



# BALLISTIC MISSILE DEFENSE REVIEW REPORT

FEBRUARY 2010



# BMDR

# Ballistic Missile Defense Review Report



February 2010



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The protection of the United States from the threat of ballistic missile attack is a critical national security priority. The threat to our deployed military forces and to our allies and partners is growing rapidly. This threat has significant implications for our ability to project power abroad, to prevent and deter future conflicts, and to prevail should deterrence fail.

At the same time, the ability of the United States to defend against many forms of this threat is also growing rapidly. The research and development activities of recent years have generated new capabilities, as well as some significant opportunities for future breakthroughs.

I have made defending against near-term regional threats a top priority of our missile defense plans, programs and capabilities. I have also directed that we sustain and enhance the U.S. military's ability to defend the homeland against attack by a small number of long-range ballistic missiles. This strategy has required careful analysis of the threat, reprioritization of investments, and improvements to the management of the program.

This review, directed by the President and mandated by Congress, reflects my continuing effort to give focus and direction to the ballistic missile defense program. If fully implemented in coming years, the plans reflected here will significantly improve the security of the United States and its allies while also enhancing international stability.

A handwritten signature in black ink, which appears to read "Robert M. Gates", is positioned in the lower right area of the page.



# EXECUTIVE SUMMARY

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The Department of Defense conducted the first-ever Ballistic Missile Defense (BMD) Review from March 2009 through January 2010. Mandated by Congress, and guided by a Presidential directive, the review comprehensively considered U.S. BMD policies, strategies, plans, and programs. The review was co-led by the Under Secretary of Defense for Policy, the Under Secretary of Defense for Acquisition, Technology and Logistics, and the Vice Chairman of the Joint Chiefs of Staff. It also involved participants from the Department of State, the Department of Homeland Security, the Intelligence Community, the National Security Staff, and the Office of Management and Budget.

## The Ballistic Missile Threat

The ballistic missile threat is increasing both quantitatively and qualitatively, and is likely to continue to do so over the next decade. Current global trends indicate that ballistic missile systems are becoming more flexible, mobile, survivable, reliable, and accurate, while also increasing in range. A number of states are also working to increase the protection of their ballistic missiles from pre-launch attack and to increase their effectiveness in penetrating missile defenses. Several states are also developing nuclear, chemical, and/or biological warheads for their missiles. Such capabilities could be significant sources of military advantage during a conflict. But they may be equally significant in times of relative peace, when they undergird efforts to coerce states near and far. Regional actors such as North Korea and Iran continue to develop long-range missiles that will be threatening to the United States. There is some uncertainty about when and how this type of intercontinental ballistic missile (ICBM) threat to the U.S. homeland will mature, but there is no uncertainty about the existence of regional threats. They are clear and present. The threat from short-range, medium-range, and intermediate-range ballistic missiles (SRBMs, MRBMs, and IRBMs) in regions where the United States deploys forces and maintains security relationships is growing at a particularly rapid pace.

## Strategy and Policy Framework

Following guidance from the President, this review has set the following policy priorities:

1. The United States will continue to defend the homeland against the threat of limited ballistic missile attack.
2. The United States will defend against regional missile threats to U.S. forces, while protecting allies and partners and enabling them to defend themselves.
3. Before new capabilities are deployed, they must undergo testing that enables assessment under realistic operational conditions.



4. The commitment to new capabilities must be fiscally sustainable over the long term.
5. U.S. BMD capabilities must be flexible enough to adapt as threats change.
6. The United States will seek to lead expanded international efforts for missile defense.

### Defending the Homeland

The United States is currently protected against limited ICBM attacks. This is a result of investments made over the past decade in a system based on ground-based midcourse defense (GMD). Because of continuing improvements in the GMD system and the number of ground-based interceptors now deployed compared to potential North Korean and Iranian long-range ballistic missile capabilities, the United States possesses a capability to counter the projected threat from North Korea and Iran for the foreseeable future.

Given uncertainty about the future ICBM threat, including the rate at which it will mature, it is important that the United States maintain this advantageous position. But doing so does not require that the United States develop these capabilities at the same accelerated rate or with the same level of risk as in recent years. Rather, the United States will refocus its homeland ballistic missile defense program as it began to do with the fiscal year (FY) 2010 budget—maintaining the current level of capability with 30 ground-based interceptors (GBIs) and further developing proven capabilities that will enhance homeland defense should a new threat emerge.

Toward that end, the United States will:

- Maintain readiness and continue to develop existing operational capabilities at Fort Greely, Alaska, and Vandenberg Air Force Base, California.
- Complete the second field of 14 silos at Fort Greely to hedge against the possibility that additional deployments become necessary.
- Deploy new sensors in Europe to improve cueing for missiles launched at the United States by Iran or other potential adversaries in the Middle East.
- Invest in further development of the Standard Missile 3 (SM-3) for future land-based deployment as the ICBM threat matures.
- Increase investments in sensors and early-intercept kill systems to help defeat missile defense countermeasures.
- Pursue a number of new GMD system enhancements, develop next generation missile defense capabilities, and advance other hedging strategies including continued development and assessment of a two-stage ground-based interceptor.

## Defending Against Regional Threats

Over the past decade, the United States has made significant progress in developing and fielding capabilities for protection against attack from short- and medium-range ballistic missiles. These include increasingly capable PATRIOT batteries for point defense, the AN/TPY-2 X-band radar for detecting and tracking ballistic missiles, Terminal High Altitude Area Defense (THAAD) batteries for area defense, space-based sensors, and sea-based capabilities such as the SM-3 Block IA interceptor.

However, these capabilities exist in numbers that are only modest in view of the expanding regional missile threat. Accordingly, in the FY 2010 budget, and continuing across the FY 2011–15 time frame, the Department of Defense will further invest in these deployable assets while developing new capabilities such as a land-based SM-3 system (tentatively called “Aegis Ashore”) and airborne infrared sensors that will make possible the simultaneous detection and tracking of ballistic missiles by unmanned aerial vehicles. Looking out over the longer term (i.e., in the 2015 to 2020 time frame), the Department is pursuing even more capable SM-3s and persistent overhead sensors in space capable of detecting and tracking large raid sizes.



*PRESIDENT ANNOUNCES NEW APPROACH TO MISSILE DEFENSE. President Obama directed a comprehensive review of ballistic missile defense policy and programs. The review’s findings related to Europe were announced on Sept. 17, 2009. Official White House photo by Pete Souza.*

## Integrating Capabilities Regionally

As threats have advanced and technical solutions have matured, it has become increasingly important to think strategically about the deployment of low-density, high-demand missile defense assets in a regional context. Such deployments must be tailored to the unique deterrence and defense requirements of each region, which vary considerably in their geography, the character of the threat, and the military-to-military relationships on which to build cooperative missile defenses.

Several principles will guide how BMD is used in the development of these regional approaches to deterrence and defense:

1. The United States will work with allies and partners to strengthen regional deterrence architectures, which must be built on the foundation of strong cooperative relationships and appropriate burden sharing.

2. The United States will pursue a phased adaptive approach to missile defense within each region that is tailored to the threats and circumstances unique to that region.
3. Because the potential global demand for missile defense assets over the next decade may exceed supply, the United States will develop capabilities that are mobile and relocatable.

These three principles will be applied on a region-by-region basis. The Department will rely on the Global Force Management process to assist in decisions on the allocation of missile defense forces. For the European region, the Administration announced the European Phased Adaptive Approach (PAA) in September 2009, following the unanimous recommendation to the President by the Secretary of Defense and the Joint Chiefs of Staff that the prior plan for missile defense protection in Europe be revised.

### **Strengthening International Cooperation**

Another key objective is to lead expanded international efforts and cooperation on missile defense. The United States seeks to create an environment in which the development, acquisition, deployment, and use of ballistic missiles by regional adversaries can be deterred, principally by eliminating their confidence in the effectiveness of such attacks. Toward this end, the United States seeks broad-based international cooperation.

Strengthening cooperation with allies and partners to develop and field robust, pragmatic, and cost-effective capabilities is an important priority. In Europe, the Administration is committed to implementing the new European Phased Adaptive Approach within a NATO context. In East Asia, the United States is working to improve missile defenses through a series of bilateral relationships. The United States is also pursuing strengthened cooperation with a number of partners in the Middle East.

The Administration also seeks to engage Russia and China on missile defense. With Russia, it is pursuing a broad agenda focused on shared early warning of missile launches, possible technical cooperation, and even operational cooperation. With China, the Administration seeks further dialogue on strategic issues of interest to both nations, including missile defense. As it pursues these discussions, the Administration will continue to reject any negotiated restraints on U.S. ballistic missile defenses.

### **Managing the Missile Defense Program**

The Administration is committed to deploying capabilities that have been proven under extensive testing and assessment and are affordable over the long term.

To strengthen the testing program, a number of steps are being taken. Working in close partnership with the Director of Operational Test and Evaluation, as requested by Congress, the Missile Defense Agency announced a new approach to testing in June 2009. This program sets

out test activities over the full course of each system's development, not just two years into the future as under the former program. These activities include a comprehensive set of ground and flight tests designed to demonstrate operational performance and validate models used to support an evaluation of system effectiveness. The new master plan is to be reviewed and updated semiannually. This new approach will be evaluated after one year of experience (June 2010), and any necessary adjustments will be made at that time.

To ensure adequate oversight of the missile defense program, DoD has enhanced the roles and responsibilities of the Missile Defense Executive Board (MDEB). Established in March 2007, the MDEB provides oversight and guidance in a collaborative mode involving all missile defense stakeholders in DoD and some from outside DoD. The Board's work on requirements is supplemented by the work of the Warfighter Involvement Process, which is chaired by U.S. Strategic Command. The MDEB also oversees the Ballistic Missile Defense System Life Cycle Management Process, which is used by DoD to identify requirements, allocate resources, and provide departmental insight to control costs.

After careful study, DoD has come to the conclusion that it does not see benefit in bringing MDA into the Joint Capabilities Integration Development System (JCIDS) or the full DoD 5000 acquisition reporting process at this time. There is, however, benefit in further innovation in management of the program, and DoD is pursuing the creation of additional hybrid MDA/Service program offices.



# INTRODUCTION

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Upon taking office, President Obama directed a comprehensive review of U.S. ballistic missile defense (BMD) policies, strategies, plans, and programs. The United States Congress also mandated that the Department of Defense (DoD) conduct a review of ballistic missile defense strategy and policy. This report contains the findings and recommendations pursuant to this guidance. It addresses the matters of particular interest to Congress, and does so in a broad framework that reflects the President's guidance and sets out associated policy and programmatic decisions reflected in the current budget proposals.

This report serves multiple purposes. It is intended to match U.S. strategies, policies, and capabilities to the requirements of the 21st-century threats facing the nation now and in the future and to inform DoD planning, programming, budgeting, and oversight. It is also intended to facilitate executive-legislative dialogue and decision making, dialogue with allies and partners, and informed public discussion of key policy choices.

