Statement of Lieutenant General Malcolm R. O'Neill, USA, Director, Ballistic Missile Defense Organization before the Committee on National Security, House of Representatives, March 7, 1996.

Mr. Chairman and Members of the Committee, it is my privilege to appear before you today to present the Department's Ballistic Missile Defense (BMD) program and budget for Fiscal Year 1997.

As you are aware, the Department has recently completed the BMD Program Review, which was conducted by Dr. Paul Kaminski the Under Secretary of Defense for Acquisition and Technology. The Program Review established specific guidance for the BMD program over the next several years. The most significant result of the review was a reaffirmation of the Department's fundamental priorities for missile defense. The first priority remains defense against theater-class ballistic missiles, which represent a threat that is here and now. This next priority is to develop the capability to defend against longer-range ballistic missiles that could threaten the U.S. after the turn of the century. Finally, technology base programs to support both TMD and NMD round out the Department's BMD program.

Fiscal Year 1997 Program and Budget

The total Fiscal Year 1997 budget request for BMD is $2.798 billion. The Department is requesting $1.794 billion for Theater Missile Defense (TMD) RDT&E, and $268 million for TMD procurement efforts. The National Missile Defense (NMD) Deployment Readiness RDT&E program is budgeted for $508 million. Support Technologies budget request is for $226 million. Table A provides a detailed perspective on funding for Fiscal Years 1996 and 1997. Of the total BMD budget request for Fiscal Year 1997, TMD accounts for roughly 74 percent, NMD 18 percent and Technology 8 percent. This is presented on Table B.

As the Committee is aware, BMDO leads the Department of Defense team that executes the BMD program. My staff and I work closely and cooperatively with the Services as we seek to develop and acquire BMD systems. In this regard, BMDO interacts with the CINCs to ensure that as we develop BMD systems we respond to the specific needs of the warfighter. BMDO works closely with the Service Program Executive Officers (PEOs) to execute key BMD acquisition programs and put real capability into the hands of our military forces. Table C illustrates the important role the Military Services play in executing various segments of the BMD program. Using the total Fiscal Year 1997 dollars allocated to the Services and BMDO for BMD programs, you can see that the Army executes roughly 60 percent of the BMD programs, while BMDO executes 17 percent, the Navy 16 percent, the Air Force 5 percent, and other Defense entities 2 percent. The important lesson to draw from these percentages is that the BMD program is a joint program that requires well-coordinated management and execution. We strongly benefit from the Services' technical and programmatic expertise. Meanwhile, BMDO ensures that BMD programs are advocated during budget debates; prevents duplication of BMD program efforts across the Services; sponsors joint development of BMD systems; ensures focus on joint warfighter needs; and concentrates on near-term acquisition programs while judiciously investing in far term technologies. Of special significance, BMDO is responsible for designing the appropriate battle management, command, control and communications that will ensure BMD systems are fully integrated. I am pleased to report that this approach to BMD program management has succeeded in

combining the strengths of the Services and BMDO, which enable us to develop and acquire improved BMD systems and further develop critical military technologies.

Theater Missile Defense: Priority to Field Improved Defenses

The TMD program continues to focus on three sequential efforts to bring increasingly capable defenses to the warfighter. First, we have completed our near-term improvements to existing air and missile defense systems to allow them to defend against short-range tactical ballistic missiles. Prime examples of this activity are deployments of Patriot PAC-2 Guidance Enhanced Missiles (GEM) and U.S. Marine Corps HAWK Upgrades. Our tests have shown that a modified TPS-59 radar combined with the HAWK missile system is effective against short range ballistic missiles. Delivery of the upgraded systems to operational Marine Corps units will continue during this fiscal year. This program delivers a real military capability against the short range missile threat for a modest investment. Last year, we began producing the PAC-2 GEM system for the Army as the principal improvement to our existing TMD capability until the PAC-3 system begins deployment in Fiscal Year 1999. The PAC-2 GEM improvements increase the PATRIOT's defended area and improves its lethality over its capabilities during Operation Desert Storm. The GEM's improved seeker performance allows the interceptor to more precisely locate the target missile. Meanwhile, a faster reacting warhead fuze contributes to a more optimal dispersal of warhead fragments on the target. Just as important, we have deployed significant improvements to our ability to provide early warning information of ballistic missile launches to U.S. forces overseas. Last year the Air Force activated the Attack and Launch Early Reporting to Theater (ALERT) squadron with the BMDO-developed TALON SHIELD system at Falcon Air Force Base, Colorado. The Joint Tactical Ground System (JTAGS), also developed by BMDO, is a complementary tactical mobile DSP ground station for use in the theater. The Army has deployed two prototypical units, one in Germany and one in South Korea, to support the warfighter. Five of these units will be produced and fielded in Fiscal Years 1996 and 1997.

