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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2400 National Missile Defense	944922	1853527								

THE FY2000 AND FY2001 PROGRAM REPRESENTED IN THIS R-2 HAS BEEN RESTRUCTURED FOR FY2002 AND IS CAPTURED IN PE 0603882C, MIDCOURSE DEFENSE SEGMENT.

A. Mission Description and Budget Item Justification

The National Missile Defense (NMD) program is designed to protect the nation against long range ballistic missile threats. The Program contributes to each of the three components of the nation's broad strategy to deal with proliferation; preventing and reducing the threat, deterring the threat, and defending against the threat.

The Program has three objectives: (1) to develop and demonstrate an integrated system that has the capability to counter known or expected threats; (2) to complete system development and field an Initial Capability (IC) by the end of FY 2006 and an expanded capability by the end of FY 2008 (if directed to do so); and (3) to assess the technical feasibility, schedule, and cost associated with maintaining a system development path which allows evolutionary upgrading of system capabilities to counter more complex threats. Department of Defense (DoD) conducted a Deployment Readiness Review (DRR) in August 2000. On 1 September 2000, the President decided to continue development and testing and defer the deployment decision.

To execute the program, Boeing North America was competitively awarded the Lead System Integrator (LSI) contract in April 1998. The LSI was contractually accountable for meeting NMD system performance requirements, while the PM implemented and managed an accelerated and evolutionary acquisition strategy to design, develop, integrate, and test the entire system. The original contract was closed out in December 2000 and the Boeing Company was awarded a new contract, as the NMD Prime, to continue program development with options to support deployment.

The NMD system elements comprise a Ground Based Interceptor (GBI) (consisting of a kill vehicle and booster, and GBI support equipment including Command and Launch Equipment (CLE), ground and space-based sensors, and a Battle Management, Command, Control, and Communication (BM/C3) system. The ground-based sensors include development of an X-Band Radar (XBR) and the upgrade of existing Early Warning Radars (EWR). The BM/C3 system includes command and control and engagement planning capabilities, integration with existing national command and control systems, a communication network, and a communication system to transmit data to and from the interceptor while in flight. The NMD system will also use space-based assets for threat detection and tracking, such as the Air Force's Defense Support Program (DSP), and eventually the Air Force's Space Based Infrared System (SBIRS). SBIRS is an integral part of enhancing future NMD capabilities.

NMD DEVELOPMENT/INTEGRATION provides for the Prime Contractor to develop and integrate the individual NMD elements into a cohesive system. In FY 1998, the BM/C3 contract transitioned to Boeing, under the LSI contract. In FY 1999, the Exoatmospheric Kill Vehicle (EKV), Payload Launch Vehicle (PLV) and Integrated System Test Capability (ISTC) contracts were assumed by Boeing. At the end of FY 2000, the last of the NMD legacy contracts, the Ground Based Radar –