The BMD review was conducted over ten months in close coordination with many stakeholders both inside DoD and beyond. At DoD, the review was led jointly by the Under Secretary for Policy, the Under Secretary for Acquisition, Technology, and Logistics, and the Vice Chairman of the Joint Chiefs of Staff. It involved close collaboration with the Missile Defense Agency (MDA). The Military Departments, combatant commands, and multiple elements of the Office of the Secretary of Defense also contributed to the analytical work. Participants from outside DoD included the Department of State and the Department of Homeland Security, the Intelligence Community, the National Security Staff, and the Office of Management and Budget. This review was also developed in close coordination with ongoing parallel studies, including principally the Quadrennial Defense Review, the Nuclear Posture Review, and the Space Posture Review, with the aim of integrating analyses and addressing crosscutting issues.

The report begins with an overview of the ballistic missile threat to the United States and its allies, considering specific threats in a broad context of key trends and uncertainties. The report then turns to the strategy and policy framework and the priorities of the Administration. In the following sections, the report describes the steps proposed by the Administration both to defend the homeland and to address threats to our forces overseas, and our allies and partners. It also sets out in detail steps to strengthen international cooperation on BMD. The report then addresses a series of issues associated with the Department's management of the missile defense program.



# THE BALLISTIC MISSILE THREAT

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## *Context*

The threat posed by ballistic missile delivery systems is likely to increase while growing more complex over the next decade. This judgment by the Intelligence Community is borne out by recent events, such as Iran's launch of a new mobile, solid-propellant medium range ballistic missile (MRBM) in December 2009. Ballistic missile systems are becoming more flexible, mobile, survivable, reliable, and accurate while also increasing in range. Pre-launch survivability is also likely to increase as potential adversaries strengthen their denial and deception measures and increasingly base their missiles on mobile platforms.

Key trends in the development of the threat include the following:

- The threat is increasing both quantitatively and qualitatively.
- Quantitatively, many states with missiles are increasing their inventories, at the same time that a growing number of states are deploying missiles with greater capabilities.
- More states are moving to advanced liquid-propellant systems and even to solid-propellant systems, which increase flexibility, mobility, survivability, and reliability.
- Ranges are increasing, putting ever more targets at risk.
- Accuracy is increasing, making these systems more effective against point targets.
- Some states are working to defeat missile defenses, through both technical and operational countermeasures.
- Some states are also taking steps to increase the protection of their ballistic missiles from pre-launch attack, including through more aggressive denial and deception practices as well as a shift to mobile systems.
- Some states are also developing nuclear, chemical, and/or biological warheads for missiles, and if they are successful in these efforts, the threat to others will be greatly magnified.
- These technical capabilities could be significant sources of military advantage during a conflict. But they may be equally significant in times of peace or crisis, when they may undergird efforts to coerce other states.



## *The Threat to the Homeland*

One of the most significant threats to the U.S. homeland is the continued progress of regional actors in developing weapons of mass destruction (WMD) and the means to deliver them by ballistic missiles. North Korea, which has demonstrated its nuclear ambitions and continues to develop long-range missiles, is of particular concern. Following the Taepo Dong 1 missile test in 1998, North Korea has conducted flight tests of the Taepo Dong 2 (TD-2) missile in 2006 and more recently in April 2009. Despite the most recent launch's failure in its stated mission of orbiting a small communications satellite, it successfully tested many technologies associated with an ICBM. Although the test launches of the TD-2 in 2006 and 2009 were deemed unsuccessful, we must assume that sooner or later North Korea will have a successful test of its TD-2 and, if there are no major changes in its national security strategy in the next decade, it will be able to mate a nuclear warhead to a proven delivery system.



*NORTH KOREAN AND IRANIAN BALLISTIC MISSILE ACTIVITIES. Ongoing developmental and testing efforts by North Korea and Iran include the launch of an Iranian satellite on February 2, 2009 (left photo), and the April 5, 2009 launch of a North Korean Taepo Dong 2 (right photo). The TD-2 could be capable of reaching parts of the United States.*

Although Iran has not stated an intent to develop ICBMs, it continues to pursue longer-range ballistic missiles. Iran launched its Safir Space Launch Vehicle (SLV) in August 2008 with what it claims was a dummy satellite. Iran used the Safir-2 SLV to place the domestically produced Omid satellite in orbit in February 2009, according to statements made to the press by Iranian officials. Despite continued diplomatic efforts Iran also continues to defy its international obligations on its nuclear program, further reducing international confidence in the nature of its program. These factors only compound international concerns about the intent of its ballistic missile program.

Looking ahead, it is difficult to predict precisely how the threat to the U.S. homeland will evolve, but it is certain that it will do so. Iran and North Korea have yet to demonstrate an ICBM-class warhead. How rapidly and successfully North Korea and Iran pursue this and other capabilities are an open question, as is the speed with which they might actually deploy capabilities and increase their numbers over time. Working with the international community, the United States will continue to seek to stem these threats, through diplomacy and other means.

Today, only Russia and China have the capability to conduct a large-scale ballistic missile attack on the territory of the United States, but this is very unlikely and not the focus of U.S. BMD. As

the President has made clear, both Russia and China are important partners for the future, and the United States seeks to continue building collaborative and cooperative relationships with them. With Russia, the Administration is pursuing an agenda aimed at bringing the strategic military postures of the two countries into alignment with their post – Cold War relationship – no longer enemies, no significant prospect of war between them, and cooperating when mutually advantageous. The United States will continue to engage with Russia’s neighbors as fully independent and sovereign states, and looks forward to a peaceful and prosperous Russia that makes contributions to international peace and security as a global partner. The Administration is closely monitoring China’s continuing buildup of military capability, including its missile forces. While the United States will ensure that we can defend our interests in the region, we remain committed to a relationship that is positive, cooperative, and comprehensive and do not believe a hostile or adversarial relationship with China is by any means inevitable.

### *Regional Threats*

Regional actors, such as North Korea in Northeast Asia and Iran and Syria in the Middle East, have short, medium, and intermediate range ballistic missiles that threaten U.S. forces, allies, and partners in regions where the United States deploys forces and maintains security relationships.

North Korea conducted seven widely publicized ballistic missile launches on July 4–5, 2006. It successfully tested six mobile theater ballistic missiles, demonstrating a capability to target U.S. and allied forces in South Korea and Japan. On July 3–4, 2009, it again exercised its capability to threaten U.S. and allied forces and populations in South Korea and Japan by launching seven ballistic missiles. North Korea has developed an advanced solid-propellant short-range ballistic missile (SRBM). A mobile IRBM is also under development.



*GROWING BALLISTIC MISSILE THREATS.* Iran and North Korea continue to pursue ballistic missiles with extended ranges. Iran is developing and testing ballistic missiles capable of targeting much of Europe.

Iran also presents a significant regional missile threat. It has developed and acquired ballistic missiles capable of striking deployed forces, allies, and partners in the Middle East and Eastern Europe. It is fielding increased numbers of mobile regional ballistic missiles and has claimed that it has incorporated anti-missile-defense tactics and capabilities into its ballistic missile forces.

Iran has an extensive missile development program and has received support in the past from entities in Russia, China, and North Korea. DIA believes that Iran still depends on outside sources for many of the related dual-use raw materials and components; for example, the Shahab-3 MRBM is based on the North Korean No



*IRANIAN SHAHAB-3 VARIANT MRBM. The Iranian Shahab-3, with a range of 1,300–2,000 km, is a mobile system capable of evasion.*

Dong missile. Iran continues to modify this missile to extend its range and effectiveness. In 2004, Iran claimed that it tested an improved version of the Shahab-3; subsequent statements by Iranian officials suggest that the improved Shahab-3's range is up to 2,000 kilometers and that Iran has the ability to mass-produce these missiles. In addition, Iran's solid-propellant rocket and missile programs are progressing, and Iran has flight-tested a new solid-propellant MRBM with a claimed range of 2,000 kilometers. Iran is also likely working to improve the accuracy of its SRBMs.

Syria also presents a regional threat. It has several hundred SCUD-class and SS-21 SRBMs and may have chemical warheads available for a portion of its SCUD missiles. All of Syria's missiles are mobile and can reach much of Israel and large portions of Iraq, Jordan, and Turkey from launch sites well within the country.

The commitment of the United States to defend against ballistic missile capabilities from North Korea and Iran stems from the U.S. perception, shared by our allies and partners, that they are threatening. North Korea and Iran have shown contempt for international norms, pursued illicit weapons programs in defiance of the international community, and have been highly provocative in both their actions and statements. They have exploited the capabilities available to them to threaten others. Their neighbors—and the United States—may be limited in their actions and pursuit of their interests if they are vulnerable to North Korean or Iranian missiles. Deterrence is a powerful tool, and the United States is seeking to strengthen deterrence against these new challenges. But deterrence by threat of a strong offensive response may not be effective against

these states in a time of political-military crisis. Risk-taking leaders may conclude that they can engage the United States in a confrontation if they can raise the stakes high enough by demonstrating the potential to do further harm with their missiles. Thus U.S. missile defenses are critical to strengthening regional deterrence.

### *Trends*

It is difficult to make confident predictions about the future of the missile threat. However, there are a number of regional and global trends in the development, deployment, and proliferation of ballistic missiles and their associated technologies that are of concern to the United States.

One regional trend that particularly concerns the United States is the growing imbalance of power across the Taiwan Strait in China's favor. China is developing advanced ballistic missile capabilities that can threaten its neighbors, and anti-ship ballistic missile (ASBM) capabilities that can attempt to target naval forces in the region. China continues to field very large numbers of conventionally armed SRBMs opposite Taiwan and is developing a number of new mobile conventionally armed medium-range systems. Moreover, China has upgraded programs for command and control, communications, intelligence, and other related force capabilities, and continues to develop new SRBMs, MRBMs, and IRBMs. These missiles are key components of Beijing's military modernization program. Chinese missiles will be capable of reaching not just important Taiwan military and civilian facilities but also U.S. and allied military installations in the region.

Globally, the Intelligence Community continues to see a progression in development from short- to medium- and in some cases intermediate-range missiles. Development programs reflect increasing ambition in improving payload, range, precision, and operational performance. Those development programs could be helped by the open market that now exists in many of the associated technologies, materials, and expertise. These include the potential for salvo launches and for systems with technologies that enable the penetration of ballistic missile defenses. There is no global norm or treaty banning trade in ballistic missiles (the function of the Missile Technology Control Regime is to facilitate ad hoc coordination of export controls among like-minded exporters who desire to keep militarily sensitive technologies out of the hands of dangerous states).

An important uncertainty exists in this future landscape. Some non-state actors have sought weapons of mass destruction and the means to deliver them. These organizations, and the proliferation networks (front companies, shippers, facilitators) with which they are affiliated, are often able to sidestep or outpace international detection and export control regimes. So far, state sponsors of terror appear to be reluctant to transfer WMD capabilities to the terrorists themselves. This could change abruptly, however. The possibility of such transfer is on the rise in the Middle East. Hezbollah, for example, has already acquired and used rockets for the delivery

of conventional munitions against Israel. The advent of ballistic missile threats from such terrorist organizations would raise profound new questions about regional security.



