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

DATE: February 2002

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603175C BMD Technology

| 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 | 139340 | 121751 | 155056 | 130299 | 142785 | 147457 | Continuing | Continuing |
| 6010 Advanced Technology Development | 0 | 136561 | 118884 | 151421 | 125973 | 138348 | 139989 | Continuing | Continuing |
| 6090 Program Operations | 0 | 2779 | 2867 | 3635 | 4326 | 4437 | 7468 | Continuing | Continuing |

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

The flow down of BMD System (BMDS) capability specifications resulting from Missile Defense National Team efforts in BM/C2 and Systems Engineering & Integration will guide the integration of Ballistic Missile Defense (BMD) Technology into the BMD System, the BMDS BM/C2 architecture, and the BMDS testbed. By investing in innovation, advanced technology development enhances the Missile Defense Agency (MDA)'s capability-based acquisition strategy that emphasizes testing, spiral development, and evolutionary acquisition through the use of two-year capability blocks.

BMD Technology program is established to develop components, subsystems and new concepts needed to keep pace with the constantly evolving ballistic missile threat. Investments provide new capabilities for block upgrades to current BMDS elements as well as develop the enabling technology for new concepts and BMDS elements.

Many of today's baseline BMD projects are viable due to the wise investment in technology research, development and maturation. Examples include: the Lightweight Exoatmospheric Projectile (LEAP), indium antimonide and mercury cadmium telluride ultra-sensitive infrared detectors; 32-bit radiation hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for lightweight satellite structures; interferometric fiber-optic gyroscopes for miniaturized guidance and control projects; and solid-state gallium arsenide transmitter/receivers for advanced missile defense radars; and dual wavelength passive imaging for BMD test missions.

Advanced technology development is organized around five main thrusts, four of which are oriented to the BMDS segments. The thrusts cluster technology tasks that have a synergistic effect in the three phases of a ballistic missile's flight as well as pushing for an ever-greater geographic coverage of the BMD system for maximum military utility and cost optimization. The first thrust, Terminal Missile Defense, continues investment in atmospheric interceptor technology needs for terminal missile defenses and introduces a novel concept for long range atmospheric defense. The second thrust, Midcourse Counter-Countermeasures, builds on the previous program of developing an interceptor seeker using fused active and passive sensors for defeating sophisticated penetration aids anticipated in future threats. It adds new projects to discriminate between penaids and targets by improved ground-based radar projects, directly perturbing the objects and attacking multiple objects in midcourse by using miniature kill vehicles. The third thrust, Boost-Phase Intercept (BPI), provides a modest investment in novel early launch detection concepts and advanced high energy laser projects as risk reduction to the technical challenges of detecting and engaging a missile launch as early in its trajectory as possible. The final thrust, Global Defense, seeks to enhance the ability to provide continuous, global surveillance and precise tracking over very long ranges. Passive surveillance from space, that can quickly detect launches under all conditions and establish precise tracking, are crucial for boost phase and early midcourse intercepts.

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A number of technology activities, grouped in the Enabling Technology Support thrust, provide technology outputs that are applicable across multiple technology thrust areas. These activities are essential for robust, effective missile defense projects. Enabling Technology Support includes advanced technology development efforts in the multi-application areas of radar; focal plane arrays; materials, structures and power; space experiments; and engineering analysis. Enabling Technology Support also provides the only applied research efforts in the DoD which focus specifically on future BMD technical requirements. To prepare to meet critical future active defense needs, the efforts include an aggressive program of high-leverage technologies that yield markedly improved capabilities across a selected range of boost, midcourse, and terminal defense interceptors, advanced sensors, and innovative science. The Innovative Science and Technology (IS&T) activity invests seed money in high-risk technologies that could significantly change BMD development. This activity conducts proof-of-concept research and matures novel technologies for transition to advanced technology development. The objective of the Technology Applications (TA) Program is to develop and support the transfer of BMD-derived technology to other DoD agencies as well as other federal, state, and local government institutions, laboratories, universities, and industry. Incorporation of technology applications by the private sector and other government agencies can result in reduced unit costs, accelerated technology maturity and reliability and further improvements to future MDA applications.

Incrementally fund Historically Black Colleges and Universities / Minority Institutions (HBCU/MI) contracts in the areas of electronics, sensors, materials, and BMC3.

This project executes directed interest activities that complement the baseline advanced technology development program, but are not sufficiently relevant to be included in that program.

Program Operations: Covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at MDA'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. Also, includes reimbursable services acquired through the Defense Working Capital Fund (DWCF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS), as well as funding for charges to canceled appropriations in accordance with Public Law 101-510.