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<p>Prototype (GBR-P) contract transitioned to Boeing. Boeing, now the Prime Contractor, will develop, test, and demonstrate prototype software upgrades and hardware changes to existing EWRs required to support the NMD mission. The Prime Contractor will integrate system hardware and software to demonstrate the ability to achieve the Initial System Requirements and to provide the flexibility and robustness for growth in capability to counter known and future threats. The IC will include up to 20 ground-based interceptors at a single site, a ground-based XBR, Upgraded Early Warning Radars (UEWR) and DSP deployed by the end of FY 2006. To meet a larger and more realistic threat, the IC will be expanded to 100 ground based interceptors by the end of FY 2008, provide an upgraded XBR, and support the upgrading of 5 EWRs. The Prime Contractor will validate system performance and perform the necessary system-level trade studies to appropriately allocate element requirements with full consideration of Cost as an Independent Variable (CAIV). The Prime Contractor will operate and maintain NMD models and simulations to include ISTC, system Hardware in the Loop (HWIL), and Prime Contractor Integrated Development Systems (LIDS). Until booster development is complete, EKV flight tests will be flown on the PLV, which is a booster, comprised of a Minuteman (MM) II second and third stages. Development of the Commercial Off-the-Shelf (COTS) booster consists of integrating a Gemini-40 first stage and Orbus-1A second and third stages. The booster will be tested during two verification flights in 3Q and 4Q, FY 2001. BM/C3 incremental prototypes will be integrated and demonstrated in a distributed fashion at multiple locations, and assessed with user participation to refine and focus the BM/C3 development and system behavior. Government leads/PM provide oversight of Prime Contractor counterpart Integrated Product Team (IPT).</p> <p>SENSOR TECHNOLOGY includes research and development efforts for critical sensor components which support infrared surveillance, acquisition, tracking, and discrimination functions for use in the SBIRS Low system. Projects in radiation hardened electronics and spacecraft computers, focal plane arrays (FPAs), long-life cryogenic coolers, signal/data processing and optics are developing state-of-the-art technologies essential to operating in a space environment and viewing targets against the earth limb and space backgrounds. The projects provide mission enabling, risk and production cost reduction technologies for SBIRS Low.</p> <p>THE GBI contracts (EKV and PLV) transitioned to the Prime Contractor in FY 1999. EKV sensor flight tests were successfully accomplished in 3Q, FY 1997 and 2Q, FY 1999. COTS booster development began in FY 1998. The PM GBI performs oversight of NMD Prime Contractor GBI development, integration and test, and deployment planning activities, manages and provides specific Government Furnished Equipment (GFE) to include transportation, testing, and facilities maintenance. Additionally, this office will conduct Independent Verification and Validation (IV&V) of Prime Contractor GBI hardware and software efforts and other required Independent Performance Assessments. The Prime Contractor is responsible for the booster, test facilities, primary production facilities, Peculiar Support Equipment (PSE), Command Launch Equipment (CLE), EKV subcontractors and the integration and test of the GBI element.</p> <p>THE BM/C3 functional area will provide technical oversight of all BM/C3 development activities of the NMD Prime Contractor, BM/C3 software models and simulations, IV&V and Verification, Validation and Accreditation (VV&A), provision of the Joint National Test Facility (JNTF) BM/C3 Element Support Center and BM/C3 Element Laboratory to support BM/C3 development and system test, and technical oversight of the procurement of the NMD Communications Network (NCN).</p> <p>THE XBR is the NMD sensor responsible for acquisition, tracking, discrimination, fire control support, and kill assessment. The Shemya XBR design is being executed by the NMD Prime Contractor. An XBR testbed that leveraged off the Theater Missile Defense Ground Based Radar (TMD-GBR) program (designated GBR-P) has been developed and installed at USAKA, Kwajalein Missile Range (KMR). The GBR-P participates in NMD Risk Reduction Flights (RRF) and Integrated Flight Tests (IFT). Beginning in FY 2001, GBR-P management and upgrades will be combined with the XBR efforts of the Prime Contractor.</p>		
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<p>THE UPGRADED EWR (UEWR) hardware efforts and software upgrades were transitioned to Boeing, under the LSI contract in FY 1998. The UEWRs will detect, count and track the individual objects in a ballistic missile attack early in their trajectory. The data will be used for interceptor commit and XBR cueing. Efforts include IV&V and VV&A along with independent discrimination analysis.</p> <p>SYSTEM ENGINEERING develops the NMD system-level performance and integration requirements as prescribed in the Capstone Requirements Document (CRD) and Operational Requirements Document (ORD), and then flows them down to the individual NMD elements. The System Engineer identifies and mitigates system risk and institutes CAIV and other initiatives to facilitate system affordability. In addition, the System Engineer plans and directs Command and Control Simulations (C2Sims) in which analyses, simulations, and tests are performed. C2Sims evaluates system effectiveness, proposed NMD system architectures, and Concept of Operations (CONOPS) against near and far-term ballistic missile threats. The System Engineer develops functional definitions for the candidate deployment options needed to meet user requirements, and in this capacity, manages all interactions with the user in areas relating to requirements. In addition, the System Engineer focuses on system-level balancing, verification, and validation of the integrated NMD system. At the request of the Ballistic Missile Defense Organization (BMDO), as well as the Office of the Secretary of Defense (OSD) and other external agencies, the System Engineer conducts Ad Hoc studies in support of treaty analysis, policy guidance, and other NMD derived missions.