*IRANIAN SALVO LAUNCH. The technique of launching missiles in salvos (shown here during an Iranian exercise in 2006) demonstrates interest and capability in defeating missile defenses, thereby increasing the likelihood of a missile reaching its target. Two years later Iran would make world headlines by doctoring a photo of a different salvo launch during a follow-on exercise, but that should not be construed as an inability to conduct such launches.*

Two additional factors stand out in this proliferation landscape. First, there is the potential for a substantial increase in the transfer of advanced capabilities from both government and nongovernment entities in some technically advanced countries. Some states with more advanced capabilities continue to transfer both technologies and systems to those with less mature capabilities. These actions underscore the importance of building consensus with other governments about the damaging impact on stability and security of such transfers, and of drawing them more deeply into a global approach that stigmatizes missile proliferation as a threat to peace. Second, there is the potential for increasingly sophisticated regional missile threat capabilities. Proliferators are increasing the number of deployed systems (and thus raid sizes), shifting from liquid- to solid-fueled systems, and deploying missile defense countermeasures. These threats are inherently difficult to predict, but indicators and warnings associated with such threats remain under intense scrutiny by the Intelligence Community and our allies and partners, who are similarly concerned about these destabilizing trends.

### *Implications*

This assessment of the threat points to two key implications for U.S. defense planning. First, U.S. defense investments must be balanced in a way that enables the effective defense of the U.S. homeland and of U.S. forces, allies, and partners overseas in both the near term and long term. The Department must ensure that the balance of investments is rigorously assessed and consistently applied across each annual budget and that the assessments of plans against projected

threats are updated periodically. This analysis also shows the need to maintain a strong focus by the Intelligence Community on the ballistic missile threat and strong intelligence relationships with allies and partners. Accurate and timely intelligence should play a vital role in informing defense planning; assessments of what we do not know with confidence play an equally vital role.

Second, our defensive capabilities must be adaptable to unexpected threat developments. Threats may mature more rapidly or more slowly than predicted, may appear in unexpected locations, or may involve novel technologies or concepts of operations. It is essential that the United States be well hedged and have a strong posture against unpredicted threat developments.



# STRATEGY AND POLICY FRAMEWORK

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## *Policy Priorities*

In support of presidential guidance, this review has set the following policy priorities.

First, the United States will continue to defend the homeland from limited ballistic missile attack. These efforts are focused on protecting the homeland from a ballistic missile attack by a regional actor such as North Korea or Iran. Through our continued commitment to maintain and develop the ground-based mid-course defense (GMD) system, the United States seeks to dissuade such states from developing an inter-continental ballistic missile (ICBM), deter them from using an ICBM if they develop or acquire such a capability, and defeat an ICBM attack by such states should deterrence fail.

Second, the United States will defend U.S. deployed forces from regional missile threats while also protecting our allies and partners and enabling them to defend themselves. This policy has guided the development of U.S. capabilities since the emergence of the ballistic missile proliferation problem in the 1980s and the development of initial terminal defense capabilities (e.g., PATRIOT) in the early 1990s. As regional protection capabilities begin to take shape, it is important to ensure effective operational and political cooperation with allies and partners.

Third, before new capabilities are deployed they must undergo testing that enables an assessment under realistic operational conditions against threat-representative targets to demonstrate that they can reliably and effectively help U.S. forces accomplish their mission. Over the past decade, it was deemed necessary to rapidly put capabilities in place to address emerging threats while those systems were still in development. The Administration will take a different approach, best characterized as “fly before you buy,” which will result in a posture based on proven technology in order to improve reliability, confidence, and cost control.

Fourth, the commitment to new capabilities must be fiscally sustainable over the long term. National investments must be managed to ensure that there are sound capability improvements at reasonable cost and in overall balance with other defense priorities. Toward that end, the Administration has charted a new course for spending on its BMD programs. The President has made clear that the United States will move forward with missile defenses that are affordable, proven, and responsive to the threat. This primarily means that the Department of Defense will realign spending away from defenses planned to rely on currently immature technology, away from technologies that require unrealistic concepts of operations in order to be effective, and away from technologies intended to defeat adversarial missile threats that do not exist and are not expected to evolve in the near to midterm. These considerations led to the decisions to terminate



both the Multiple Kill Vehicle and Kinetic Energy Interceptor programs and to shift the Airborne Laser to a technology demonstration program in the FY 2010 budget.

Fifth, U.S. BMD capabilities must be adaptable to future threats and flexible to adjust as the threats change. Hedging against potential changes in the threat is essential given the uncertainty associated with the missile capabilities of potential adversaries.

Sixth, the United States will seek to lead expanded international efforts for missile defense. It will work more intensively with allies and partners to provide pragmatic and cost-effective capacity. The United States will also continue in its efforts to establish a cooperative BMD relationship with Russia. The United States, with the support of allies and partners, seeks to create an environment in which the acquisition, deployment, and use of ballistic missiles by regional adversaries can be deterred, principally by eliminating their confidence in the effectiveness of such attacks, and thereby devaluing their ballistic missile arsenals. This will help undergird a broader strategic objective: to strengthen deterrence in key regions through the integrated and innovative use of military and nonmilitary means that adapt regional deterrence architectures to 21st-century requirements.

### *Missile Defense: Deterrence, Extended Deterrence, and Assurance Goals*

Missile defenses support a number of defense strategy goals. Ballistic missile defenses help support U.S. security commitments to allies and partners. They provide reassurance that the United States will stand by those commitments despite the growth in the military potential of regional adversaries. Missile defenses also aid the United States in maintaining military freedom of maneuver, by helping to negate the coercive potential of regional actors intent on inhibiting and disrupting U.S. military access in their regions. Missile defenses are an essential element of the U.S. commitment to strengthen regional deterrence architectures against states acquiring nuclear weapons and other weapons of mass destruction in contravention of international norms and in defiance of the international community. They also support U.S. and allied capacities for mutual defense in the face of coercion and aggression by these defiant states. In these ways, missile defenses strengthen U.S. goals of deterrence, extended deterrence, and assurance. In so doing, they contribute to international peace and stability and reinforce the global nonproliferation regime. If Northeast Asia, the Middle East, and other regions become more peaceful and stable as a result of these and other measures, then more states in these regions may be willing to take steps back from the “nuclear tipping point” and toward stronger and more effective implementation of global treaty regimes.

Both Russia and China have repeatedly expressed concerns that U.S. missile defenses adversely affect their own strategic capabilities and interests. The United States will continue to engage them on this issue to help them better understand the stabilizing benefits of missile defense—particularly China, which claims to have successfully demonstrated its own ground-based

midcourse interception on January 11, 2010. As the United States has stated in the past, the homeland missile defense capabilities are focused on regional actors such as Iran and North Korea. While the GMD system would be employed to defend the United States against limited missile launches from any source, it does not have the capacity to cope with large scale Russian or Chinese missile attacks, and is not intended to affect the strategic balance with those countries.

This missile defense strategy is part of a larger strategic framework. The Administration intends to leverage all elements of national power to prevent and deter conflicts. Doing so should help mitigate the factors that drive some countries to seek ballistic missiles. The Administration's national security approach also seeks collaborative approaches with allies and partners, in order to strengthen international responses to shared challenges. Improved missile defenses and the supporting policy agenda elaborated here are integral to these larger purposes. They are intended to reinforce broad efforts to mitigate the missile (and nuclear) threats through political and cooperative measures rather than by reliance on military means alone.



# DEFENDING THE HOMELAND

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This section addresses the first element of the strategy and policy framework: to defend the homeland from the threat of a limited ballistic missile attack.

## *Status of Current Capability*

The United States is currently protected against the threat of limited ICBM attack, as a result of investments made over the past decade in a system based on Ground-based Midcourse Defense (GMD). This system relies on ground-based interceptors at two sites: Fort Greely, Alaska, and Vandenberg Air Force Base, California. By the end of FY 2010, the United States will deploy a total of 30 GBIs, with 26 at Fort Greely and 4 at Vandenberg. To enable these ground-based systems to successfully intercept attacking missiles in the midcourse part of their trajectory, the United States employs early warning radars in Alaska, California, Greenland, and the United Kingdom; afloat radar systems (i.e., Aegis destroyers, Aegis cruisers, and Sea-Based X-band radar [SBX]); and a sophisticated command and control infrastructure.

Over the past few years, the United States accelerated development of these homeland defense capabilities by simultaneously developing and fielding them. This step was taken largely in order to facilitate their deployment in time to coincide with the expected deployment of ICBMs by North Korea and its potential transfer of ICBMs to others. That projected ICBM deployment has not yet occurred.

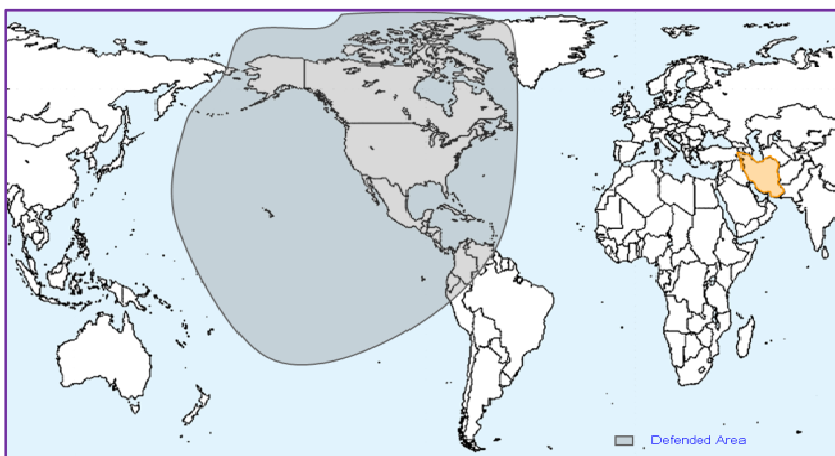
Given the continuing improvement in the GMD system and the number of ground-based interceptors currently deployed compared to potential North Korean and



*PROTECTION AGAINST ICBM ATTACKS FROM NORTH KOREA. With ground-based interceptors fielded in Alaska and California, land-based radar in Alaska and Japan, and sea-based Radar in the Pacific, the United States can defend the shaded areas from any future long-range missile attack from North Korea.*

Iranian capabilities, the United States now possesses a capacity to counter the projected threats from North Korea and Iran for the foreseeable future.

Because of uncertainty about the future ICBM threat, including the rate at which it will mature, it is important that the United States maintain this advantageous position. But doing so does not



*PROTECTION AGAINST ICBM ATTACKS FROM IRAN. The ground-based interceptors fielded in Alaska and California will provide protection from any future Iranian ICBM capability.*

require that the United States continue to develop these capabilities at the same accelerated rate as it has in recent years and accept the same level of risk in the developmental program. Rather, the United States will refocus its homeland missile defense plans to maintain the current level of capability, while

developing future, proven capabilities that will enhance homeland defense should a new threat emerge. This refocused approach was introduced in the FY 2010 budget submission, in which the Department of Defense proposed to hold the number of operationally deployed GBIs at 30, instead of the 44 originally planned.

### *Hedging Against Future Uncertainties*

An essential element of the United States' homeland ballistic missile defense strategy is to hedge against future uncertainties, including both the uncertainty of future threat capabilities and the technical risk inherent to our own development plans. The United States must be prepared with other options if the threat assessment changes or if the development of new technical capabilities are delayed.