Following these and other near-term improvements, the Department will continue efforts to develop and acquire a set of "core" TMD programs. The Department's Program Review established the TMD lower-tier systems -- the PAC-3 and Navy Area Defense programs -- as the first priority to ensure we enhance our defensive capabilities against short- to medium-range ballistic missiles as quickly as possible. We will do this by building on existing infrastructure and prior investments in ongoing programs; expanding the capabilities of the PATRIOT and AEGIS/Standard Missile systems; adding funds to deal with cost increases and development delays; exploring a concept for cooperative development with our Allies for a Medium Extended Air Defense System (MEADS); and improving our Battle Management, Command, Control and Communications (BMC3) capability.

Neither the PAC-3 nor the Navy Area Defense programs involve show-stopping technical challenges at this point. Rather, they involve engineering challenges. Nonetheless, the key issue is a matter of execution of the programs to complete the development and to field these two systems. Our task is to ensure that we have a robust program to proceed with both these systems and to field this important capability as early as possible. Therefore, the Department increased the investment in PAC-3 and Navy Area Defense to ensure that they are adequately funded to guarantee timely delivery to the warfighter. The PAC-3 program was increased by $345 million and the Navy Area Defense program by $186 million over the Future

Years Defense Plan (FYDP) through 1997-2001. These increases will allow us to begin both PAC-3 deployments and Navy Area Defense User Operational Evaluation System (UOES) deployments in Fiscal Year 1999. The mix of PAC-3 and Navy Area Defense interceptors eventually acquired to perform the lower-tier mission will depend upon their relative prices, performance and the status of the missile threat.

Patriot Advanced Capability - 3

The PAC-3 system will represent a significant upgrade to an existing air and missile defense system to specifically handle stressing theater-class ballistic missile threats. The PAC-3 system, using hit-to-kill interceptors, will be highly lethal against ballistic missiles including those with weapons of mass destruction. Improvements to the system will result in increased firepower and lethality; increased battlespace and range; enhanced battlefield awareness; and improved discrimination performance. These critical enhancements will be achieved by improvements to the missile, as well as the radar and communications systems. Operational improvements, such as remote launch operations, will also increase the battlespace and range of the PAC-3 system. These enhancements will mark a substantial improvement over our PATRIOT TMD capabilities during Operation Desert Storm.

The PAC-3 program is restructured to reduce program risk, adjust for schedule delays, and improve system performance by extending the engineering and manufacturing development (EMD) phase of the program by up to ten months; rephasing the missile and radar procurement; upgrading four launchers per battery with Enhanced Launcher Electronics Systems; and extend ing the battery's remote launch capability. The Program Review also visited the issue of the number of PAC-3 battalions to be fielded. The original plan was to deploy nine battalions. However, the review decided to field six battalions, while deferring fully upgrading the three additional battalions pending the completion of the MEADS program definition/validation phase. PAC-3 low rate initial production (LRIP) will begin the first quarter of Fiscal Year 1998, with the First Unit Equipped (FUE) date planned for the fourth quarter of Fiscal Year 1999.

Navy Area Defense

As the Committee is aware, BMDO and the Navy have been working cooperatively to develop an enhancement to the AEGIS/Standard Missile air defense system to provide a tactical ballistic missile defense capability from the sea that is comparable to the defense provided by PAC-3. This represents a critical TMD capability that can take advantage of the strength and presence of our naval forces, and build upon the existing AEGIS/Standard Missile infrastructure. Naval vessels that are routinely deployed worldwide are currently in potential threat areas or can be rapidly redirected or repositioned. A Naval TMD capability can be in place within a region of conflict to provide TMD protection for land-based assets before hostilities erupt or before land-based defenses can be transported into the theater. Our Navy Area Defense program focuses on modifications to enable tactical ballistic missile detection, tracking and engagement with a modified Standard Missile 2, Block IV.

We will use the $45 million added by Congress in the Fiscal Year 1996 Defense Authorization and Appropriations Bills to compensate for system engineering and design efforts not fully funded in Fiscal Year 1995. The Program Review added $186 million to Navy Area Defense through the FYDP in order to make it fully executable on a moderate risk profile. These funds will cover delays in risk reduction flights and

adjusted cost estimates for test targets and lethality efforts. In turn, this will minimize the delays in the EMD program and LRIP missile procurement.

Our plan is to field a UOES capability in Fiscal Year 1999 and an FUE in Fiscal Year 2001. Thereafter, operational units will use the legacy UOES system for continued testing and as a contingency warfighting capability.