</p> <p>DEPLOYMENT & SUSTAINMENT (D&S) comprises development of plans and analysis to support system production, deployment and sustainment to include: Manpower Personnel Training (MPT) analysis; maintenance and supply support planning; site activation/deployment planning; Government Furnished Property/Government Furnished System/Government Furnished Facilities (GFP/GFS/GFF); and Environmental Safety and Health (ESH) activities. The effort includes conducting siting analyses and supporting site selection; preparing statutory National Environmental Protection Agency (NEPA) and other ESH compliance analyses and documentation; establishing facilities requirements, assessing existing facilities, and developing MILCON programming and budget documentation. The D&S activity also includes the development of the Site Activation Command (SAC) organization, missions and functions, and operating procedures. The SAC will be activated to proceed with the NMD system deployment. The SAC will deploy site manager support personnel, resolve site activation priorities and conflicts, manage activation of deployment sites, and coordinate and oversee system installation, acceptance and turnover activities.</p>		
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<p>SYSTEM TEST AND EVALUATION activities involve managing and overseeing the NMD test and evaluation program, including execution of the lethality ground and flight test programs, and development of program test documentation such as the Test and Evaluation Master Plan (TEMP). Managerial oversight and execution responsibilities ensure the following are available: (1) test infrastructure (including test ranges and instrumentation); (2) oversight of Prime Contractor Ground-Based Test Models & Simulations; (3) target development for sensor and intercept tests; (4) sensor technology enhancements; (5) revised program strategy changes that include multiple engagements, test range upgrades, and the development of the new target booster; and (6) upgrades to government test facilities for the Prime Contractor. Management activities include detailed test plans, and post-test analysis plans for each ground and flight test. Post-test evaluation, analysis, review and reporting are also provided for under this project. Included in this area is the Discrimination program which provides the U.S. with the capability to generate high confidence target signatures for ballistic missile defenses. This is a critical adjunct to the design and evaluation of NMD system performance across the full spectrum of threats and engagement scenarios. This program provides signature collection sensors for live-fire missions and analysis of the resulting test data. Additionally, predictive models of target signatures are developed, as well as algorithms for the critical functions of discrimination, target handover and aimpoint selection.</p> <p>TEST TRAINING AND EXERCISE CAPABILITY (TTEC) will develop and implement through the Prime Contractor the hardware and software to meet the program management, technical and administrative support requirements of testing, training and conducting exercises. The Operational Support Group (OSG) will over see and facilitate the development of the NMD training program through its interface with the User community. TTEC also provides training development and reviews and assesses NMD System Training Plan.</p> <p>THE TECHNICAL DIRECTOR ensures a totally integrated effort of system engineering, test and evaluation, and production and logistics support over the system life cycle. Includes the process of system definition/baseline development; design engineering; systems engineering; software management; developmental and operational test and evaluation; reliability, availability and maintainability (RAM); standardization and specifications; countermeasures mitigation; and product improvement. Represents the Program Executive Officer in OSD, Joint Staff, congressional staff and international forums.</p> <p>MANAGEMENT AND OPERATIONAL SUPPORT provides personnel and related support common to all NMD projects including support to the Office of the Director, BMDO and his staff located in Washington, DC, as well as BMDO's Executing Agents within the U.S. Army Space and Missile Defense Command, U.S. Army PEO Missile Defense, U.S. Navy PEO for Theater Defense, U.S. Air Force PEO office and the JNTF. This project supports funding for overhead/indirect personnel costs, benefits and infrastructure costs such as rents, utilities and supplies. Additionally, this project maintains NMD Joint Project Office (JPO) operations as well as JPO scientific, engineering and technical assistance contractor support.</p> <p>This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing DoD policy.</p>		
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<p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 491097 NMD Development/Integration: Conducted three IFTs-3, 4, and 5. IFT-3 was the first intercept demonstration. IFT-5 was the first Integrated System Flight Test, and demonstrated the potential system capability to meet the threat requirement. Completed Integration Assembly Test and Checkout (IAT&C) facility at Redstone Arsenal. Completed GBI Development Integration Lab/System Integration Lab (GDIL/SIL). Continued COTS booster development. Initiated and completed one Integrated Ground Test (IGT-5) utilizing the ISTC. Conducted LIDS builds 5 and 6. Released BM/C3 Build Increment (BI)-1 software build. Prepared and completed documentation in preparation for the DRR. Conducted GBI Critical Design Review (CDR). Conducted RRFs-7, 8, 9 and 10. Conducted In Flight Interceptor Communication System (IFICS) hardware CDR. • 5675 Sensor Technology: Continued development of Infrared Radar (IR) Focal Plane, cryogenic, rad hard electronics and rad hard filters effort. Achieved a break through in cutoff wave lengths for Mercury Cadmium Telluride (MCT) focal planes. Continued development of a rad hard readout for focal planes. Continued development of an improved high efficiency cryocooler. Progress in fabricating rad hard memories, analog to digital converters and filters continued. • 26421 GBI: Conducted IFT-3 and provided support for the NMD IFT-4 and IFT-5. Supported IGT-5. Developed tactical CLE Build 1 and Build 2. Supported pre-mission testing. Completed silo upgrade at KMR. Conducted IV&V and VV&A assessments. Supported assessment GBI CDR. Conducted production planning. • 23705 BM/C3: Conducted BM/C3 engineering and integration activities to support BM/C3 development by the NMD Prime Contractor. Provided