The FY 2011 budget request demonstrates the Administration's commitment to providing a robust defense of the United States against long-range threats and to hedge against improvements in the capabilities of potential adversaries. To ensure that our homeland defense remains effective and viable over the long term, the Department will seek funding for a substantial investment in a number of new GMD system enhancements. These include a program to increase GMD system reliability, availability, and maintainability (RAM); a program to guard against ground system obsolescence; and funding to restart the Future Avionics Upgrade/Obsolescence Program (FAU/OP). The Department will also emphasize proven capabilities by requesting funding for additional GMD testing, including the addition of an ICBM-class target and planning for a salvo test.

The threat environment described earlier reinforces the need for the United States to maintain a flexible approach to developing missile defense capabilities. The Department must be prepared to adjust its plans as the threat evolves. The Missile Defense Agency is currently developing next-generation missile defense capabilities to counter future threats. Within this set of capabilities, a number of new technologies and concepts are being pursued to improve homeland defense. These include intercepting long-range missiles early in their flight, launching interceptors based on remote sensor information, and strengthening ballistic missile sensor networks. In addition, MDA will begin advanced technology development for a new Standard Missile 3 variant, the Block IIB, which should provide some capability to intercept long-range missiles. These developments will ensure that the United States will stay ahead of the emerging long-range ballistic missile threat.



*GROUND-BASED INTERCEPTOR. Secretary Gates is shown here viewing a ground-based interceptor in its silo at one of three ballistic missile defense fields at Fort Greely, Alaska on June 1, 2009.*

In addition to continuing to sustain and improve the GMD system through a variety of means, including a rigorous flight testing program, the United States is also pursuing several other hedging strategies for defense of the homeland against a ballistic missile attack. For example, the United States will continue development and assessment of a two-stage ground-based interceptor. We will also pursue multiple paths to develop and deploy ballistic missile sensors, including both airborne and space-based detection and tracking systems. Although the Airborne Laser (ABL) program has been restructured, the Department will continue to research the potential of directed energy systems for missile defenses, including the establishment of a directed energy research program inside MDA. MDA “red team” activities also support hedging by anticipating possible future changes in the threat.

The Department also plans to complete the construction of Missile Field 2 in Fort Greely, Alaska by emplacing the full 14 GBI silos and making those silos operationally ready. This will both replace older, inadequate silos from Missile Field 1 and provide a reserve capability to rapidly deploy up to 8 additional GBIs from the pool of interceptors currently designated for testing. Although the Department does not currently foresee a need for more than 30 deployed GBIs, these extra operational silos will provide an additional hedge against future threat uncertainty. The Department does not require the procurement of additional GBIs for this purpose.

### *In Summary*

To sustain homeland protection over the near and long term, the Administration plans a comprehensive agenda with the following elements:

1. Existing operational capabilities at the two sites will be maintained and their continued development will proceed through rigorous tests. These capabilities include both the three-stage missiles deployed at both sites and potentially the two-stage missiles originally planned for deployment in Europe.
2. The second field of 14 silos at Fort Greely will be completed so that extra silos are ready if additional GBI deployments become necessary. Supplemental sensors will be deployed to improve the tracking of missiles launched at the United States.
3. Investments in SM-3 development will be made for future land-based deployment as the ICBM threat matures.
4. Investments in sensors and early-intercept kinetic kill systems will be increased to enable intercepts to help defeat countermeasures.
5. Additional programs to hedge against future uncertainties will also be pursued.

## DEFENDING AGAINST REGIONAL THREATS

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The second element of the Administration's strategy and policy framework is defense against regional missile threats to U.S. forces, allies, and partners. Whereas homeland defense benefits from the relatively long flight times associated with ICBM threats, which allow time for complex system response and for large interceptors such as GBIs to provide an effective defense, defending against regional missile threats involves much shorter flight times and thus necessitates a highly agile missile defense system and responsive command and control authorities. Because of the large and increasing numbers of short and medium-range ballistic missiles, any regional missile defense capabilities must also be produced and fielded in sufficient quantity to deter and defend against those threats.

### *Status of Current Capability*

Over the past decade the United States has made significant progress in developing and fielding essential capabilities for protection against attack from short- and medium-range ballistic missiles. These capabilities include increasingly capable PATRIOT batteries that provide point defense against short-range ballistic missiles, the powerful AN/TPY-2 X-band radar for detecting and tracking ballistic missiles, and soon-to-be-deployed THAAD batteries for defense against both short- and medium-range ballistic missiles. Sea-based capabilities have also continued to develop. The Aegis system offers not only the ability to provide surveillance and tracking of ballistic missiles but also an upper-tier missile defense capability in the form of the SM-3 Block IA interceptor. Space-based sensors detect ballistic missile launches and provide data to ground- and sea-based missile defense assets.

However, these capabilities are modest numbers when set against the rapidly expanding regional missile threat. The Administration took steps to address this problem in the FY 2010 budget, by providing additional money for THAAD interceptors, for SM-3 Block IA interceptors, and for the



*AEGIS BMD SM-3 FLIGHT TEST. The Arleigh Burke-class guided missile destroyer USS Hopper, equipped with the Aegis Weapons System, is shown launching a SM-3 while underway in the Pacific Ocean. The missile successfully intercepted a short-range ballistic missile launched from the Pacific Missile Range Facility in Kauai, Hawaii. This exercise marked the 19th successful intercept of 23 at-sea firings using the Aegis Ballistic Missile Defense System.*



upgrading of more Navy ships to incorporate the Aegis BMD capability. The President’s Budget request for FY 2011 will further expand these deployable capabilities.

*Near-term Capabilities*

Looking to the future of regional defense, DoD is developing capabilities for deployment in the near term (out to 2015) and over the longer term. A key objective is to leverage recent successes in regional missile defense to further expand that capability at low risk. As part of the solution, DoD will increase the procurement of proven systems such as THAAD, the SM-3 interceptor, and the AN/TPY-2 radar.

The second part of the solution is to further improve the technology that has already been developed. At the moment, the SM-3 interceptor is launched only from sea. In the 2015 time frame, a relocatable land-based SM-3 system, tentatively called “Aegis Ashore,” will be available that will make possible better regional coverage by virtue of its ability to be placed inland. These land-based interceptors will provide persistent coverage of the areas they protect and will be an important element of a future regional missile defense against medium- and intermediate-range ballistic missiles.

DoD will also continue to improve the SM-3 interceptor missile defense capability. By 2015 a more capable SM-3 missile, the Block IB, will be available. It will have an improved seeker capability for greater on-board discrimination and greater area coverage. This interceptor will be deployed both at sea and on land, with the “Aegis Ashore” system. The coverage area will also be increased by developing the technology to launch an SM-3 interceptor in response to remote

<b>Block IA</b>	<b>Block IB</b>	<b>Block IIA</b>	<b>Block IIB</b>
<p><b>Kill Warhead (KW)</b></p> <ul style="list-style-type: none"> <li>• 1-Color Seeker</li> <li>• Divert &amp; Attitude Control System (DACS)</li> </ul>	<p><b>KW</b></p> <ul style="list-style-type: none"> <li>• 2-Color Seeker</li> <li>• Improved Optics</li> <li>• Advanced Signal Processor</li> <li>• Improved DACS</li> </ul>	<p><b>21" Nosecone</b></p> <p><b>Large Diameter KW</b></p> <ul style="list-style-type: none"> <li>• Advanced Discrimination Seeker</li> <li>• High Divert DACS</li> </ul>	<p><b>Improved KW</b></p>
<p><b>Stage 2 &amp; 3:</b></p> <ul style="list-style-type: none"> <li>• 13.5" Propulsion</li> </ul>	<p><b>Stage 2 &amp; 3:</b></p> <ul style="list-style-type: none"> <li>• 13.5" Propulsion</li> </ul>	<p><b>Stage 2 &amp; 3:</b></p> <ul style="list-style-type: none"> <li>• 21" Propulsion</li> </ul>	<p><b>High Performance Upper Stage</b></p> <p><b>Stage 2:</b></p> <ul style="list-style-type: none"> <li>• 21" Propulsion</li> </ul>
<p><b>Stage 1:</b></p> <ul style="list-style-type: none"> <li>• MK 72 Booster</li> <li>• MK 41 Vertical Launch System (VLS) Compatible</li> </ul>	<p><b>Stage 1:</b></p> <ul style="list-style-type: none"> <li>• MK 72 Booster</li> <li>• MK 41 VLS</li> </ul>	<p><b>Stage 1:</b></p> <ul style="list-style-type: none"> <li>• MK 72 Booster</li> <li>• MK 41 VLS</li> </ul>	<p><b>Stage 1: Existing</b></p> <ul style="list-style-type: none"> <li>• MK 72 Booster</li> </ul>

*AEGIS BMD SM-3 EVOLUTION. The SM-3 is being fielded in “blocks” as technology advances, enabling improved defense through upgrades to the interceptor.*

sensor data. Once this capability is fully developed, the interceptors—no longer constrained by the range of the Aegis radar to detect an incoming missile—will be able to be launched sooner and therefore fly further in order to defeat the incoming threat.

It is also important that we continue development of the Command and Control, Battle Management, and Communications (C2BMC) Program, the overarching command and control system that brings together information from the various sensors, provides planning capability for missile defense operations, and makes available situational awareness for all levels of decision making. This continued development will incorporate the architecture of current and future sensor systems that support missile defense, the various weapons systems we currently use, and those in development such as the THAAD missile system, the PATRIOT, SM-3 variants, and GBIs. The continued development of C2BMC will allow for tailoring by each region's needs, and it will be interoperable with systems we may develop with allies and partners. For defense of the homeland it will make possible a seamless, global picture that incorporates all aspects of the BMD architecture.

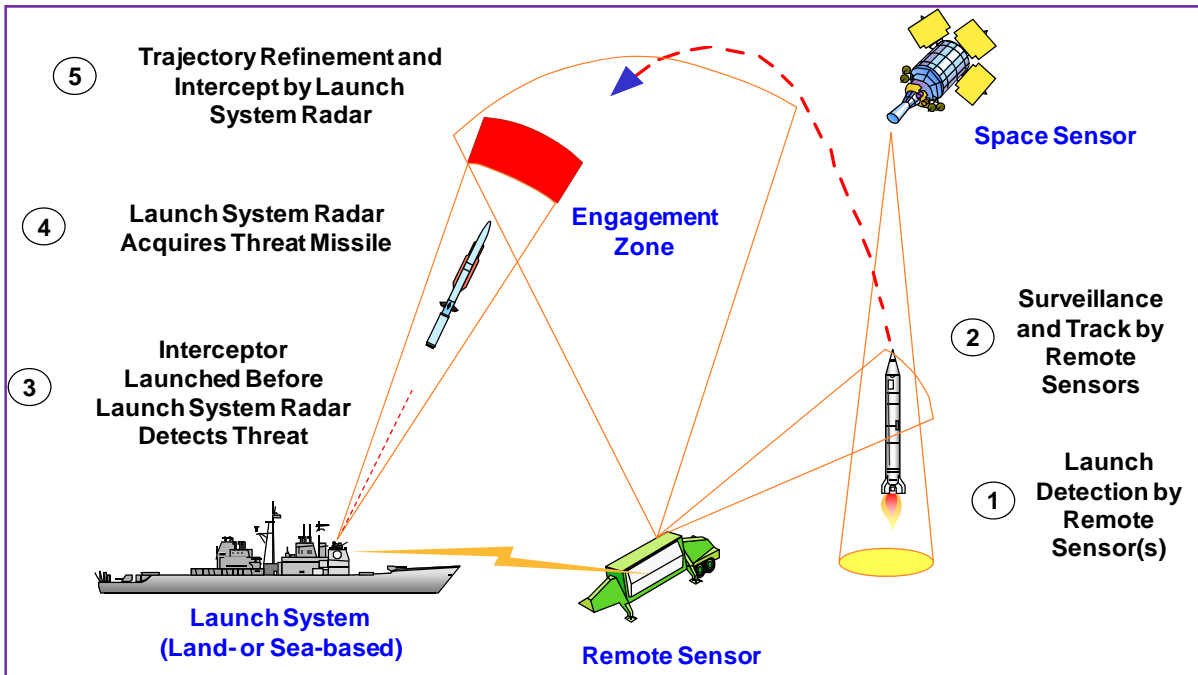
A final capability intended for development in the 2015 time frame is an airborne infrared sensor. The goal of this program is to be able to simultaneously detect and track many ballistic missiles from unmanned aerial vehicles. These distributed airborne platforms will add significant depth to regional missile defenses.

