Space Experiment data reduction, contamination control, focal plane arrays (visible and long-wave), and survivability)
- 22188 Supporting **Program Office** activities

Total 293878

B. Other Program Funding Summary	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
PE 0603880C, BMD System		807993	1065982	1208546	1157025	1139885	1176979	Cont	Cont
PE 0603881C, Terminal Defense System		200119	169974	200171	234318	228443	367744	Cont	Cont
PE 0603882C, Midcourse Defense System		3762250	3192594	3071581	3016343	2969142	2595708	Cont	Cont
PE 0603883C, Boost Defense System		599835	796927	1389817	1399902	1591160	2274654	Cont	Cont
PE 0603175C, Technology		139340	121751	155056	130299	142785	147457	Cont	Cont
PE 0603875C, International Cooperative Program	125805								

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2002
BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE: 0603884C Sensors / PROJECT: 5041

C. Acquisition Strategy:

SBIRS Low began Program Definition activities in August 1999 with the award of two firm fixed price contracts. During its first year, the program refined the requirements culminating in the August 2000 System Requirements Review (SRR). A successful SRR defined the driving design requirements and allowed the SBIRS Low contractors to complete an initial design, which was validated at the System Design Review in April 2001. The program matured the design and mitigated risk as it prepared for the Preliminary Design Review scheduled for 3/4Q FY 2002. Program Definition may continue past CDR to support the evolutionary development of the SBIRS Low system to support the BMD System. Program Definition is expected to be followed by a competitive Engineering Development contract, scheduled for award in the fourth quarter of FY 2005, leading toward a first launch in 4Q FY 2008.

SBIRS Low is an integral part of the BMD System. The SBIRS Low restructure will develop a capabilities based acquisition program that emphasizes the Missile Defense Agency's evolutionary acquisition, spiral development and testing strategy through the use of two-year capability blocks. SBIRS Low will initially focus on providing an adjunct to the BMD testbed and continue to develop enhanced capabilities to support the BMD block structure and integration.

As directed by the FY 2002 National Defense Appropriations Conference Report, the Department will develop specific program plans for delivery to the Congressional defense committees by 15 May 02.

D. Schedule Profile*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Deliver Program Plan to Congressional defense committees.		3Q					
Preliminary Design Review		3Q-4Q					
Critical Design Review					3Q		
Engineering Development Contract Award					4Q		

*Remainder of schedule subject to the Congressionally directed restructure due to the Congressional defense committees by 15 May 2002.

MDA RDT&E COST ANALYSIS (R-3)

DATE: **February 2002**

BUDGET ACTIVITY: **4 - Program Definition and Risk Reduction**

PE NUMBER AND TITLE: **0603884C Sensors**

PROJECT: **5041**

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Space Based Infrared System Low										
b. Program Definition	FFP	TRW, CA		97828	2Q				Cont	
c. Program Definition	FFP	Spectrum Astro, AZ		97828	2Q				Cont	
d. Program Definition Extension	TBD	TRW, CA				113081	1Q	Cont	Cont	
e. Program Definition Extension	TBD	Spectrum Astro, AZ				113081	1Q	Cont	Cont	
f. Program Definition Support	Various	Various		15779	2Q	38145	2Q	Cont	Cont	
g. Other **Risk Reduction**	Various	Various		11183	2Q	7383	2Q	Cont	Cont	
h.										
Subtotal Product Development:				222618		271690			Cont	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
i. **Program Office Support** (OGC)	Various	Various		23038	2Q	22188	2Q	Cont.	Cont	
j.										
Subtotal Support Costs:				23038		22188			Cont	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Test and Evaluation:										

MDA RDT&E COST ANALYSIS (R-3)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5041

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Management Services:										

Remark:

Project Total Cost:				245656		293878			Cont	

Remark:

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5049

COST (*In Thousands*)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5049 Russian-American Observation Satellite Program	0	54461	69130	83423	54512	11493	11494	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Russian-American Observation Satellites (RAMOS) project is an innovative U.S. – Russian space-based remote sensor research and development program addressing ballistic missile defense and national security. This program engages Russian developers of early warning satellite in the joint definition and execution of aircraft and space experiments. The RAMOS program will design, build, launch, and operate two satellites that will provide stereoscopic observations of the earth's atmosphere and ballistic missile launches in the short wavelength and mid-to-long wavelength infrared bands. Preliminary experiments designed to support program definition occurred between 1995 and 1999 using existing U.S. and Russian space and aircraft platforms to collect imagery. The U.S. Midcourse Space Experiment and the Miniature Sensor Technology Integration satellites were used to collect nearly simultaneous stereo imagery with the Russian RESURS 01 satellite. Joint experiments using U.S. and Russian prototype sensors were flown aboard the U.S. Flying Infrared Signatures Technology Aircraft, demonstrating our ability to jointly plan, execute, and analyze RAMOS type experiments. Note that RAMOS is not an operational element of the overall Ballistic Missile Defense System. It is a cooperative program with the Russian Federation on mutually beneficial research that is missile defense related and provides a foundation for future cooperative efforts.

The RAMOS team began Program Design in the fall of 2000. The RAMOS project consists of two co-orbital satellites each with a sensor suite consisting of an infrared imaging radiometer, a visible wide-angle photometer, and a visible camera. Additionally one satellite will carry a short waveband infrared polarimeter and the other an ultraviolet photometer. Current plans call for Russia to provide the launch capability, satellite platforms, and the ground processing and control equipment while the U.S. will provide the infrared sensors. The satellites are scheduled for launch in FY2006 with a nominal two-year on-orbit life expectancy.

FY 2001 Accomplishments:

- Project was funded under Program Element 0603875C (International Cooperative Programs). Previous projects included: 1161 Advanced Sensor Technology and 4000 Operational Support.

Total 0

FY 2002 Planned Program:

- 22000 **RF Hardware Development** - Continue detailed designs of the satellite platforms, ground project, launch vehicle, and all associated projects and instruments to accomplish the space experiment, including build-to-specification, detailed drawings and updated risk mitigation plans. Develop test plans for system and component testing and perform quality assurance activities during fabrication of the projects. Finalize concept of operations and continue experiments planning.

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2002
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors
	PROJECT 5049

- 23770 **US Hardware Development & Program Management Support** -Begin detailed designs of the satellite primary sensors and all associated projects and instruments to accomplish the space experiments. Finalize test plans for testing and continue to perform quality assurance activities during fabrication of the sensor project. Design and fabricate sensor prototypes to be used during interface and project tests. Continue concept of operations and experiments planning. Begin fabrication of long lead items. Begin writing software for sensor. Begin development of models and simulations to test the design and concepts to include computer mass and mathematical models, orbit models of experiment simulations, and simulations to validate hardware and design trades. Prepare concept for management, processing, storage, and analysis of experiment data.
- 8691 **Engineering & Integration Support, Security Monitoring Support, and Development Support -** Perform system engineering and configuration control processes for the RAMOS project. Monitor and facilitate progress of critical design. Monitor and evaluate subproject and component testing. Provide technical review of exported data. Provided in country administrative, security, and technical support of the RAMOS program office.

Total 54461

FY 2003 Planned Program:

- 32000 **RF Hardware development** - Complete detailed designs of the satellite platforms, launch vehicle, and all associated projects and instruments to accomplish the space experiment, including build-to-specification, detailed drawings and updated risk mitigation plans. Complete assembly, integration & test of 1st Technological Model and begin assembly of Universal Space Platform Engineering Model #2. Complete definition of ground facility, mission operations design and operations concept. Finalize test plans for system and component testing and perform quality assurance activities during fabrication of the projects. Continue science experiments planning. Initiate procurement of mission operations software and hardware.
- 27330 **U.S. Hardware Development & Program Management Support** - Complete detailed designs of the satellite primary sensors and all associated projects and instruments to accomplish the space experiments. Begin fabrication & assembly of US sensors, payload support electronics, and ground support equipment and continue quality assurance activities during sensor fabrication. Complete fabrication, assembly, and test of payload calibration system. Complete integration and test of engineering model #1 and continue development of engineering model #2. Finalize concept of operations and experiments planning. Continue sensor software development. Continue development of models and simulations.
- 9800 **Engineering & Integration Support, Security Monitoring Support, and Development Support -** Perform system engineering and configuration control processes for the RAMOS project. Update and control program documentation, and support Critical Design Review and transition to Fabrication and Assembly phase of program. Monitor and evaluate subproject and component testing. Provide technical review of exported data. Provided in country administrative, security, and technical support of the RAMOS program office.