technical oversight for capability increment-3A to support IFTs-4 and 5 in 2Q and 4Q, FY 2000, and BI-1 to support the NMD DRR. Supported IGT-5 and IFTs-4 and 5. Completed IFICS Prototype integration at KMR. Supported and coordinated Cheyenne Mountain Operations Center (CMOC) integration planning. Provided technical oversight of the procurement of the NCN. Conducted IV&V and VV&A assessments. Initiated support for production, fielding and deployment of the BM/C3 Element including integration with Cheyenne Mountain Operations Center (CMOC) and Integrated Tactical Warning and Attack Assessment (ITW/AA). • 28060 XBR: Participated in IFT-4 and IFT-5 with GBR-P on-line, and the Radar Credible Target-2 mission (RCT2) and IFT-5 with GBR-P in-line. Completed system segment specification test and evaluation for government acceptance of GBR-P. Completed necessary requirements to provide GBR-P as Government Furnished Property to Prime Contractor. Transitioned GBR-P contract management from the XBR Program Office to the Prime Contractor. Conducted Preliminary Design Review (PDR) and Intermediate Design Review (IDR) for Capability 1 (C1) XBR. Conducted IV&V and VV&A assessments. • 10355 UEWR: Continued to support UEWR development activities and preparation for the critical NMD milestones, including the Integrated System Test (IST) and DRR. Continued to participate in and support the Real Time Defense Information Infrastructure – Common Operating Environment (DII-COE) Technical Working Group/Integrated Product Team (TWG/IPT). Supported system flight and ground test planning, execution and limited post-test independent analysis. Supported evaluation of algorithms and integration into the deployable system. Supported discussion of issues with radars located on foreign soil. Supported integration of legacy systems with existing missions. 		
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• 28008	System Engineering: Continued engineering and integration activities at the system level. Assessed and refined user requirements (CRD, ORD and CONOPs). Transitioned to C1 Expanded program and continued requirements refinement (NMD System Requirements Document (SRD)) for C1 Expanded and Long Term, Capability 2 (C2) and Capability 3 (C3) Program. Continued identification and mitigation of system risk and implementation of CAIV and other initiatives to facilitate system affordability. Developed single integrated C1/C2 NMD System Cost Analysis Requirements Document (CARD) and C1 Expanded addendum consistent with system technical requirements. Conducted NMD System Engineering IDR in 3Q, FY 2000 and supported the DRR. Updated the NMD System Threat Assessment Report (STAR). Developed/updated detailed threat "design-to" and "analyze-to" parameters and scenarios. Conducted C2Sim exercise and tabletops. Continued integration with the SBIRS Program Office to ensure the satisfaction of NMD program requirements. Performed nuclear environment calculations/requirements verification. Conducted data fusion/system discrimination development. Coordinated system VV&A and continued to maintain IV&V capability to perform system VV&A. Conducted follow-on NMD architecture studies.	
• 28417	Deployment & Sustainment: Implemented the system level acquisition logistics strategy and analysis process that enabled the Government to properly oversee and assess the Prime Contractor's planning and execution of its acquisition logistics program. Continued development of the initial NMD System sustainment program planning. Published the NMD Integrated Development Plan (IDP) and the NMD Capstone Site Activation Plan (CSAP) with changes driven by the program evolution to the C1 Expanded architecture. Updated the Operational and Suitability (O&S) Assessment Report. Updated the Joint Manpower Estimate (JME) with C1 Expanded manpower impacts. Continued facility design based on impacts of C1 Expanded. Supported design reviews of XBR and GBI weapons Sites. Issued request for proposal for construction contract for XBR. Initiated design of IFICS Data Terminals (IDTs) and supported standard design process. Prepared advance planning/pre-award documentation for future award of NMD System deployment construction contracts. Conducted public hearings on the EIS at the candidate interceptor and radar sites. Continued NEPA environmental compliance process, including additional actions necessary for C1 Expanded deployment. Completed NMD Deployment EIS and continued preparation of other ESH documents required for system development and deployment. Completed Alaska Siting Study and North Dakota and IFICS Data Terminal (IDT) Addenda. Initiated the Site Activation Command (SAC) planning. Evaluated the Industrial Base's ability to achieve C1 Expanded Deployment. Developed and issued System Producibility and Manufacturing (P&M) Plans updated for the C1 system architecture and subsequently updated them for C1 Expanded. Implemented a System Safety Program Plan. Provided and managed GFP, GFF and GFS. This included the EKV Checkout Facility and the GBI IATC. Implemented an approach to meeting TTEC requirements. Reviewed MPT issues and ensured MPT is on track and ready to support IC. Developed SAC missions and functions, organization, staffing, equipment, and administrative communications requirements, funding profiles, operations manual, and initiated the manning process.	
• 144846	System Test and Evaluation: Supported IGT-5 at the ISTC. Updated TEMP with support of the NMD System Test and Evaluation (T&E) IPT. Completed program documentation, pre-mission flight tests for IFT-4 and IFT-5, pre-launch preparations and oversee execution of IFTs-3, 4, and 5, RRFs-7, 8, 9, and 10, and a target of opportunity at Kodiak. Evaluated post-test results to support DRR data gathering. Completed VV&A of IFT 6 targets and accredited the ISTC. Implemented lethality and live fire testing plan. Coordinated test range infrastructure and upgrades to support EKV flight test from KMR. Coordinated test range instrumentation upgrades and provide data collection and analysis for NMD testing. Conducted target launches for IFTs-3, 4, and 5 from Vandenberg AFB (VAFB). Conducted Orbital Sub-Orbital Program (OSP) demonstration flight of new targets launch program. Developed and procured backup target Multi Service Launch System (MSLS).	
• 163338	Management and Operational Support: Continued providing management analysis and support for overhead/indirect fixed costs.	
Total	944922	