The Missile Defense Agency is now exploring another option, called “Early Intercept” (EI), which examines the feasibility of intercepting missiles early in their flight using currently planned interceptors and sensors. Instead of relying on larger and faster boosters, EI is achieved by reducing the timelines associated with early sensor tracking and rapidly developing fire-control solutions so that today's missiles can intercept threat missiles much earlier in their flight. EI should provide an additional opportunity to shoot at incoming threat missiles.

### *Long-term Capabilities*

Toward the end of the decade, more capable interceptors and sensors will become available. The SM-3 Block IIA will have a higher burnout velocity and a more advanced seeker. These features will make it much more capable than the SM-3 Block IA or IB and will provide greater regional coverage.

A follow-on missile, the SM-3 Block IIB, is in the initial phase of technology assessment and development. It is expected to be even more capable than the IIA. With a higher burnout velocity and greater divert capability, the SM-3 Block IIB will have some early-intercept capability against a long-range missile. Matched against regional medium-range and intermediate-range ballistic missiles, the SM-3 IIB will defend a greater area than the SM-3 IIA.



*LAUNCH ON REMOTE CONCEPT.* This represents a future capability to sense a threat remotely, transmit tracking information to the interceptor's flight computer, and launch the interceptor earlier and farther downrange than the ship's own radar would allow.

Investments are also being made to develop an “engage on remote” technology that includes not only launching on data from a remote sensor track but also the ability to uplink data from assets other than the Aegis radar. This will allow the interceptor to engage the threat missile at greater ranges.

A further long-term effort seeks to develop persistent overhead sensors to detect and track large raid sizes of ballistic missiles over their entire trajectories from space. Such an ability would greatly reduce the need for terrestrial sensors and the size of deployable missile defense systems. This Precision Tracking and Space System” (PTSS) is an important funding priority in the President’s Budget for FY 2011 and the Future Years Defense Program.

### *Integrating Capabilities Regionally*

As we look back over recent efforts to develop these capabilities, they can reasonably be described as “bottom up”—the United States worked aggressively with available technologies to improve them and bring them rapidly to the field in growing numbers. Looking to the future, it is becoming increasingly important to think “top down,” or more strategically, about the deployment of missile defense assets in a regional context. In other words, regional approaches must be tailored to the unique deterrence and defense requirements of each region, which vary considerably in their geography, in the history and character of the threat, and in the military-to-military relationships on which to build cooperative missile defenses. Several principles must guide the development of our regional approaches.

First, the United States will strengthen regional deterrence architectures. Regional deterrence must be built on a solid foundation of strong cooperative relationships and appropriate burden sharing between the United States and its allies. Our alliances must be built on productive plans and action that enhance allied security. As such, it is important that allies have the opportunity to contribute appropriately to the defense of common interests.

While missile defenses play an important role in regional deterrence, other components will also be significant. Against nuclear-armed states, regional deterrence will necessarily include a nuclear component (whether forward-deployed or not). But the role of U.S. nuclear weapons in these regional deterrence architectures can be reduced by increasing the role of missile defenses and other capabilities.

More broadly, the United States seeks new ways to deal with the challenges posed by states seeking nuclear weapons in contravention of international norms and in defiance of the international community.

Second, the United States will pursue a phased adaptive approach within each region that is tailored to the threats unique to that region, including their scale, the scope and pace of their development, and the capabilities available and most suited for deployment. This does not require a globally integrated missile defense architecture that integrates allies into a uniform, global structure. Instead, the United States will pursue regional structures sharing common assets that are relevant and robust because they are tailored to the unique requirements and opportunities within each region.

Third, because the demand for missile defense assets within each region over the next decade will exceed supply, the United States will develop capabilities that are mobile and relocatable. This feature would make possible their movement from one region to another in time of crisis. This capacity for surge defense should help dissuade potential aggressor states in all regions from thinking they can gain some long-term advantage.

These principles will be applied on a region-by-region basis. As previously stated, the Department will rely on the Global Force Management process to assist in decisions on the allocation of missile defense forces.



*PATRIOT MISSILE LAUNCH. PATRIOT missile defense interceptors are capable of intercepting short- and medium-range missiles at relatively close range in their terminal phase of flight.*

### *The Phased Adaptive Approach in Europe*

The Administration's approach to missile defense in Europe was announced in September 2009. This announcement followed a unanimous recommendation to the President by the Secretary of Defense and Joint Chiefs of Staff that the 2007 plan for European missile defense be revised.

Under this new approach, in Phase 1 (2011 time frame) existing missile defense systems will be deployed to defend against short- and medium-range ballistic missiles. Phase 1 will focus on the protection of portions of southern Europe by utilizing sea-based Aegis missile defense-capable ships and interceptors (the SM-3 Block IA). This first phase will also include a forward-based radar, which, by providing data earlier in the engagement, will enhance the defense of Europe and augment homeland defense capabilities already in place in Alaska and California.

In Phase 2 (2015 time frame) our capabilities will be enhanced by the fielding of a more advanced interceptor (the SM-3 Block IB) and additional sensors. Phase 2 will include land-based SM-3s in southern Europe, in addition to their sea-based locations, expanding coverage to additional NATO allies.

In Phase 3 (2018 time frame) coverage against medium- and intermediate-range threats will be improved with a second land-based SM-3 site, located in northern Europe, as well as an upgraded Standard Missile 3 (the SM-3 Block IIA, which is already under development) at sea- and land-based sites. These changes will extend coverage to all NATO allies in Europe.

In Phase 4 (2020 time frame) an additional capability against a potential ICBM launched from the Middle East against the United States will be available. This phase will take advantage of yet another upgrade to the Standard Missile 3, the Block IIB. All four phases will include upgrades to the missile defense command and control system.

The United States has been working closely with NATO allies on the relationship of the European PAA to the Alliance's missile defense plans. In addition to these NATO-wide consultations, the Czech Republic and Poland, both close allies, continue to play an important role in our collective missile defense efforts. The United States values the leadership of these nations on missile defense at NATO and welcomes their commitment to involvement in the new architecture. We also see opportunities for cooperation with Russia in the context of the European Phased Adaptive Approach, which are discussed in greater detail in the section titled "Strengthening International Cooperation."

### *Tailoring Phased Adaptive Approaches to Other Regions*

Missile defenses are an integral part of U.S. military and diplomatic strategies wherever the United States has security commitments. In East Asia and the Middle East, the United States

faces challenges similar to those in Europe regarding how to phase in needed capabilities in a way that is adaptive to developments in the threat.

It is essential to note that the regions differ in the range, volume, and technical sophistication of the existing and potential threat. This variation has important implications for how phased adaptive approaches to missile defense are applied in each regional context. The regions also differ in terms of the U.S. role and interests in the region: in Europe, the United States engages as a party to a multilateral alliance; in East Asia, the United States cooperates through bilateral alliances and with key partners; in the Middle East, the United States has a number of key partners and deployed forces. These differences have important implications for the authorities under which the United States is able to operationally employ defenses in protection of local partners.

The regions also differ in how they currently cooperate in BMD with the United States. The United States and Japan cooperate in a way that is highly interoperable, and the nations are working together to jointly develop a future system. The United States and Israel are involved in the co-production of the Arrow 2 missile defense system as well as in additional BMD research and development activities. The United States is also



*AN/TPY-2 RADAR. This transportable X-band radar is currently deployed to Japan to aid in detecting and tracking potential threats in the Pacific region.*

beginning to work with some partners of the Gulf Cooperation Council. In short, the foundations for applying phased adaptive approaches in these regions are different, and thus so too are the pathways forward.

### *The Implications of Phased Adaptive Approaches to Regional Architectures*

The benefits of comprehensive, phased adaptive approaches to regional missile defense architectures are considerable. They allow strong partnerships with regional allies and partners in meeting emerging security challenges, as well as a responsible measure of burden sharing. They focus resources on real, emerging threats and rely on proven solutions.

Another benefit is improved deterrence. Missile-armed challengers in the Middle East and Northeast Asia will find it more difficult to threaten and coerce their neighbors in the region and beyond. U.S. allies and partners will remain confident in the role of the United States as security guarantor. These results could help significantly reduce pressures at the so-called nuclear tipping point.

But there are also some challenges. Perhaps the most important derives from the fact that regional demand for U.S. BMD assets is likely to exceed supply for some years to come. Although the missile threat is developing at different rates in different regions, overall it is developing rapidly. Today there are thousands of ballistic missiles and hundreds of launchers in countries other than Russia, China, the United States, and NATO members; roughly 90 percent of those missiles have ranges less than 1,000 kilometers. Against this threat, the United States currently has only a few hundred defensive short-range interceptors deployed in multiple regions. U.S. combatant commanders are expressing steadily rising interest in and requirements for protection against these threats. U.S. regional allies and partners are also expressing increasing interest and demand.



THAAD Fire Control and Communication with Launcher in Background

Mobile THAAD Equipment

*THAAD BATTERIES. The Terminal High Altitude Area Defense system is used for area defense of short- and medium-range missiles in their terminal phase of flight. It is air-transportable for rapid deployment in times of crisis.*

In the short term, the United States will address this mismatch between supply and demand with a comprehensive force management process that adjudicates competing requirements from the combatant commands. This approach underscores the value of developing capabilities that are flexible and adaptive and also relocatable, so that they can be surged into troubled regions in times of political-military crisis.

Over the longer term, the potential solutions are more numerous. The Department of Defense has proposed a robust procurement pathway for the years ahead to meet surging demand. It is also seeking to increase the contributions that allies make to regional architectures and to research and development. In addition, DoD is emphasizing the importance of strengthening regional deterrence by multiple means and not just through reliance on missile defense (or extended nuclear deterrence). The Department also supports efforts to increase international cooperation to suppress the development of specific regional threats of a particularly troubling kind—such as those posed by North Korea and Iran.

Whatever measures are taken to address this problem, it is not necessary that the United States be able to negate every deployable missile in an enemy's arsenal. Our forces must be able to protect what we and our partners value. These include the political and economic targets, including population centers, that an enemy may want to put at risk, as well as military capabilities essential for prevailing in a conflict. The ability to protect these assets helps reinforce deterrence and greatly magnifies the challenges for a leader contemplating aggression against some U.S. interest.