Theater High Altitude Area Defense

THAAD is the more mature upper-tier system. During the Program Review, the THAAD program was adjusted to maintain track on an early deployment of a UOES capability before the end of the decade. Prior to the Program Review, its funding profile was on the order of about $700 million per year. However, it adjusted the program significantly, making outyear adjustments to our investment in the program. The Department decided to keep the UOES portion of the program on track, which will entail fielding about 40 THAAD missiles and the GBR by Fiscal Year 1999. However, the Program Review restructured the rest of the program for the objective THAAD system, taking about $1.9 billion out of the $4.7 billion that was programmed through the FYDP.

The THAAD System is the only core TMD system capable of engaging the full spectrum of theater-class ballistic missile threats. The THAAD system provides extended coverage for a greater diversity and dispersion of forces or the capability to protect population centers. But the principal additional capability provided by this important system is the ability to deal with longer range theater missile threats as they begin to evolve and emerge over time. Using THAAD as an overlay also reduces the number of missiles that the lower-tier systems must engage. The THAAD system will provide a unique capability for wide area defense against tactical ballistic missiles at higher altitudes and more attempted intercepts at longer ranges (a "shoot-look-shoot" capability) with a lethal hit-to-kill interceptor. This is a mission the PAC-3 and Navy Area Defense systems cannot perform. The THAAD system consists of the TMD Ground-based Radar (GBR) surveillance and tracking sensor, interceptors, launchers, and BMC3.

The initial deployment will be with what the Department calls a "UOES plus" system, essentially an enhanced version of the UOES system, in lieu of the previously planned full-capability objective system. This improved UOES capability will meet the most critical THAAD requirements. It will concentrate on militarizing the UOES design and upgrading certain components, such as the infrared seeker, radar upgrades and BMC3 improvements. The resulting THAAD program delays the production ramp-up and the FUE by over two years.

In Fiscal Year 1997, the THAAD program will conclude its demonstration/validation flight tests. These tests are designed to resolve technical issues and demonstrate the system's capabilities. So far, BMDO and the Army have conducted four flight tests. The next flight test, which will attempt an intercept of a theater-class ballistic missile target, is scheduled to take place within the next few days.

Navy Theater-Wide

The Navy Theater Wide system will bring a new, complementary capability to our other core programs by providing ascent phase coverage where the mobility of AEGIS ships allows such coverage. In addition, the system will add the same kind of

terminal coverage capability as the THAAD system, providing long range coverage and wide area protection. As in the case with the lower-tier Navy Area Defense system, the Navy Theater Wide system will operate free of sovereignty or host nation support issues, free to be deployed instantly whenever our national interest requires.

The Navy Theater Wide system is the least mature of all our systems, not only of the upper-tier, but all the TMD systems taken together. Prior to the Department's review, we were proposing funding this program in our Fiscal Year 1996 and 1997 budgets at a very low level to mature the key enabling technologies. This was at a level of about $30 million per year. During the review, however, Congress authorized and appropriated a substantial increase -- $170 million -- to this program. The Program Review decided to spend all the appropriated funds for Fiscal Year 1996 over two years and not begin a full commitment to the Navy Theater Wide program at this time. A more deliberate pace was selected, which will allow us to proceed to a system-level intercept flight test using a combination of the AEGIS Weapon System, the Standard Missile and a kinetic kill intercept vehicle.

In parallel, the program is structured to conduct concept definition studies to determine what is the best configuration with which to proceed. There is much synergism among the technologies needed for a robust Navy Theater Wide system, including seeker technologies being developed in the National Missile Defense program. The Program Review determined that the posture for this program is to conduct a technology demonstration, leveraging maturing technologies and complete a concept definition study to confirm the interceptor configuration for the system. In order to accomplish this program approach, the Department made a substantial increase to the funding profile. While starting out at a slow pace, we will add about $600 million through the FYDP to ramp up to a significant annual investment in Navy Theater Wide.

Medium Extended Air Defense System (MEADS)

We will continue developing the MEADS system during Fiscal Year 1997. This system is different from the other lower-tier missile defense systems we are planning to deploy. For example, while the PAC-3 system is oriented in a particular threat direction, MEADS provides 360 degrees of coverage. It will be a highly mobile system and designed to be deployed with our forward and maneuvering forces. In this regard, MEADS is designed to respond to an important operational requirement by providing protection for the combat maneuver force against shorter-range theater-class ballistic missiles, advanced cruise missiles, and other air-breathing threats as well. This system will replace HAWK, and also would ultimately replace the PATRIOT system. As I noted earlier, the Department is deferring fully upgrading three PATRIOT battalions pending a decision on development and deployment of MEADS.