Total 69130

B. Other Program Funding Summary	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
0603880C, BMD System		807993	1065982	1208546	1157025	1139885	1176979	Cont	Cont
0603881C, Terminal Defense System		200119	169974	200171	234318	228443	367744	Cont	Cont
0603882C, Midcourse Defense System		3762250	3192594	3071581	3016343	2969142	2595708	Cont	Cont

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)			DATE February 2002
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction		PE NUMBER AND TITLE 0603884C Sensors	PROJECT 5049

0603883C, Boost Defense System		599835	796927	1389817	1399902	1591160	2274654	Cont	Cont
0603175C, Technology		139340	121751	155056	130299	142785	147457	Cont	Cont
0603875C, International Cooperative Program	125805								

C. Acquisition Strategy:

Russian-American Observation Satellite is a cooperative experiment program designed to engage the Russians in early warning and theater missile defense related technologies. The tasks to complete the design, fabrication, launch, and operations of the two-satellite constellation will be completed under three major contracts.

The first contract is with Utah State University/Space Dynamics Laboratory (USU/SDL), a designated University Affiliated Research Center for space sensors. Space Dynamics Lab is the current U.S. prime contractor for RAMOS and has a prime/subcontractor relationship with the Russian State Company, Rosvoorouzhenie (now Rosoboronexport), for Russian tasks. This contractual approach will be used for design and development of the RAMOS project through the Preliminary Design Review scheduled for 2Q FY02. After Preliminary Design Review, Utah State University will remain as the prime U.S. contractor for the sensor development and fabrication as well as mission planning and data reduction.

The second contract will be a direct contract with the Russian State Company, Rosoboronexport (formerly Rosvoorouzhenie). During FY2001-FY2002, Missile Defense Agency (MDA) plans to negotiate a government-to-government agreement with the Russian Federation to govern the RAMOS program. Once this agreement is concluded, MDA will contract directly with Rosoboronexport for the Russian efforts. Under this contract, Rosoboronexport, through Russian subcontractors, will be responsible for the development and fabrication of the satellite platforms, development and operation of the ground project, and launch services for the two RAMOS satellites.

The third contract is with Ball Aerospace and Technologies Corporation (BATC) of Boulder, CO. As the Systems Engineering and Integration contractor for Missile Defense Agency, BATC will be primarily responsible for monitoring the Russian effort and facilitating the integration of U.S. and Russian components. BATC will also support preparation of program documentation for technology protection and security and provide in country administrative, security and technical support of RAMOS Program Office.

RAMOS will follow the Missile Defense Agency's capability-based acquisition strategy that emphasizes testing, spiral development, and evolutionary acquisition through the use of two-year capability blocks.

D. Schedule Profile	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Preliminary Design Review for U.S. Sensors		3Q					
RAMOS Project Preliminary Design Review		4Q					
Earliest Opportunity to Authorize Detailed Design		4Q					

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PROJECT: 5049

MDA-USU/SDL Contract Award		4Q					
MDA/Russian Contract Signed		4Q					
Complete Critical Design for U.S. Sensors			2Q				
RAMOS Project Critical Design Review			3Q				
Earliest Opportunity to Authorize Hardware Fabrication			3Q				
Begin Payload Test and Calibration Activities				1Q			
Earliest Opportunity to Authorize Shipment of Payload					2Q		
Ship US Payload #1					2Q		
Ship US Payload #2					4Q		
Launch Satellite #1						4Q	
Launch Satellite #2						4Q	
Earliest Opportunity to Declare Satellites Operational							1Q

MDA RDT&E COST ANALYSIS (R-3)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5049

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. US Hardware Development	CPAF	Utah State University/Space Dynamics Lab, Logan, UT		23603	1Q	27030	1Q		50633	
b. RF Hardware Development	OTAF	Rosoboronexport, RF		22000	2Q	32000	2Q		54000	
c. Engineering & Integration Support	CPAF	Ball Aerospace and Technologies Corporation, Boulder, CO		8000	1Q	9000	1Q		17000	
d.										
Subtotal Product Development:				53603		68030			121633	