### *Hedging Against Future Regional Uncertainties*

As with the defense of the homeland, it is important to hedge against future uncertainties in the regional threat. In particular, the United States will hedge against the possibility of more rapid than projected quantitative and qualitative developments in the existing threat, and against the possibility of new missile threats developing in an unexpected location.

The phased adaptive approach provides an inherent hedge against these uncertainties by deploying missile defenses that are both relocatable and scalable. Relocatable assets can be surged to a region in times of crisis, providing increased capability against a larger threat raid size. This feature will also allow missile defenses to be brought to bear in new regions relatively swiftly. Scalable assets can be integrated into existing regional architectures. Furthermore, the same multiple pathways for ballistic missile sensor development that provide a hedge for homeland defense will also provide a hedge for regional missile defense, but for a different reason. More capable threat sensors will improve our ability to counter larger threat raid sizes.

Meeting the regional ballistic missile threat requires increased missile defense inventories. To that end, the Department intends to increase both inventory and production capacity of THAAD and SM-3 interceptors. To further add to the system's flexibility, DoD will also convert more ships to the Aegis weapons system to provide more sea-based ballistic missile defense capabilities. The mobility of these systems provides a critical hedge against potential expansion of the ballistic missile threats in a given region.

### *Regional Architectures and Defense of the Homeland*

These regional architectures are not meant to substitute for the defense of the homeland. However, over time they can become effective means to that end if threats to the homeland appear in specific regions as states develop and deploy intercontinental-range capabilities.

In the European Phased Adaptive Approach, for example, Phase 4 explicitly envisages additional capabilities that can be added to the European architecture to improve on the current defense of the homeland. Specifically, advanced technology assessments and development are under way on the SM-3 Block IIB with an expected deployment less than a decade from now. This more capable interceptor will be deployed to Europe in order to augment existing homeland protection against ICBM threats from the Middle East. The sensor architecture can also be supplemented



over time in ways that promise much-improved performance against systems in the Middle East aimed at the United States. In other regions, phased adaptive approaches can be applied with similar longer-term objectives.

### *In Summary*

To implement this new focus on regional architectures, the Administration will pursue the following initiatives:

- Deploy the European Phased Adaptive Approach, which accelerates the deployment of proven technologies and also promises improved long-term protection of the homeland.
- Apply phased adaptive approaches in other regions by building on current efforts, with a principal focus on East Asia and the Middle East.

Furthermore, the development of these regional architectures will be guided by three principles:

1. The United States will work with allies and partners to strengthen regional deterrence architectures, that must be built on the foundation of strong cooperative relationships and appropriate burden sharing.
2. The United States will pursue a phased adaptive approach within each region that is tailored to the threats and circumstances unique to that region.
3. Because the potential global demand for missile defense assets over the next decade may exceed supply, the United States will develop capabilities that are mobile and relocatable.

## *Case Study: The Phased Adaptive Approach in Europe*

### **Key Elements of the September 2009 Decision**

The 2007 plan called for a “third site” in Europe. First proposed early in the decade, it was intended to supplement the national protection of the United States at the two existing sites in Alaska and California. By locating a site for supplemental protection in Europe, the plan offered improved protection against ICBM threats emanating from the Middle East while also providing some protection of Europe against medium- and intermediate-range ballistic missiles. It was a sound technical solution based on the technology available at the time. Poland agreed to host the field of interceptors and the Czech Republic offered to host a radar needed for target discrimination over Europe (the European Midcourse Radar, or EMR). In addition, the decision involved a commitment to deploy closer to Iran an AN/TPY-2 radar useful for early target identification.

Against the backdrop of the new strategy and policy framework described earlier, two key factors led to the decision to revise this plan and apply a new approach in Europe. First, since the 2007 plan was initially considered, U.S. investments in missile defense technology have created new technical opportunities. The Standard Missile 3 Block IA has entered into service with the U.S. Navy and has a demonstrated track record of success in its test program. The development of improved versions has begun, including Blocks IB and IIA, which will be deployable both at sea and on land. In addition, advanced technology development for an even more capable land-based variant, the SM-3 Block IIB, will begin in 2011.

There have been similarly important advances in sensor technology, producing a variety of options to detect, classify, and track enemy missiles and to guide the interceptor in flight. The result is that an alternative emerged to the GBI-based architecture, one that had to be assessed on its relative merits and on its quality of protection, timelines to initial operational capability, flexibility, and cost-effectiveness, among other features.

Second, while Iran and other regional actors have not yet acquired or deployed ICBMs, the threat from shorter-range missiles has developed very quickly. For example, Iran already has hundreds of ballistic missiles that threaten its neighbors, and it is actively developing and testing ballistic missiles that can reach beyond its neighbors and further into Europe. This capability poses a clear and present danger to U.S. deployed forces, allies, and partners.

Iran also continues to work on longer-range ballistic missiles, space-launch vehicles, and other technologies that could contribute to an ICBM capability. Moreover, it has an ongoing program of missile cooperation with North Korea. These factors suggest that a future transfer of technologies or entire systems may be possible when and if North Korea’s ICBM program reaches a point of technical maturity. These concerns about Iran’s missile capabilities are magnified by Iran’s determination to continue its nuclear program in long-standing defiance of its international obligations. So far, Iran has not taken adequate steps to increase international confidence in its claims of an exclusively peaceful nuclear program. Likewise, its development of long-range and robust missile capabilities does not increase confidence in the alleged peaceful intent of its nuclear program.

The continued development and improvements of the GBI capability increase our confidence that 30 deployed GBIs are sufficient to defend the United States against an ICBM threat from Iran and North Korea for several years. However, the existing and growing threat in Europe to deployed forces, allies, and partners needs to be matched by the deployment of missile defense capabilities able to counter short- and medium-range ballistic missiles as well as longer-range threats in the future.

The previous plan was thus replaced by the European Phased Adaptive Approach (PAA) to missile defense.

## *Case Study: The Phased Adaptive Approach in Europe (continued)*

### **Benefits of the Phased Adaptive Approach in Europe**

There are many benefits to the European PAA. First, the PAA more directly addresses the threat in Europe. As Iran continues to develop its short- and medium-range ballistic missile capabilities, protection for U.S. forces, allies, and partners is provided much sooner under the PAA than the previous plan. In Phase 1, protection is planned to be available as early as 2011, whereas under the previous plan the GBI site in Europe would not have been operational until approximately 2017. Not only does the PAA provide protection years earlier, but it also brings it to those parts of Europe and those deployed forces that are most vulnerable to existing and near-term threats.

Second, the PAA utilizes existing and proven capabilities to meet current threats, and then will improve those capabilities over time by integrating new technology after operationally realistic testing. This approach provides flexibility to upgrade and adjust the architecture and to do so in a cost-effective manner as the threat evolves and our capabilities develop. Furthermore, the PAA's use of distributed, mobile, and relocatable systems also increases the system's survivability by making the assets more difficult for an adversary to target.

In addition to upholding our NATO Article 5 commitments to U.S. allies in Europe, the European PAA will also be able to improve on the protection of the U.S. homeland against ICBMs currently provided by the GBIs located on U.S. soil. In the short term, the PAA does this by adding the forward-based radar in southern Europe, which will provide data to augment missile defense coverage of the United States and Europe. Over time, as the four phases progress, defense of the U.S. homeland will be augmented by Europe-based SM-3 Block IIB interceptors, which are planned to be able to provide an early-intercept capability against potential Iranian ICBMs. Moreover, if the threat grows quantitatively, the PAA will be able to grow as well, adding additional interceptors without having to construct heavy infrastructure such as silos, and at much lower cost per interceptor than with GBIs.

The European PAA also offers increased opportunities for allied participation and burden sharing. Allies have unanimously welcomed the PAA and are studying architectures for a potential NATO missile defense system. The United States is committed to making the PAA its national contribution to a NATO missile defense effort, and seeks an Alliance decision to pursue a NATO-wide effort for missile defense of allied populations and territory. To share the burden, we support NATO's development of a command and control system for territorial missile defense. Individual NATO allies will also be able to contribute by providing missile defense assets, by hosting European PAA assets on their territory, or both.

# STRENGTHENING INTERNATIONAL COOPERATION

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Another key objective in the Administration's strategy and policy framework is to lead expanded international efforts and cooperation on missile defense. The United States is committed to working intensively with allies and partners in two categories: (1) developing and fielding robust, pragmatic, and cost-effective capabilities, and (2) engaging in international cooperation on a broad range of missile defense-related activities, including technological and industrial cooperation. As part of this effort, DoD will also work to expand cooperation with Russia on missile defense, counterproliferation, and related issues.

The United States seeks to create an environment in which the development, acquisition, deployment, and use of ballistic missiles by regional adversaries can be deterred, principally by eliminating their confidence in the effectiveness of such attacks. This approach will reinforce elements of the broader national security strategy that emphasize practical solutions to emerging challenges, solutions that involve all elements of national power. In addition, by working with allies and partners to promote effective missile defense capabilities, the United States builds closer defense cooperation ties as it accomplishes its direct purpose of making U.S. partners less vulnerable to coercion and ballistic missile attack.

The Department is also participating in a broad-based interagency review of the current U.S. export control system. The current system, founded during the Cold War and rooted in the concept of a bipolar world, was designed to control technologies and manufacture of U.S. origin. The global economy has changed. Technologies and processes once deemed critical are now widely available and in many cases no longer controlled by the United States. The Department will seek to understand how best to develop key missile defense technologies while also controlling them via multilateral arrangements so that we and our allies can maximize the benefits for our own security as we prevent their acquisition by those who would use them in ways contrary to our interests.

## *Europe*

In Europe, the Administration is committed to implementing the new European Phased Adaptive Approach within a NATO context. In December 2009, NATO foreign ministers welcomed the European PAA and declared that it reinforces NATO's central role in missile defense in Europe. The United States sees the European PAA as part of our extended deterrent and a visible demonstration of our Article 5 commitment to Europe. In practical terms, this means that the European PAA would be the U.S. national contribution to a NATO missile

defense capability. Toward this end, the United States is working within Alliance structures to define an agreed implementation plan. First, the United States supports a potential NATO decision to adopt the role of missile defense of allied territory and populations. Second, we support NATO's efforts to build and strengthen the Alliance's program for an integrated command and control system for missile defenses (Active Layered Theater Ballistic Missile



*A MEETING OF THE NORTH ATLANTIC COUNCIL (NAC).  
(Photo courtesy of NATO)*

Defense, or ALTBMD). ALTBMD is currently designed to link allies' assets together for missile defense of deployed forces, but it could be expanded to coordinate allied assets for the defense of populations and territory. As NATO takes these important steps, the United States will be able to contribute the European PAA to the Alliance's developing missile defense capability.

The Administration is also working directly with specific partners to develop and deploy needed capabilities for the defense of Europe. Poland and the Czech Republic, which were to play an important role in the previous plan, continue to play a role in implementing the European PAA. Other allies already own or are working with the United States to acquire specific capabilities, such as naval vessels equipped with the Aegis defensive system, that could be adapted to include a missile defense capability. These systems could be linked with the PAA to create a networked defense. A primary U.S. emphasis is on ensuring appropriate burden sharing. The Administration recognizes that allies do not view the specifics of the missile threat in the same way, and do not have equal resources to apply to this problem, but there is general recognition of a growing threat and the need to take steps now to address both existing threats and emerging ones.