Later this month, the U.S., France, Germany and Italy will sign a Memorandum of Understanding (MOU) to proceed jointly to develop the MEADS system. MEADS consolidates and harmonizes the efforts of NATO allies who had contemplated country-unique systems, such as the TLVS in Germany, Aster/Arabel in France and Italy, and Corps SAM for the U.S. The agreement to pursue MEADS represents not only a new path for transatlantic armaments cooperation, but also a growing recognition of the risks to alliance security posed by the proliferation of weapons of mass destruction and their delivery systems. The cost share for the MEADS program throughout the Program Definition and Validation (PDV) phase (the U.S. equivalent

of demonstration/validation) is 50/20/20/10 among the U.S., France, Germany, and Italy, respectively. The Department added $85 million over the FYDP to fund the U.S. share of the cooperative PDV phase, which concludes in Fiscal Year 1999. This increase brings our funding to a rate of about $30 million per year and fulfills our international commitments at this time. We must make a decision by Fiscal Year 1998 on the program's future direction.

Two U.S. companies, Lockheed Martin and a joint venture between Hughes Aircraft and Raytheon, have joined with their European counterparts (Daimler-Benz Aerospace, and Siemans from Germany; Aerospatiale and Thompson from France; and Alenia from Italy) to form two international teams that will execute the PDV phase of the program. A single international team will be chosen to pursue Design and Development (EMD in the U.S.), with an in-service date scheduled for about 2005.

Joint TMD Program Element

Joint TMD activities represent programs and tasks that are vital to the execution of joint BMD programs. These activities have been grouped together because they provide direct support across BMD acquisition programs which could not be executed without this important support. Therefore, we introduce greater efficiency into the programs because they accomplish an effort once which otherwise would have to be separately accomplished for each Service element. These activities include architecture development and battle management, command, control, communications, and intelligence; test and evaluation support, including the development and fabrication of targets; threat analysis and support; model and simulation support; lethality and phenomenology studies and analysis; and direct interface with the warfighter. Unfortunately, we did not adequately explain the importance of this key program element last year and sustained a significant and painful reduction to its budget. This significantly reduced our ability to support the core TMD acquisition programs. In some instances, critical target development and lethality analysis had to be funded by the core programs themselves. These unexpected expenditures contributed to some of the executability issues identified by the BMD Program Review.

Therefore, I would like to outline just a few critical activities that are funded in the Joint TMD account. Interoperability in BMC3I is essential for joint TMD operations. Accordingly, BMDO takes an aggressive lead to establish an architecture that all the Services can build upon and is actively pursuing three thrusts to ensure an effective and joint BMC3I for TMD. The three thrusts are: improving early warning and dissemination, ensuring communications interoperability, and upgrading command and control centers for TMD functions. The primary goal is to provide the warfighter with an integrated TMD capability by building-in the interoperability and flexibility to satisfy a wide range of threats and scenarios. From its joint perspective, BMDO oversees the various independent weapon systems developments and provides guidance, standards, equipment and system integration and analysis to integrate the multitude of sensors, interceptors, and tactical command centers into a joint theater-wide TMD architecture. While this may not seem to be as exciting as building improved TMD interceptors, it is absolutely critical to the success of the U.S. TMD system. It is the glue that holds the architecture together and will ensure that the whole is greater than the sum of its parts.

In addition to BMC3I, the other activities in this program element strongly support

the TMD system and key acquisition programs. For example, BMDO test and evaluation responsibilities include oversight of major defense acquisition program (MDAP) testing, sponsoring and conducting TMD family of systems integration and interoperability tests, development of common targets, and providing for range and ground tests. My organization sponsors and conducts system integration tests to ensure inter- and intra-Service operability and interoperability of the TMD family of systems with external systems. In addition, this program element funds a critical series of interactions with the warfighting CINCs. The CINC's TMD Assessment program consists of operational exercises, wargames, and Warfare Analysis Laboratory Exercises (WALEX). Our WALEX programs, for instance, allow senior military leadership insights into TMD operational planning and employment. The CINC TMD Assessments program enhances two-way communication between BMDO as the developer and the warfighting CINCs who are the users of TMD systems. These exercises allow the CINCs to assess their TMD capabilities and shortfalls so they may refine and articulate their TMD requirements, and improve their current and future TMD operational capabilities. The program facilitates the development and refinement of TMD doctrine and concepts of operations as part of the CINC's and Joint Staff's overall theater operations plans. We need to fully fund this important program element if we are to deliver on our promise of improved TMD systems to the warfighter.