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<p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 1439920 NMD Development/Integration: Prepare for Defense Acquisition Board (DAB) review. Conduct NMD System CDR. Conduct C2 System Readiness Review (SRR). Conduct IFT-6. UEWR software releases 5 & 6 will be implemented. A BI-2 (BM/C3) Readiness Review will be conducted. Participate in the NMD integrated system test IFT-6 with GBR-P in-line. Continue COTS booster development. Conduct Booster Verification (BV) Flight Test 2. Continue XBR and EKV algorithm upgrade. Continue to work integration with legacy systems and other missions. Accomplish close out of the LSI contract and initiate new NMD Prime contract with Boeing. Restructure NMD development program to a capabilities based block/increment upgrade effort incorporating spiral development concept. Plan for an increased flight test tempo and add multiple engagements. • 5900 Sensor Technology: Deliver Lot 3 (final) FPAs of LWIR focal plane program. Initiate a focal plane producibility effort to support fabrication of flight units and reduce manufacturing costs. Continue Silicon FPA program for SBIRS Low. Continue visible array rad hard star tracker program; continue FPA performance testing. Complete cryocooler efforts through life and performance testing. Continue development of cryogenic integration technologies in cooperation with SBIRS Low contractual designs. Continue performance and life testing of cryocoolers. Continue development of cryocooler prototype. Continue development of rad hard electronics components/devices. Flight test a space optics cleaner prototype and finalize the design. Support continued development of adaptive algorithms. • 30500 GBI: Continue oversight of GBI design development, integration and test, test planning, and deployment planning. Monitor EKV flight unit integration for IFT-6, and pre-mission flight tests. Support IFT-6, including post test data reduction. Conduct IV&V and VV&A assessments. Oversee Alternate Boost Vehicle development activities. Support BV Flight Test 2, and post test data reduction. • 20900 BM/C3: Oversee provision of BI-1 to support Integrated System tests. Support IFT-6, and IGT-6. Continue technical oversight of engineering and acquisition activities for NCN. Conduct IV&V and VV&A assessments. Support initiation of Cheyenne Mountain integration and provide user interaction with United States Space Command (USSPACECOM). Support BM/C3 participation in C2 Simulations and Battle Planning Exercises. Continue support for production, fielding and deployment of the BM/C3 Element • 22800 XBR: Validate XBR hardware and software design. Support system flight and ground test planning, execution, and post-test independent analysis. Support evaluation of algorithms and integration into the deployable system. Conduct SW IV&V and VV&A assessments. Complete CDR and DAB Review. Provide Government oversight of the Prime Contractor XBR final design and preliminary software development. • 9700 UEWR: Continue Real Time DII-COE evaluation for UEWR. Support system flight and ground test planning, execution, and limited post-test independent analysis. Support evaluation of tracking and object classification algorithms and their integration into the deployable systems software and hardware. Support discussion of issues with radars located on foreign soil as well as activities associated with EWR's Environmental Impact Statement (EIS), Radio Frequency Interference (RFI), and Ionospheric Data Collections (IDC). 		
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• 28800	System Engineering: Continue JPO level system engineering and integration activities. Assess and refine user CRD, ORD, and CONOPs. Continue requirement refinement for NMD SRD. Support DAB review. The System Engineering Team will continue to provide comprehensive support for major NMD program milestones, NMD system requirements and design reviews, internal and external interface development/implementation cost assessment support, elevation of deployment readiness, and system deployment. Continue mitigation of system risk and implementation of CAIV and other initiatives to facilitate system affordability. Develop and update Initial Block and Block 1 Increment 1 NMD System CARD and develop Long Term capability annex against technical requirements. Conduct System CDR and C2 SRR. Update the NMD STAR. Develop/update detailed threat "design-to" and "analyze-to" parameters and scenarios. Conduct C2Sim exercise and tabletops. Continue integration with the SBIRS Program Office to ensure satisfaction of NMD system requirements. Perform nuclear environment calculations/requirements verification. Conduct data fusion/system discrimination development. Coordinate system VV&A and maintain IV&V capability to perform system VV&A.	
• 45700	Deployment & Sustainment: Implement the acquisition logistics strategy and analysis process which enables the Government to properly assess the Prime Contractor's acquisition logistics program. Continue development of the initial NMD System sustainment program planning to include maintenance and supply support for the C1 Expanded architecture. Complete XBR and GBI facility designs. Issue Request for Proposal (RFP) for Construction contracts for XBR and GBI. Complete site-specific designs of IDT. Begin design of non-tactical facilities at GBI site. Continue ESH documentation. Complete element RAM and supportability testability data and issue analysis reports. Provide Human System Integration (HSI) domain assessment criteria to service components for review. Elevate Independent HSI Domain Assessment Reports to JPO risk management IPT, identifying cost, schedule, and performance concerns, issues, and recommended risk mitigation. Develop and issue System Producibility and Manufacturing (P&M) Plans updated for C1 expanded architecture. Implement the baseline approach to meeting TTEC requirements. Ensure MPT is on track and ready for IC. If so directed, activate and staff the SAC and oversee the site preparation for the missile field at Ft. Greely.	
• 115100	System Test and Evaluation: Support IGT-6. Update TEMP with support of the NMD System T&E IPT. Complete program documentation, pre-mission flight for IFT-6, pre-launch preparations and oversee execution of IFT-6. Evaluate post-test results. Oversee RRFs. Conduct pre and post-mission work. Complete VV&A of IFT-8 target. Continue lethality and live fire testing plan. Coordinate test range infrastructure and upgrades to support EKV flight test from KMR. Coordinate test range instrumentation upgrades and provide data collection and analysis for NMD testing. Conduct target launch for IFT-6 from VAFB. Oversee BV Flight Test 2. Provide ground facility infrastructure and upgrades for NMD testing including: aerothermal testing at Tunnel 9, lethality testing at the Arnold Experimentation and Development Center (AEDC) Range G, and Infra-Red (IR) sensor testing at the 7V/10V Chamber at AEDC and Portable Optical Sensor Tester (POST).	
• 134207	Management and Operational Support: Continue providing management and support for overhead/indirect fixed costs.	
Total	1853527	