### *East Asia*

In East Asia, the United States has a range of cooperative relationships. Japan is one of our most significant international BMD partners. The United States and Japan have made considerable strides in BMD cooperation and interoperability in support of bilateral missile defense operations. Japan has acquired a layered integrated missile defense system that includes Aegis BMD ships with Standard Missile 3 interceptors, Patriot Advanced Capability 3 (PAC-3) fire units, early warning radars, and a command and control system. The United States and Japan

regularly train together, and our forces have successfully executed cooperative BMD operations. One of our most significant cooperative efforts is the co-development of a next-generation SM-3 interceptor, called the Block IIA. This co-development program represents not only an area of significant technical cooperation but also the basis for enhanced operational cooperation to strengthen regional security. The U.S.-Japan partnership is an outstanding example of the kind of cooperation the United States seeks in order to tailor a phased adaptive approach to the unique threats and capabilities in a region.



*GUIDED MISSILE DESTROYER. In Nov. 2009 The guided-missile destroyer USS Curtis Wilbur (DDG 54) transits through the Pacific Ocean with Mount Fuji in the background.*

The Republic of Korea (ROK) is also an important U.S. BMD partner. The ROK has indicated interest in acquiring a missile defense capability that includes land- and sea-based systems, early warning radars, and a command and control system. The United States and ROK are working to define possible future BMD requirements. As these requirements are determined, the United States stands ready to work with the ROK to strengthen its protection against the North Korean missile threat. The United States looks forward to taking further steps to enhance operational coordination and build upon ongoing missile defense cooperation.

The United States continues to consult bilaterally with Australia regarding U.S. BMD capabilities and plans in order to share information that would help Australia with decisions regarding BMD should the need for it be seen in the future.

The United States is also engaged in multilateral discussions on BMD capability development with several partners in the East Asia region. As we enter into bilateral discussions of missile defense in East Asia, an additional goal is to share BMD information among countries on a multilateral basis in order to help each country improve its own capabilities.

### *The Middle East*

The United States is also cooperating with security partners in the Middle East to strengthen missile defense in the eastern Mediterranean and Persian Gulf.

The United States and Israel coordinate extensively on missile defense issues. The two have a long history of cooperative research and development, which has borne fruit in the deployment of Israel's Arrow missile defense system. Through various exercises, the United States and Israel have established a capability to cooperate operationally.

In the Persian Gulf, the United States has a continuous missile defense presence and seeks to build on the Bilateral Air Defense Initiative to strengthen cooperation. A number of states in the region are exploring purchases of some missile defense capability under the auspices of the foreign military sales (FMS) program.

### *Russia*

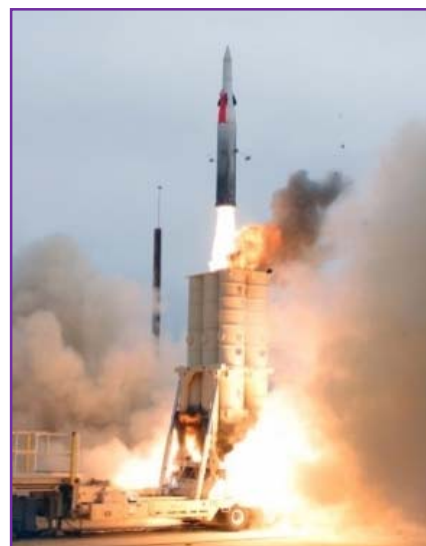
The Administration has given a special emphasis to renewing cooperation with Russia on missile defense. U.S. officials have discussed with Russia's leaders our view that U.S. missile defenses are a needed response to an emerging challenge to international peace and stability.

One of the benefits of the European Phased Adaptive Approach is that it allows for a Russian contribution if political circumstances make that possible. For example, Russian radars could contribute useful and welcome tracking data, although the functioning of the U.S. system will not be dependent on that data.

The Administration is committed to substantive and sustained dialogue with the leadership of Russia on U.S. missile defenses and their roles in different regions. For example, the United States and Russia have initiated a joint assessment of the ballistic missile threat, as agreed to by Presidents Obama and Medvedev at the July 2009 Moscow Summit. Our goals are to enlist Russia in a new structure of deterrence that addresses the emerging challenges to international peace and security posed by a small number of states seeking illicit capabilities. Moreover, the Administration seeks to develop a mutual understanding of a new approach to strategic stability that integrates both defensive and offensive capabilities in the hope that this will enable the two nations to commit to even deeper reductions in their nuclear arsenals. As it pursues this goal, the Administration will continue to reject any negotiated restraints on U.S. ballistic missile defenses.

### *China*

Engaging China in discussions of U.S. missile defense plans is also an important part of our international efforts. China is one of the countries most vocal about U.S. ballistic missile defenses and their strategic implications, and its leaders have expressed concern that such defenses might negate China's strategic deterrent. The United States will continue to discuss these matters with China. Maintaining strategic stability in the U.S.-China relationship is as important to the Administration as maintaining strategic stability with other major powers. At the same time, it is important that China understand that the United States will work to ensure protection of our



*ARROW 2 LAUNCH. The United States is working with Israel to develop the Arrow 2 ballistic missile defense system against regional threats.*

forces, allies, and partners in East Asia against all regional ballistic missile threats. Consequently, the Administration is committed to substantive and sustained dialogue with China, with the goals of enhancing confidence, improving transparency, and reducing mistrust on strategic security issues.

### *In Summary*

To implement its commitment to strengthen international cooperation, the Administration will take a number of steps (some of which have been elaborated in the previous section on regional architectures). It will:

1. Pursue the European Phased Adaptive Approach in a NATO context and support enhanced multilateral cooperation together with intensified bilateral cooperation with partners seeking to deploy capabilities. This effort should include building on the ALTBMD foundation.
2. Work with allies in East Asia to advance cooperative agendas to develop and deploy capabilities and adapt regional deterrence architectures to emerging requirements.
3. Work with security partners in the Middle East and elsewhere on similarly tailored agendas of cooperative action.
4. Conduct a substantive and sustained dialogue with Russia on all dimensions of the missile defense issue. However, the United States will not negotiate restraints on U.S. BMD capabilities.
5. Conduct a substantive and sustained dialogue with China to deepen mutual understanding of the challenges of strategic stability.





# MANAGING THE MISSILE DEFENSE PROGRAM

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The strategy and policy framework reflects the commitment of this Administration to deploy capabilities that have been proven under rigorous testing and are affordable over the long term. These commitments are part of a broader effort to align management of the missile defense program with the current strategy and policy framework and with national and international requirements. Toward that end, this review has considered the following specific questions.

1. What more can or should be done now to strengthen the testing program?
2. Can missile defense be made more cost-effective?
3. Is internal DoD oversight of the program adequate?
4. Is external transparency adequate?

The legislative mandate for this review specified a longer list of questions. Those questions have been fully explored as a part of this review, and the answers have been gathered under these four overarching questions for the sake of clarity.

In answering these questions, this review built on a comprehensive evolution of management practices associated with the missile defense program that has been overseen by Secretary Gates over the past three years.

- In March 2007, the Missile Defense Executive Board (MDEB) was established, bringing together senior DoD executives (and also representatives of the Department of State and National Security Staff) to review and provide guidance for missile defense.
- In September 2008, the Deputy Secretary of Defense issued innovative guidance to allow the Military Departments, the Joint Staff, the combatant commands, and other directorates within the Office of the Secretary of Defense to participate in and influence the development of the Missile Defense Agency's annual program plan and budget submittal.
- Further, the Deputy's guidance provided guidelines for responsibilities and authorities for resource execution as the developing elements of the Ballistic Missile Defense System (BMDS) reach maturity and are transitioned to the Military Departments for operation and support. The guidance, termed the BMDS Life Cycle Management Process, was used to develop the Missile Defense Agency's inputs to the President's Budget for FY 2011.

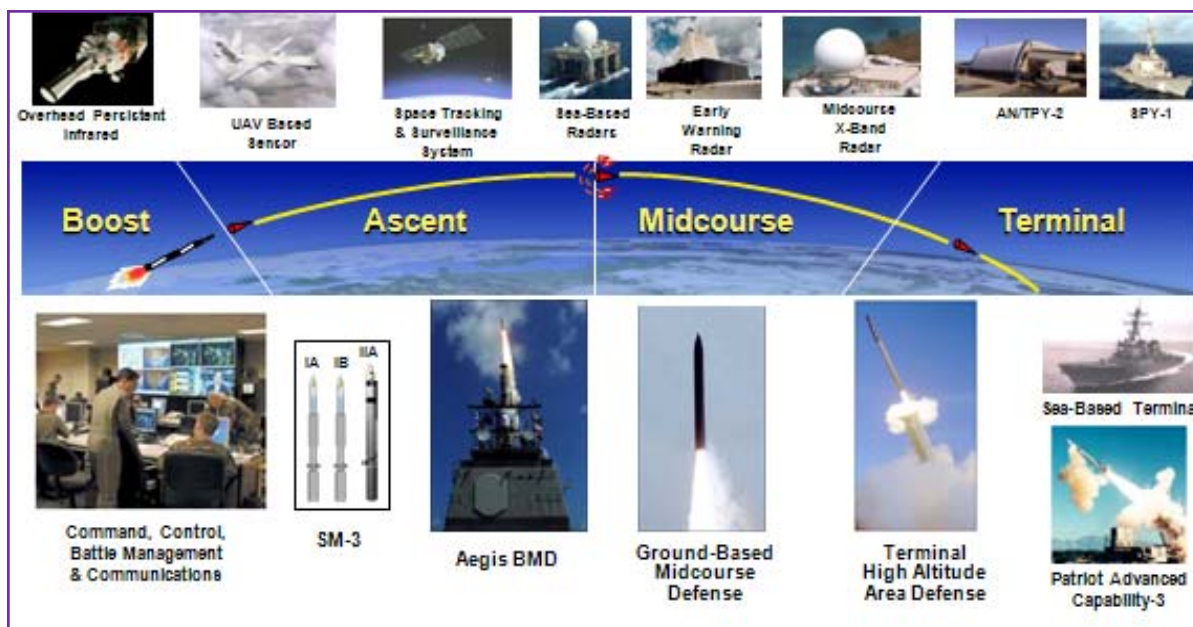
- In June 2009 the Missile Defense Agency adopted a new approach to test planning that integrates recommendations made by DoD’s Director of Operational Test and Evaluation (DOT&E), among others.

These steps have been studied in this review in the context of the new strategy and policy framework and broader initiatives by the Administration to promote improved planning and effective acquisition reform, with the following results.

### *Strengthening the Testing Program*

The 2002 decision to proceed with the simultaneous development and deployment of ground-based interceptors was a high-risk acquisition strategy intended to quickly field ballistic missile defenses before testing was complete. President Obama’s commitment to deploying proven technologies reinforces the urgency of adopting a new approach to the testing of missile defense capabilities in development.