Remark: Prior to FY99, the Russian-American Observation Satellite program was in BA3 – Advanced Technology Development, PE 0603173C, Support Technologies – ATD

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Development Support	Allot	AFRL, Hanscom AFB		591	1Q	600	1Q	Continuing	1191	
b.										
Subtotal Support Costs:				591		600			1191	

Remark: Prior to FY99, the Russian-American Observation Satellite program was in BA3 – Advanced Technology Development, PE 0603173C, Support Technologies – ATD

Air Force Research Laboratory technical support will be required in program development, experiment planning and data analysis, with emphasis on earth backgrounds, data certification technology transfer
and surveillance.

MDA RDT&E COST ANALYSIS (R-3)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5049

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Security Monitoring Spt	Allot	DTRA		100	2Q	200	2Q		300	
b. Program Mgt Spt	CPFF	CSC/NRC, Arlington,VA and Aerospace, El Segundao, CA		167	2Q	300	2Q		467	
c.										
Subtotal Management Services:				267		500			767	

Remark: Prior to FY99, the Russian-American Observation Satellite program was in BA3 – Advanced Technology Development, PE 0603173C, Support Technologies – ATD

Project Total Cost:				54461		69130			123591	

Remark:

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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors PROJECT 5050

COST (*In Thousands*)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5050 System Engineering and Integration	0	10000	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

System Engineering and Integration will support the integration of SBIRS Increment 3 into the BMD System. This effort includes the definition and risk reduction of Space-Based Infrared System Increment 3/BMD System interfaces. This activity is incorporated into 5041 Space-Based Infrared System Low in FY 2003 and beyond.

Concept Definition
This project performs the necessary engineering, trade studies, and system requirements definition for the sensor project of the BMD system.

Risk Reduction
Provide Simulation and Hardware in the loop demonstrations of Space-Based Infrared System Low and BMD functionality. Provide exercise support to elicit operator-in-the loop feedback.

Data Collection and Phenomenology
Analyze past Infrared and Visible Sensor Data collections from previous experiments and test to support algorithm development.

Experiments
Plan and develop pre-on-orbit tests (Integrated Flight Tests, Critical Measurement Program Flights, Red Crow Experiments, etc…) that provide data for Space-Based Infrared System Low Risk Reduction Effort.

Space-Based Infrared System Integration
Integrate Space-Based Infrared System into BMD Blocks.

The flow down of BMD System capability specifications resulting from Missile Defense National Team efforts in BM/C2 and Systems Engineering & Integration will guide the integration of SE&I into the BMD System, the BMDS BM/C2 architecture, and the BMD testbed.

FY 2001 Accomplishments:

-

Total

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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors
	PROJECT 5050

FY 2002 Planned Program:

- 10000 Perform systems engineering for SBIRS integration into the Ballistic Missile Defense Architecture. Address interoperability issues and interface features (data flow rate, volume, format, and data content), data fusion/sensor synergy and architecture analysis).

Total 10000

FY 2003 Planned Program:

-

Total

B. Other Program Funding Summary	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
0603880C, BMD System		807993	1065982	1208546	1157025	1139885	1176979	Cont	Cont
0603881C, Terminal Defense System		200119	169974	200171	234318	228443	367744	Cont	Cont
0603882C, Midcourse Defense System		3762250	3192594	3071581	3016343	2969142	2595708	Cont	Cont
0603883C, Boost Defense System		599835	796927	1389817	1399902	1591160	2274654	Cont	Cont
0603175C, Technology		139340	121751	155056	130299	142785	147457	Cont	Cont
0603875C, International Cooperative Program	125805								

C. Acquisition Strategy:

The flow down of BMD System capability specifications resulting from Missile Defense National Team efforts in BM/C2 and Systems Engineering & Integration will guide the integration of SE&I into the BMD System, the BMDS BM/C2 architecture, and the BMD testbed.