U.S. - Israel Arrow Program

Israel has been involved in U.S. missile defense programs since 1987, when both countries signed a Memorandum of Understanding on BMD participation. Israel's participation includes architecture studies, technology development and experiments, examination of boost-phase intercept concepts, and the development of the Arrow interceptor missile. As the Secretary of Defense has noted recently, the Arrow program advances our shared objective of working together to develop effective ways to counter the threat posed by ballistic missiles in the Middle East and elsewhere. An agreement with the Israeli Ministry of Defense to continue involvement in the development of the Arrow weapon system will be ready for signature between both our countries in the near future. The Arrow Deployability Program, as it is called, involves a total commitment of $500 million over the next five years, with $300 million contributed by Israel and $200 million from the United States. This will allow for the integration of the jointly developed Arrow interceptor with the Israeli developed fire control radar, launch control center and battle management center. I am particularly pleased to report that on February 20th, the Arrow II missile completed its second successful flight test, which will lead soon to the intercept of a target tactical ballistic missile.

System integration efforts will lead to a UOES-like Arrow system projected for fielding in Fiscal Year 1998. The U.S. continues to derive valuable data and experience through our participation in the Arrow program. In particular, we are gaining important experience in establishing interoperability with U.S. TMD systems and the Arrow weapon system. The agreement we have on participation in the Arrow program will be revisited in three years to evaluate the synergies between Arrow and U.S. TMD programs and to ensure that worthwhile benefits continue to flow to the U.S. programs. It is important to note that this cooperative program is also funded within the Joint TMD program element.

Cruise Missile Defense

Many TMD sensors, BMC3, and weapons also have an effective capability to counter the growing land-attack cruise missile threat. In particular, the lower-tier PAC-3, Navy Area Defense, and MEADS systems operate in the same battlespace and will have significant capability against the cruise missile threat. In addition, the NMD BMC3 architecture will be designed to promote interoperability and evolution to a common BMC3 system for ballistic and cruise missile defense.

The Department also has a number of initiatives outside the BMD program to improve the ability of U.S. forces to detect and defeat cruise missiles "in theater" or launched against the United States. These initiatives include advanced technology sensors to detect low observable cruise missiles; upgrades to existing airborne platforms to improve beyond the horizon detection capability against cruise missiles; and upgrades to existing missile interceptor systems.

National Missile Defense

The Department's NMD goal is to position the U.S. to effectively respond to a strategic ballistic missile threat, as it emerges. Based upon the Program Review, the NMD effort has been shifted from a technology readiness to a deployment readiness program. Following the 1993 Bottom Up Review, the NMD program focused on maturing the most challenging technical elements - often called the "long poles" - of the NMD system. The Department is sensitive to Congressional interest in a shift to a more system-oriented approach which would provide for the balanced development of all elements necessary for the initial deployment. We are focusing our efforts on a program that is referred to as "3 plus 3" -- a three year development and planning phase which, if necessary, could be followed by a three year system acquisition and deployment phase.

The Department is committed to the development phase -- or the first "three" years -- of this 3 plus 3 program. During this period BMDO and the Services will develop and begin testing the elements of an initial NMD system. If, at the end of those three years of NMD development efforts, the ballistic missile threat to the United States warrants the deployment of an NMD system, then in another three years that system could be deployed. Based on this program an initial operational capability could be achieved in approximately six years, by the year 2003.

If, on the other hand, we reach 1999 and the threat does not warrant deployment of an NMD system, the Department's 3 plus 3 program is designed to preserve the capability to deploy an NMD system within three years by continuing development of the system elements and conducting a series of integrated tests. Over time, these efforts would allow us to enhance both the technology base and the demonstrated systems performance. Therefore, we can make a more informed deployment decision and, when the threat materializes, be in a position to deploy a more capable NMD system. The system capability would grow through three avenues: incorporating advanced technology, increasing element performance and adding additional elements. We would continue to improve system effectiveness by incorporating advanced technologies as they mature in our technology base program. As we continue to test we will identify and incorporate improved components to the system elements, such as improving the kill vehicle, enhancing its lethality, or refining the system software. When appropriate, we will add additional elements to the defense. For example, the Space & Missile Tracking System (SMTS), which is being developed separately by the U.S. Air Force, would be integrated into our proposed architecture as soon as it was available to enhance overall NMD performance. As I testified last

year, the SMTS system provides a vital role for both NMD and TMD systems. The low earth orbit SMTS is an integral part of a potential deployment of an objective NMD system. While we are enhancing the NMD systemÍs capability we will address production and deployment lead-time issues to reduce the time required to field the system when a deployment decision is made.

Funding for NMD has been shifted forward in the FYDP with allocations of about an additional $100 million per year in Fiscal Years 1997 and 1998. This increase, coupled with the additional funds provided by Congress for NMD in Fiscal Year 1996, will allow us to complete a reasonable, albeit high-risk, development program leading to the demonstration of the NMD system in an Integrated System Test in 1999.