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B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001 PB)	950248	1740238		
Adjustments to Appropriated Value				
Appropriated Value				
a. Congressional General Reductions		-21361		
b. STTR				
c. Internal Reprogramming	-5326			
d. Omnibus or Other Above Threshold Reductions				
e. Congressional Add		135000		
f. Adjustments to Budget Years Since FY 2001 PB		-350		
Current Budget Submit (FY 2002 PB)	944922	1853527		

Change Summary Explanation:

This program has been restructured and transitioned to Program Element 0603882C starting in FY 2002.

Funding: FY 2000 – BMDO Internal Reprogramming.

FY 2001 – Congressional Add and Congressional reductions (\$-13098 General Reduction, \$-4188 Section 8186, and \$-4075 Section 1403).

Schedule: IFT-3 moved from 3Q FY 1999 to 1Q FY 2000

IFT-4 moved from 4Q FY 1999 to 2Q FY 2000

IFT-5 moved from 3Q FY 2000 to 4Q FY 2000

IFT-6 moved from 4Q FY 2001 to 3Q FY 2001

C. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
PE 0603871C NMD MILCON Design	16000	14500								
PE0603871C NMD MINOR MILCON		2000								
PE 0603871C NMD MILCON Construction		84880								
PE 0208871C NMD Procurement		73845								

D. Acquisition Strategy: The NMD program is adopting an evolutionary acquisition strategy using a capability based program process. This involves transitioning the program to a more robust development and test program with the capability for a threat based block upgrade development that can deliver specific levels of system performance. To accomplish this, the program will adopt a spiral development methodology in the development of the NMD system. This methodology has been selected in recognition of the rapidly changing technology environment and the need to satisfy Government requirements that are defined in general terms within an evolving technology base. This process will (1) allow early implementation of a capability while supporting an evolving requirement/threat definition process, (2) minimize the risks of obsolescence posed by the rapid pace of technology development, (3) provide opportunities to update a system to a changing set of standards, and (4) allow informed

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trades between cost, schedule, and performance while exploring operational possibilities. The development program is structured with several new initiatives to address some of the issues raised prior, and subsequent to the DRR. These include (1) initiating a countermeasures mitigation program and developing capabilities to resolve issues with likely countermeasures, (2) adding test infrastructure and improving test management to allow more operationally challenging representative flight tests and providing for more testing against more challenging targets, and (3) increasing the fidelity of the system simulations. The program's spiral development acquisition approach calls for continuous architecture development through incremental block upgrades that support update cycles of approximately four years for system hardware and two years for software.

E. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
<u>Engineering Milestones</u>								
a. NMD DRR	3Q							
b. GBI CDR	4Q							
c. BM/C3 IFICS H/W CDR	4Q							
d. Site Environmental Impact Study Complete	4Q							
e. Site Design Complete	3Q							
<u>Test and Evaluation Milestones</u>								
f. C2Sim 99	1Q							
g. C2Sim 00		1Q						
h. IFT-3	1Q							
i. IFT-4	2Q							
j. IFT-5	4Q							
k. IFT-6		3Q						
l. IGT-5	1Q							
m. IGT-6		3Q						
n. BV-1 Pathfinder		3Q						
o. BV-2		4Q						
p. BM/C3 Build Increment 1	2Q							
q. BM/C3 Build Increment 2		2Q						
r. RRF-11		2Q						
<u>Contract Milestones</u>								
s. GBR-P Contract Transition	4Q							

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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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* This project this program has been restructured and transitioned to Program Element 060xxxxC starting in FY 2002.