D. Schedule Profile	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Concept Study Evaluations & Recommendations		1Q-4Q					
Decision Architecture Reviews		1Q-4Q					
AC Program Review		4Q					

MDA RDT&E COST ANALYSIS (R-3)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5050

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Engineering & Integration	Various	Various		10000	1/2Q			Cont	Cont	
b.										
Subtotal Support Costs:				10000				Cont	Cont	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Management Services:										

Remark:

Project Total Cost:				10000				Cont	Cont	

Remark:

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5060

COST (*In Thousands*)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5060 Test and Evaluation	0	14762	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Radar technology test bed will capitalize on recent advances in radar and computational technologies to enable leap-ahead advances in radar capabilities. These capabilities are required to make projects more affordable while providing capabilities against counter-measures and advanced threats. This project will employ an open system architecture to permit infusion of new components from throughout the radar technology community.

The flow down of BMD System capability specifications resulting from Missile Defense National Team efforts in BM/C2 and Systems Engineering & Integration will guide the integration of T&E into the BMD System, the BMDS BM/C2 architecture, and the BMD testbed.

FY 2001 Accomplishments:

-

Total 0

FY 2002 Planned Program:

- 4762 Concept evaluation.
- 5000 Concept studies.
- 2000 RF/IR countermeasure mitigation.
- 3000 Decision Architecture prototype development and integration.

Total 14762

FY 2003 Planned Program:

-

Total

B. Other Program Funding Summary	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5060

0603880C, BMD System		807993	1065982	1208546	1157025	1139885	1176979	Cont	Cont
0603881C, Terminal Defense System		200119	169974	200171	234318	228443	367744	Cont	Cont
0603882C, Midcourse Defense System		3762250	3192594	3071581	3016343	2969142	2595708	Cont	Cont
0603883C, Boost Defense System		599835	796927	1389817	1399902	1591160	2274654	Cont	Cont
0603175C, Technology		139340	121751	155056	130299	142785	147457	Cont	Cont
0603875C, International Cooperative Program	125805								

C. Acquisition Strategy:

The program will be managed by Missile Defense Agency with support from the U.S. Army Space and Missile Defense Command and the Navy PEO for Theater, Air and Missile Defense. Test and Evaluation will follow the Missile Defense Agency's capability-based acquisition strategy that emphasizes testing, spiral development, and evolutionary acquisition through the use of two-year capability blocks.

D. Schedule Profile	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Concept study evaluations & recommendations		1Q-4Q					
Decision Architecture reviews		1Q-4Q					
AC Program Review		4Q					

MDA RDT&E COST ANALYSIS (R-3)

DATE: February 2002

BUDGET ACTIVITY: 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE: 0603884C Sensors

PROJECT: 5060

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Decision Architecture	Various	SPARTA/SMDC		3000	2Q			Cont.	3000	
b. Concept Studies	Various	Various		5000	2Q			Cont.	5000	
c. CM Mitigation	Various	LockMart/SMDC		2000	2Q			Cont.	2000	
Subtotal Product Development:				10000					10000	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Concept Evaluation	Various	Various		4762	2Q			Cont.	4762	
Subtotal Support Costs:				4762					4762	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Management Services:										

Remark:

Project Total Cost:				14762					14762	

Remark:

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2002
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors PROJECT 5090

COST (*In Thousands*)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5090 Program Operations	0	10459	10439	10759	11168	12314	10467	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project covers personnel and related facility support costs, statutory and fiscal requirements, and support service contracts.

Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at Missile Defense Agency's Executing Agents within the US Army Space & Missile Defense Command, US Army PEO Air and Missile Defense, US Navy PEO for Theater Surface Combatants, US Air Force and the Joint National Integration Center. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.

Fiscal Requirements include reimbursable services acquired through the Defense Working Capital Fund (DWCF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. Missile Defense Agency has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. Also includes funding for charges to canceled appropriations in accordance with Public Law 101-510.

Assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement Missile Defense Agency and Executing Agent government personnel. Typical efforts include cost estimating; security management; information management; technology integration across Missile Defense Agency projects; and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.

FY 2001 Accomplishments:

- Project was funded under Program Elements: 0604442F (SPACE BASED INFRARED SYSTEM) and 0603875C (International Cooperative Programs).

Total 0

FY 2002 Planned Program:

- 10459 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, and supplies.

Total 10459

MDA RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2002
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors
	PROJECT 5090

FY 2003 Planned Program:

- 10439 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, and supplies.

Total 10439

B. Other Program Funding Summary	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
N/A									

C. Acquisition Strategy:

N/A

D. Schedule Profile	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
N/A							