The NMD system we will demonstrate in 1999 includes four fundamental building blocks used by all of the proposed NMD architectures: the interceptor; ground-based radar; upgraded early warning sensors; and battle management, command, control and communications (BM/C3). Depending on the threat to which we are responding when a deployment is required, these elements could be combined in a treaty compliant deployment or some other architecture.

The Ground Based Interceptor is the weapon element of NMD. It consists of an exoatmospheric kill vehicle (EKV) launched by a fixed, land-based booster. We have made significant progress over the past few years to develop an EKV which can perform hit-to-kill intercepts of strategic reentry vehicles in the midcourse phase of their trajectory. Rockwell and Hughes are under contract to develop and test competing EKV designs which will be evaluated in a series of flights starting later this year. Following intercept flights in 1998, a single contractor will be selected for the initial system. The EKV flights, which start this year, will be conducted using the Payload Launch Vehicle as a surrogate for a dedicated booster. Several options are being examined for the GBI booster, including Minuteman III, and other modified, off-the-shelf, boosters.

The NMD Ground-based radar is an X-band, phased array radar that leverages heavily off developments achieved by the THAAD GBR program. By taking advantage of the work already completed in the TMD arena, BMDO has been able to reduce the expected development cost of the GBR by approximately $70 million. In 1998 the GBR prototype, developed by Raytheon, will be fabricated at the U.S. Kwajalein Atoll to begin testing to resolve critical issues related to discrimination, target object map, kill assessment, and electromechanical scan.

The Upgraded Early Warning Radar (UEWR) program is designed to answer fundamental questions concerning how UEWRs can contribute to National Missile Defense while completing the initial development. We have already completed two years of successful demonstrations, showing how software modifications can increase the radars' detection range, sensitivity, and accuracy. Our plan is to award a contract in early 1997 for the design and test of a software demonstrator. This tool will be used to prepare specifications for the early warning radars' upgrades necessary if there is a decision to deploy an NMD system before SMTS is available.

The National Missile Defense Battle Management, Command, Control, and Communications (BMC3) program provides the capability for the designated operational Commander to plan, coordinate, direct, and control NMD weapons and sensors. The NMD BMC3 development program uses an open system architecture and the best industry practices for development of software that will have the

capability to support NMD integrated ground and flight tests. The BMC3 product, which will include cruise missile defense consideration, leverages off previous NMD developments and the BMC3 systems being developed for the TMD program.

Over the FYDP, the Department has budgeted those funds required for a deployment readiness effort, or roughly $2.8 billion. Deployment of an initial system would cost approximately $5 billion more. Our analysis shows that such a deployment would provide an effective defense against first generation rogue ballistic missile threats to the U.S. The intrinsic strength of our concept for an initial deployment is that the architecture has been specifically designed for evolutionary development of a more robust and effective NMD system over time; it can grow to counter an increasingly sophisticated threat, if required.

As I mentioned earlier, one of the significant enhancements to the NMD system will occur when the SMTS becomes available. This system, funded and developed as part of the Space-based Infrared System (SBIRS) program, provides 360 degree over the horizon sensing throughout the threat trajectory which greatly increases the system performance against all of the potential threats.

The NMD development program we are planning will continue to comply with all treaty obligations. As the 3 plus 3 NMD program progresses, we will study many different technologies and architectures. We will review these options from every perspective including cost, operational effectiveness, and existing treaty obligations.

Potential Early Deployment Options

The 3 plus 3 concept I have described for NMD has its genesis in last year's efforts by the BMDO Tiger Team, which investigated how we could accelerate the development and deployment of an NMD system to respond to more rapidly emerging threats to the United States. The Tiger Team, estimating time scales of approximately four years to deployment, described several opportunities and the associated challenges to deploy an interim NMD capability to deal with rudimentary Third World threats to U.S. territory. In this regard, the BMDO Tiger Team was an important and valuable endeavor. Nonetheless, it is important to note that the opportunities they described are "off ramps" from efforts to develop and deploy an objective and highly capable NMD system, and if not carefully evaluated, could become technological "cul de sacs." Simply put, near-term options might not field an initial system that could be evolved to a more effective defense. The tradeoff we must consider is between earlier deployment of a less capable system, or later deployments of increasingly effective defenses for the U.S. homeland. Our 3 plus 3 approach is designed to provide an early deployment opportunity which can evolve robustly with the threat and operational needs.

As I mentioned earlier, and as a by-product of the Tiger Team exercise, both the Air Force and Army provided their recommendations on how to develop and deploy an NMD system. The Air Force and Army, in particular, have proposed alternatives which are very similar to, and with immediate commitment to deployment could allow earlier maturation than, the Department's 3 plus 3 program. In either case, a minimum of approximately four years to a capability was estimated. Consideration of such alternatives to the 3 plus 3 program has strengthened the commitment to deployment readiness within the Department. When it literally could come down to the effective defense of the nation against an accidental, unauthorized or limited ballistic missile attack, it is critical for us to fully assess all the options before us. The

Army, Navy and Air Force remain critical members of our team and are vigorously and efficiently developing those portions of our 3 plus 3 architecture to which they are assigned.