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Prime Contractor												
	CPAF	Boeing*	1853139	1439920	N/A							
GBI												
	CPFF	Raytheon	277490		N/A							
	CPFF	Boeing	292994	200	N/A							
	CPIF	Lockheed	239144		N/A							
	TM	NRC	16926	6910	N/A							
	CPFF	Sparta	8765	1989	N/A							
	TM	Mevatec	9264	7128	N/A							
	CPFF	SY TECH	6448	424	N/A							
	TM	TBE	22945	3299	N/A							
	CPFF	Stone Engineer	4398	1726	N/A							
	CPFF	Tybrin	100		N/A							
	CPFF	COLSA	5	5	N/A							
	CPFF	Various	214	0	N/A							
	MITRE	Eng/Tech Spt	240	243	N/A							
	MIPR	OGA'S	33932	1866	N/A							
	N/A	GBI IOB	0	6363	N/A							
	N/A	Misc Contracts	20344	347	N/A							
BM/C3												
	N/A	NWSC	10344	1900	N/A							
	CPAF	TRW	16612	4090	N/A							
	FFRDC	MITRE Corp.	11790	1610	N/A							
	BPA (ITSP)	Sencom (ITSP)	7114	532	N/A							
	CPFF	Sparta	8857	3840	N/A							
	TM	NRC	6310	1700	N/A							
	MIPR	GFE	1288	1800	N/A							
	N/A	Misc Contracts	7639	1086	N/A							
	CPAF	CST-HSV	798	520	N/A							
	MIPR	QRI-HSV	942	962	N/A							

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4 - Demonstration and Validation

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	CPAF	CSC-HSV	174	984	N/A						
	MIPR	AMCOM	1313	380	N/A						
	MIPR	USASMDC	2717	680	N/A						
	CPFF	GBS	650	30	N/A						
	CPFF	COLSA		65	N/A						
	CPAF	Vanguard Res.	1180	236	N/A						
	BPA	TECOLOTE	290	170	N/A						
	MIPR	USAF ESC		65	N/A						
	MIPR	ARL	1000	250	N/A						
XBR											
	CPFF	Raytheon	164361		N/A						
	CPAF	TBE	13747	3100	N/A						
	CPAF	COLSA	17311	1351	N/A						
	CPAF	NRC	7264	1580	N/A						
	MIPR	MIT LLNL	13750	1630	N/A						
	TM	Ga Tech	3641	1903	N/A						
	TM	Mevatec	3002	5000	N/A						
	N/A	Misc OGA/IOB	15081	6525	N/A						
	N/A	Other Spt	5736	1711	N/A						
UEWR											
	PR	MITRE Corp.	16530	4231	N/A						
	BPA (ITSP)	SENCOM	6288	2751	N/A						
	BPA (ITSP)	TECOLOTE	1481	0	N/A						
	MIPR	GSA (FEDSIM (STA))	497	0	N/A						
	BPA (ITSP)	STA	156	0	N/A						
	CPR/PR	MIT LLNL	2284	350	N/A						
	CPAF/MIPR	TRW @ JNTF	833	600	N/A						
	MIPR	GSA (PRC)	900	0	N/A						
	MIPR	GSA (AFRL)	200	140	N/A						
	N/A	Misc Contracts	4867	778	N/A						
	MIPR	GSA (Xontech)	0	400	N/A						
	TBD	IV&V	0	450	N/A						
SENSOR TECHNOLOGY											
	N/A	Cubic	365		N/A						

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	CPAF	Ball	50		N/A								
	CPFF	Raytheon	1309	262	N/A								
	N/A	Phillips	1687		N/A								
	MIPR	AFRL	6483	1736	N/A								
	CPFF	TRW	116		N/A								
	CPAF	Dynacs	317	63	N/A								
	CPFF	Swales	977	195	N/A								
	CPAF	Ball	3654	731	N/A								
	CPAF	Ball	255	51	N/A								
	CPFF	Raytheon	3964	793	N/A								
	CPAF	Rockwell	4320	864	N/A								
	N/A	USASMDC	4618	924	N/A								
	CPFF	NRC	220	44	N/A								
	N/A	MRC	1186	237	N/A								
	MIPR	SPAWAR	410		N/A								
	N/A	TBE	95		N/A								
	N/A	ADI	400		N/A								
	N/A	Raytheon	280		N/A								
	Subtotal Product Development:		3174872	1529320									

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING												
	CPFF	BMD/CSC	107438	15500	N/A							
	N/A	SMDC	7574		N/A							
	N/A	JNTF	18188	1110	N/A							
	N/A	DTRA	6415	1520	N/A							
	N/A	USAF/SMC/SBIRS	4640	4800	N/A							
	N/A	NSWC	5817	2800	N/A							
	N/A	Threat and CM	3797	0	N/A							
	MIPR	MIT LLNL	8200	3000	N/A							