**FY 2001 Accomplishments:**

| | | |
|---|---|---|
| • | 0 | Prior efforts funding in 0602173C and 0603173C PEs |
| Total | 0 | |

**FY 2002 Planned Program:**

| | | |
|---|---|---|
| • | 6205 | Terminal Missile Defense: Initiate advanced development of advanced technology interceptor component addressing: extending the footprint for upper-tier BMD systems. |
| • | 55291 | Midcourse Counter-Countermeasures: Initiate advanced development of discriminating seeker components including multicolor focal plane arrays and laser radars. Initiate advanced development of transportable discriminating radar and miniature kill vehicle concepts. |
| • | 4964 | Boost-Phase Intercept: Initiate advanced development of early launch detection concepts and enhanced boost phase high energy laser systems. |

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- 11170 Global Defense: Continue advanced development of space-based passive surveillance component technologies. Initiate development of advanced concepts for airborne sensors and weapons.
- 26777 Enabling Technology Support: Initiate advanced development and applied research of radar, focal plane arrays, MS&P analysis; and other enabling technologies, concepts and processes. Use leveraging of commercial investment to advance the development and maturity of technologies to be used by BMD systems.
- 3954 Incrementally fund an estimated 10 Historically Black Colleges and Universities / Minority Institutions (HBCU/MI) contracts in the areas of electronics, sensors, materials, and BMC3 selected in FY01 competition. Continue to provide assistance to large, medium, and small businesses bringing BMD supported technology to the commercial market through the TA program and other mechanisms.
- 28200 Directed interest activities.
- 2779 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, and supplies.

Total 139340

**FY 2003 Planned Program:**

- 7092 Terminal Missile Defense: Continue with the advanced development of advanced technology interceptor component addressing: extending the footprint for upper-tier BMD systems.
- 60279 Midcourse Counter-Countermeasures: Continue with the advanced development of discriminating seeker components including multicolor focal plane arrays and laser radars. Continue with the advanced development of transportable discriminating radar, miniature kill vehicle, and interactive discrimination concepts.
- 8274 Boost-Phase Intercept: Continue with the advanced development of early launch detection concepts and enhanced boost phase high energy laser systems.
- 14183 Global Defense: Continue with the advanced development of space-based passive surveillance component technologies. Continue development of advanced concepts for airborne sensors and weapons.
- 25299 Enabling Technology Support: Continue with the advanced development and applied research of radar, focal plane arrays, MS&P analysis; and other enabling technologies, and concepts
- 3757 Incrementally fund an estimated 10 Historically Black Colleges and Universities / Minority Institutions (HBCU/MI) contracts in the areas of electronics, sensors, materials, and BMC3 selected in FY2001 competition. Continue to provide assistance to large, medium, and small businesses bringing BMD supported technology to the commercial market through the TA program and other mechanisms.
- 2867 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, and supplies.

Total 121751

| B. Program Change Summary | FY 2001` | FY 2002 | FY 2003 |
|---|---|---|---|
| Previous President's Budget (FY 2002 PB) | | 112890 | |
| Appropriated Value | | 112890 | |
| Adjustments to Appropriated Value | | 28200 | |

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| | | | |
|---|---|---|---|
| a. Congressional General Reductions | | -1750 | |
| b. SBIR / STTR | | | |
| c. Omnibus or Other Above Threshold Reductions | | | |
| d. Below Threshold Reprogramming | | | |
| e. Rescissions | | | |
| Adjustments to Budget Years Since FY 2002 PB | | | 121751 |
| Current Budget Submit (FY 2003 Budget Estimates) | | 139340 | 121751 |

| C. Other Program Funding Summary | | FY 2001 | FY 2002 | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0603173C – Advanced Technology Development | | | 0 | | | | | | CONT | CONT |
| 0602173C – Applied Research | | | 0 | | | | | | CONT | CONT |
| 0603880C - BMD System | | | 807993 | 1065982 | 1208546 | 1157025 | 1139885 | 1176979 | CONT | CONT |
| 0603881C - Terminal Defense Segment | | | 200119 | 169974 | 200171 | 234318 | 228443 | 367744 | CONT | CONT |
| 0603882C - Midcourse Defense Segment | | | 3762250 | 3192594 | 3071581 | 3016343 | 2969142 | 2595708 | CONT | CONT |
| 0603883C - Boost Defense Segment | | | 599835 | 796927 | 1389817 | 1399902 | 1591160 | 2274654 | CONT | CONT |
| 0603884C – Sensors Segment | | | 335338 | 373447 | 489181 | 1145680 | 899806 | 1007660 | CONT | CONT |