The Army and Air Force proposals are very similar to BMDO's plans in that they use the same fundamental building blocks: ground-based interceptors, ground-based radars, upgraded early warning radars, and BM/C3. The differences come in the specific design of these elements and the way they are eventually combined architecturally. The Air Force's proposal is based on the belief that significant benefits can be achieved by leveraging off the deployed Minuteman III infrastructure. They propose using the Minuteman III booster to launch the kill vehicle, which could be either the EKV already described or a somewhat simpler kill vehicle which could be developed by the Air Force. The Minuteman III concept would allow the use of existing launch silos and some of the existing BM/C3 network, potentially reducing the total cost. To provide the necessary sensor data, the Air Force proposes to augment the coverage provided by Upgraded Early Warning Radars.

The Army suggests a commercial booster developed by combining existing "off-the-shelf" booster stages to launch the EKV. These interceptors would be deployed in the existing silos of the old Safeguard complex near Grand Forks, North Dakota. In order to enhance radar coverage, the Army proposes also to augment early warning radars and recommends using technology from the GBR.

Each of these architectures has merit, but they also have potential shortcomings. Early deployment options are capable of defending against only the most simple ballistic missile threats -- that is a few warheads atop first generation ICBMs. BMDO and CINCSPACE are engaged in the assessment of the existing and future threats, as defined in the National Intelligence Estimate and the NMD Threat Assessment Report. The joint endeavor with CINCSPACE includes an aggressive effort to specify the operational requirements, including effectiveness and coverage, and evaluate them against architectural options and system level developmental requirements. Two major efforts for this evaluation include active Command and Control simulations, which combine architectural options, specific threats, and concepts of operations in a simulated real-world environment; and a cooperative effort in the development of the Battle Management and Command, Control and Communications (BMC3) element. The NMD architecture will be specifically tailored to meet the current and emerging threats.

In addition to such operational concerns, alternative architectures still need to be reviewed from the perspective of our treaty obligations. For instance, the proposals call for the use of additional early warning radars. One alternative also would use existing Minuteman III assets (including silos) as the boosters for the NMD kill vehicles. This raises both ABM and START Treaty issues.

I think it is important for the Congress to be aware of these and other potential architectures, including both operational concepts and arms control impacts when considering these alternative architectures. While I acknowledge that there are potential limitations, I still believe there is strong merit to considering them.

If we identify an emerging ballistic missile threat to the U.S., I would like to have the best possible deployment options available to the President and Congress. I want to reiterate, when we address the defense of the American People against even a rudimentary Third World ballistic missile threat, I want to make sure we have every

feasible opportunity to effectively defeat that threat as soon as possible.

I strongly endorse staying the course with the Department's current NMD strategy, while continuing to protect our earlier deployment options. I think it is the prudent course of action. Following three more years of system development, we will reach the point where a low risk decision could be made to deploy an NMD system, if the threat warrants. If not, we will be prepared to continue development of a system that could still be deployed quickly in response to a threat but would ensure a more effective defensive system. The 3 plus 3 program is designed with the flexibility to allow it to be accelerated if the threat warrants and additional resources are applied. As it is currently structured it provides the capability to deploy with an IOC in 2003, the date Congress desired. At this time the specific deployment architecture is not an issue which must be decided. What is needed is program stability. Completing definition of a system of this complexity in three years is a challenge - we cannot afford to keep starting over to develop something new. I urge you to accept our program and to provide sufficient resources to complete the deployment readiness phase of the 3 plus 3 program. Then, if it is necessary, we will be prepared to defend all of America against limited missile attacks by 2003.

BMD Technology Program

As we move forward with our acquisition programs, the programmatic demands on our BMD resources have continued and the number of Congressional earmarks has risen. I am concerned that because of this we have been forced to reduce our technology program. I would like to remind the Committee that today's acquisition programs are possible only because significant past investments in BMD technology made them possible. For instance, development of the "hit-to-kill" interceptor technology, now adopted by PAC-3 and THAAD, evolved from the SDIO's Flexible Lightweight Agile Guidance Experiment (FLAGE) technology demonstration program in the mid-1980's. Technologies making the infrared sensors and data processors possible for the upcoming SMTS satellite system have been developed over the past decade through BMDO-sponsored research and development. That includes infrared detectors, cryogenic coolers, optical hardware and radiation-hardened microelectronics.