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BUDGET ACTIVITY							June 2001	
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				0603871C NMD			2400	
	MIPR	Misc/POET	1567	70	N/A			
DEPLOYMENT & SUSTAINMENT PLANNING (R&D)								
	MIPR	NIST	7263		N/A			
	N/A	USAF/SMC	21215		N/A			
	CPFF	CSC	22430	12405	N/A			
	CPFF	TBD	2610		N/A			
	TBD	Mis Contracts	11112					
	CPFF	Nichols		4937	N/A			
	CPFF	COLSA		20	N/A			
	CPFF	MEVATEC		1310	N/A			
	MIPR	AMCOM		4434	N/A			
	MIPR	USAC	3292	9657	N/A			
	MIPR	USA War College		1384	N/A			
	MIPR	USASMDC	4000	3192	N/A			
	MIPR	Schreiver AFB	0	500	N/A			
	MIPR	HQ AFCEE		1062	N/A			
	MIPR	DOD Joint Spectrum C.		412	N/A			
	MIPR	Hill AFB		200	N/A			
	MIPR	NSA		400	N/A			
	MIPR	USACECOM		50	N/A			
	MIPR	ARSPACE		783	N/A			
	MIPR	Alaskan Air Comm.		454	N/A			
	MIPR	611 th ASG/FMA		4500	N/A			
MANAGEMENT AND OPERATIONAL SUPPORT								
	CPAF/CPFF	CSC	142725	40224	N/A			
	N/A	SFAE-MD/NMD ANAL	88580	4768	N/A			
	N/A	GOVT PERS	14100	6000	N/A			
	N/A	Misc RES.	9331		N/A			
	N/A	USSPACECOM	4946		N/A			
	N/A	TSM (SMDC)	11774	12400	N/A			

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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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	N/A	Operational accounts	165760	43207	N/A							
	N/A	GOVT PERS (HSV)	5710	21608	N/A							
	TBD	CS Radar	0	6000	N/A							
DISCRIMINATION												
	CPFF via NRL	PRA	18332	0	N/A							
SYSTEM ARCH AND ENGINEERING												
	N/A	Misc Contracts	13269									
THREAT AND COUNTERMEASURE												
	N/A	Misc Contracts	4194	0	N/A							
Subtotal Support Costs:			714279	208707								

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
TEST AND EVALUATION												
	CPAF/TM	TBE	44912	0	N/A							
	CPFF	COLSA	49883	6016	N/A							
	N/A	Dynetics		486	N/A							
	CPFF	Boeing	10000	841	N/A							
	CPFF	Raytheon	7400	0	N/A							
	CPAF	TRW	246	0	N/A							
	CPFF	Raytheon	2900	0	N/A							
	CPAF	SAIC	2331	0	N/A							
	CPAF	Nichols	5126	1954	N/A							
	MIPR	USAKA	36839	8713	N/A							
	FFRDC/MIPR	Sandia	4147	47	N/A							
	OGA/MIPR	USASMDC	4383	841	N/A							
	OGA/MIPR	JNTF	1999	308	N/A							
	OGA/MIPR	NRL	1971	0	N/A							
	N/A	Misc Contracts	71851	0	N/A							
	MIPR	VAFB	2208	785	N/A							
	TM	MEVATEC	5396	3823	N/A							

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4 - Demonstration and Validation							June 2001	
BUDGET ACTIVITY				PE NUMBER AND TITLE			PROJECT	
4 - Demonstration and Validation				0603871C NMD			2400	
MIPR	Space&Msl Cmd	327	0	N/A				
CPFF	Lockheed MMS	3020	0	N/A				
CPFF	CAS	748	1358	N/A				
CPFF	SY TECH	965	280	N/A				
OGA/MIPR	SBIRS SPO	2831	202	N/A				
MIPR	AMCOM	2914	831	N/A				
MIPR	USARSPACE	1020	420	N/A				
MIPR	Eglin AFB	1922	1214	N/A				
N/A	SATCOM	960	402	N/A				
OGA/MIPR	OGAs	2868	19	N/A				
N/A	RTTC		428	N/A				
N/A	VRC	3320	2083	N/A				
N/A	EAC	500	327	N/A				
N/A	TEXCOM	780	364	N/A				
N/A	HRED	240	336	N/A				
N/A	SLAD	870	224	N/A				
N/A	CEI	3000	1690	N/A				
N/A	COLSA	680	243	N/A				
N/A	TRW	3540	1690	N/A				
N/A	Various OGA'S	1516	196	N/A				
N/A	SAIC	1324	749	N/A				
N/A	MIT LLNL	4480	2279	N/A				
N/A	ITT	1659	872	N/A				
N/A	AEDC	3675	518	N/A				
N/A	SANDIA	5935	2900	N/A				
N/A	MEVATEC	135	70	N/A				
N/A	TBE	876	879	N/A				
N/A	SMDC	123	87	N/A				
N/A	Nichols	10		N/A				
NMD TARGETS								
FFRDC/MIPR	Sandia	97702	40828	N/A				
OGA/MIPR	USASMDC	11824	5110	N/A				
OGA/MIPR	SMC	68910		N/A				

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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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	OGA/MIPR	SY TECH		2083	N/A							
	MIPR	MIT LLNL		2335	N/A							
	N/A	USASMDC	1454	5291	N/A							
	N/A	Various OGA'S	3675	14978	N/A							
MODELLING AND SIMULATION												
	N/A	USASMDC	3890		N/A							
TEST RESOURCES												
	N/A	Misc Contracts	15474		N/A							
Subtotal Test and Evaluation:			504759	115100								

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.				0		0		0				
Subtotal Management Services:												

Remark:

Project Total Cost:			4393910	1853527								
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Remark:

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