Just as these past technology investments helped enable current TMD acquisition programs, today's technology investments will prepare us for evolving, proliferating threats. Evolving threats, based on reasonable extrapolations of credible countermeasures, set the pace and direction of today's advanced technology program. As a result, next generation TMD and NMD systems will be able to draw from a set of readily available technology solutions.

We have organized the technology program to balance across several variables, including TMD and NMD applications, and technology development and demonstrations. In this regard, we have identified the most critical technology requirements for the program and are pursuing them within the constraints of the funding available for the technology program. These unique technology requirements include:

- Sensor and seeker component programs to improve the range and resolution of missile defense sensor systems and interceptor seekers;
- Interceptor component programs to develop faster, smarter, more capable interceptors;

- BMC3 high-data and low-error advanced component technologies needed in automated decision aids, data fusion, adaptive defense operations, and secure communications;
- Phenomenological research to determine how the threat, environment and defensive systems will behave and interact during an engagement; and
- Research into advanced concepts, such as directed energy systems, that are capable of global coverage (i.e., accomplishing both national and multiple-theater missile defense missions), and that can engage targets in the boost-phase.

I believe that proper development of technologies to meet these critical requirements is essential to maintaining our program's technological edge. Nowhere else in the Department are the basic or component BMD technology programs funded. Therefore, to ensure the continued flow of new solutions to meet evolving ballistic missile defense requirements and technology needs, I encourage the Congress to consider the BMD advanced technology program as a strategic investment. I will make sure the technology program maintains a clear focus and that its products remain relevant to the BMD mission and are of high quality. I believe this investment is critical to the continued success and viability of our BMD program.

Conclusion

The BMD program today is a focused, prudent response to the real world. We are aggressively working to meet existing and emerging ballistic missile threats, first to our forces overseas, as well as our friends and allies; and secondly, the emerging missile threat to the United States.

I am dedicated to ensuring that we field improved TMD systems as soon as possible to provide real protection for our men and women as they go into battle to defend our national security interests. I believe we have made strong progress in developing and acquiring these improved systems. I am particularly proud that the lower-tier TMD systems will very soon be in the hands of the warfighter. We have made this progress because of the strong and enduring Executive-Legislative consensus on Theater Missile Defenses. This consensus is directly responsible for ensuring consistent program direction and the stable allocation of resources to get the job done. This support must continue if we are to deliver on our collective promise to give the warfighter the protection he needs in a world with proliferating missile threats.

As I have testified today, the Department has structured a deployment readiness program for NMD that is prudent and flexible. That program acknowledges that some potentially adversarial nations are interested in developing longer range ballistic missiles which could strike the United States. The 3 plus 3 program could deploy an effective nationwide NMD system against a first generation Third World threat by the year 2003. However, if that threat develops sooner, we have options which could deploy an emergency NMD system at an earlier date. Given the uncertainty of the ballistic missile threat to the U.S., it is prudent for the Department to proceed with the 3 plus 3 program. However, I think it is critical that we work closely together on a bipartisan basis to form the consensus for NMD that the TMD program has long enjoyed. Such a course is required if we are to succeed in maintaining program stability and coherence. The success of NMD depends on our ability to reach this

consensus.

On a more personal note, as many of you are aware, I have announced my intention to retire. Therefore, I would like to express my deep appreciation for the wonderful working relationship I have enjoyed with the Members and staff of this Committee. Dr. Perry forwarded to me several weeks ago one of the most personally heartwarming and inspiring letters I have ever read. It was a request, signed by you, Mr. Chairman and you, Mr. Spratt, as well as some twenty other Members of Congress, many of them here today, asking Dr. Perry to retain me as the Director of BMDO. I will never forget your expression of confidence in my honesty and integrity. I am personally and professionally appreciative of this support. Nonetheless, for two reasons I persisted in my plans to retire this year. First, for the first time in 33 years, my family has asked that I slow down just a bit. Lastly, I truly feel that this is a propitious time for the program to make a leadership change. Between you, Mr. Chairman, and you, Mr. Spratt, there is now as much detailed understanding of the missile defense program on this side of the river as there is on the other. The Administration is committed to missile defense, with the only major disagreement with Congress in terms of how much and how soon, rather than missile defense, yes or no. Of course, there is much more to be done and we will need your help to make missile defense a reality. I hope the future Director of BMDO has the opportunity to work closely with you, Mr. Chairman, Mr. Spratt and all the Members of this Committee. That experience has been a great honor and privilege for me.

Thank you, Mr. Chairman. I look forward to continuing to work with the Committee, as well as the entire Congress, to make highly effective and affordable missile defenses a reality. Mr. Chairman that completes my statement. I look forward to addressing the Committee's questions.