In June 2009, the Missile Defense Agency announced a new approach to testing, embodied in an Integrated Master Test Plan. Consistent with recommendations of the DOT&E, the new approach addresses the testing of each system through its entire development, replacing an approach that looked only two years into the future. The intent is to update the plan semiannually to accommodate test results, emerging threats, or a new strategic direction such as the Phased Adaptive Approach. Given the complexity and global scale of the BMD system and of overall missile defense operations, assessments of system effectiveness must leverage the results of independently accredited models and simulations to supplement flight tests. The plan outlines a combination of ground and flight tests aimed specifically at acquiring test data to validate those



*THE BALLISTIC MISSILE DEFENSE SYSTEM. The U.S. BMDS is composed of integrated land-, sea-, air- and space-based sensors and “shooters” capable of intercepting a range of ballistic missile threats in various stages of flight.*

models and simulations. Specific tests are also designed to demonstrate key performance elements that cannot be effectively modeled. For the first time, the plan incorporates a series of dedicated, operational test events. The combination of models, simulations, and actual flight test data can then be used in evaluating operational effectiveness.

Congress has expressed a particular interest in the metrics by which reliability is evaluated. In addition to tracking each system's operational availability, the plan incorporates assessment objectives that address system- and component-level reliability and maintainability. These data are collected during day-to-day operations of the deployed elements, as well as during dedicated exercises and flight test events. Other key assessment criteria include the systems' logistics supportability, the quality and maturity of their software, and their use of computer resources. The results of these assessments form the basis for an evaluation of operational suitability.

In DoD's view, this procedure is a major step forward and addresses concerns raised with the prior test construct. The DOT&E has been actively engaged in overseeing the development of this new approach and has concurred with its implementation. While there will undoubtedly be refinements to this new testing construct, the Department needs to gain experience with its implementation before assessing the need for adjustments. DoD expects to work with Congress over the coming year to conduct that assessment.

### *Cost-Effectiveness*

How can missile defenses be made more cost-effective? Answering this question requires a definition of the metrics by which a weapon system is determined to be cost-effective. This review has focused on the following metrics.

One metric of cost-effectiveness is cost in comparison with other available options. In principle, less expensive interceptors that provide the same capability should be favored over more expensive ones. For example, a future variant of the SM-3 could provide a complement to the existing GBIs. The current cost of a GBI is approximately six times the cost of the SM-3 today.

A second metric of cost-effectiveness is affordability. Is the BMD system, as currently being developed, affordable from the larger perspective of the Department's and the nation's competing priorities? It should be noted that since 2001, the average funding for missile defense has accounted for about 2 percent of the Department's top line.

A third metric of cost-effectiveness is the relationship between incurred costs and costs avoided. Strong and effective missile defenses are intended to have a deterrent effect by making clear to potential proliferators the impossibility of gaining an advantage in threatening to employ or employing ballistic missiles. Strong and effective defenses thus may help mitigate the emergence of future threats, whether from additional countries or of a more advanced kind from among the

ranks of countries now of concern. Such a dampening effect could reduce other types of costs for the United States and its allies in meeting those future threats. Investment in stronger missile defenses with the aim of strengthening deterrence must also be considered in the context of broader investments with the same aim, including larger deployments of conventional military forces, advanced forms of strategic strike, and even nuclear forces.

The actual life-cycle cost of the missile defense system is difficult to determine, because there is no final configuration for the system. It is clear that an effort to match one-for-one the potential deployments of short-range missiles within the regions would be prohibitively expensive. Accordingly, the United States must pursue a comprehensive approach to risk management. This must include a robust international norm against missile proliferation and technology transfer, effective action by members of the Missile Technology Control Regime, and diplomacy concentrated on particular countries of concern. Such an approach also supports the Administration's decision to focus on developing and deploying mobile systems, which enable us to bring more missile defenses to bear on the most immediate threat.

Adopting a cost-effective approach to BMD development occasionally involves taking decisive action on programs that do not meet cost, schedule, or performance goals. Accordingly, the Secretary announced his intention in the FY 2010 President's Budget request to seek the termination of two troubled programs and the restructuring of a third.

The Multiple Kill Vehicle (MKV) program was one such troubled program. The MKV was intended to be deployed on midcourse interceptors, like the ground-based interceptor, so that one interceptor could address complex countermeasures by identifying and destroying all lethal objects in a threat cluster. However, the MKV technology was not maturing at a reasonable rate. Since continuing to develop those technologies required to demonstrate MKV effectiveness would have been time-consuming and costly, the Department chose to terminate the MKV program and invest in other approaches.

The Defense Department also terminated the Kinetic Energy Interceptor (KEI) program. The KEI mission was designed to counter advanced ballistic missile threats by intercepting missiles in the boost phase of flight. KEI was neither affordable nor proven, could not be integrated into existing weapons platforms or systems, and did not conform to the strategy of focusing on emerging regional missile threats. As a result, it grew in cost from \$4.6 billion to \$8.9 billion, the development schedule continued to slip, and the average-unit production cost grew from \$25 million to more than \$50 million per interceptor. In addition, the KEI's size meant that any existing operational platform would need significant modifications to host it.

Finally, the Airborne Laser (ABL) program was identified for restructuring because it had experienced repeated schedule delays and technical problems since its inception in 1996, and

because its operating concept was not adequately defined. Plans for a second ABL aircraft were canceled, and the existing ABL aircraft—a highly modified 747 transport—was retained but shifted to a technology demonstration program. The Department is examining the implications of retaining the current ABL aircraft as a high-energy laser research test bed.

Cost control is an important aspect of cost-effectiveness. MDA is subject to existing DoD-wide programming and budgeting oversight processes, and MDA programs are reviewed and compete equally in the annual Program Planning Budgeting and Execution (PPBE) process. This practice is reflected in the September 2008 decision to adopt the Ballistic Missile Defense Life Cycle Management Process. This topic is taken up in further detail in the following section on oversight, but the main point is clear: in the view of DoD, the Life Cycle Management Process is functioning well to identify requirements, allocate resources, and provide departmental insight to control costs, and it should be maintained.

### *Internal DoD Oversight*

Congress has posed multiple questions regarding oversight of the missile defense program that reflect different concerns about the acquisition and requirements processes, among others. Some historical context is useful for defining the issues.

Reacting to heightened concern about missile proliferation, in 2002 then-Secretary of Defense Donald Rumsfeld redefined some of the roles of the newly renamed Missile Defense Agency and streamlined its oversight and reporting processes. MDA was exempted from DoD's standard acquisitions rules and requirements generation process. This decision reflected the then broad consensus within DoD's leadership that the rapid development of capability was an urgent priority and, further, that there was need for a centralized approach to the management and oversight of the missile defense program in the context of special authorities. It establishes business rules, and it facilitates the transition of developmental capabilities to operational status.

This approach, while successful in developing deployable capabilities, also generated some challenges. The Military Departments were generally not closely involved in determining requirements or in the development process. As BMDS elements approached technical maturity,



*THE INTEGRATED MASTER TEST PLAN. IMTP is a key planning document for the Missile Defense Agency's test program, which provides critical data to demonstrate the performance of ballistic missile defenses. Ground and flight tests demonstrate and assess system capabilities and provide data for advanced modeling and simulation activities that measure and predict the performance of all missile defense technologies.*

this lack of engagement worked against orderly transition of capabilities from MDA to the Services, blurring responsibilities for operation and support and for budget formulation and execution.

As noted above, an initial step was taken to address these and some related oversight challenges in March 2007 with the creation of the Missile Defense Executive Board. The MDEB is chaired by the Under Secretary of Defense (Acquisition, Technology, and Logistics [AT&L]), and its membership includes representatives from USD (Policy); USD (Intelligence); Cost Assessment and Program Evaluation; the Joint Staff; the Department of State; the Military Departments; U.S. Strategic Command; DOT&E; the Director, Defense Research and Engineering; and MDA. Advisers now include USD (Comptroller); Commander, U.S. Northern Command; and the National Security Staff. The board provides oversight and guidance in a collaborative mode.

The board's work on requirements is supplemented by the work of the Warfighter Involvement Process, which is chaired by USSTRATCOM. One of the tasks of this group is to assess force structure and inventory requirements. The MDEB is supported by four committees: Program, Acquisition, and Budget Development; Policy; Test and Evaluation; and Operational Forces. Together, they provide the opportunity for the Department to review a broad spectrum of program topics in detail.

The MDEB also oversees the BMDS Lifecycle Management Process described in the preceding section and recommends to the Department's leadership a strategic program plan and associated funding strategy. The process manages missile defense as a comprehensive portfolio, following a recommendation of the 2006 Quadrennial Defense Review. This approach helps ensure a proper balance among different funding demands. It clarifies the roles of stakeholders in determining the program plan and budget. It establishes business rules. And it facilitates the transition of developmental capabilities to operational status.

Within DoD, the MDA budget now moves through the following steps. First, initial direction for the development of the missile defense program plan and budget is provided by the Department's leadership through the National Defense Strategy, Guidance for the Development of the Force, and departmental fiscal guidance. Warfighter and Military Departments then lead the development of required capabilities as well as requests for specific operational elements and amounts for operational support. MDA—with USD(AT&L), USD (Comptroller), USSTRATCOM, and the Military Departments—then develops a draft program plan and a budget. The program plan and budget are next presented to the MDEB for review, endorsement, and forwarding to the Deputy Secretary for final approval. Last, MDA's program and budget are tracked through multiple reviews by the MDEB for compliance during the execution year.

This review of this oversight process has come to the following main conclusions.

First, the approach adopted in 2007 has effectively addressed the concerns then evident about Service involvement and capability transition. The Services are now involved in the process of setting requirements for capabilities and support, monitoring the development of capabilities, and working through their components with the combatant commands to flow capability into the force. Indeed, all of the stakeholders in future BMD capabilities are closely engaged in the oversight of the developmental process. Since March 2007, the MDEB has engaged with and has directed or endorsed a number of Military Department–specific topics, including Terminal High Altitude Area Defense Transition Readiness, Joint Capability Mix Study recommendations for acquiring additional THAAD and standard missiles, formulation and execution of the BMDS Life Cycle Management Process, and Lead Military Department decisions for the original BMDS elements. Frequent MDEB meetings and the variety of topics presented for review and deliberation have resulted in departmental decisions on planning, development, and transition from element development to Military Department operation. The MDEB is well positioned to oversee and direct the efforts to execute the Administration’s direction on the new capabilities to be established by the development of the European Phased Adaptive Approach.

Second, there would be no benefit in bringing MDA into JCIDS or the full DoD 5000 acquisition reporting processes at this time. The current approach functions well to define requirements and acquire needed capabilities in a timely fashion. The MDEB is convened a minimum of six times each year, allowing senior Department leadership almost continuous insight and involvement in Missile Defense Agency issues, decisions, and planning. The four committees supporting the MDEB also meet numerous times each year and provide further opportunities for the Department to examine and discuss Missile Defense issues and plans in detail.

Over the past two and a half years, the MDEB has reviewed and made decisions on requirements and acquisitions in areas including budget preparation and execution reviews; Strategic Arms Reduction Treaty target alternatives; air-launched target options; missions, roles, and structures of the Missile Defense Agency; Missile Defense Policy Guidance; and Warfighter Prioritized Capability List input to system requirements.

Third, there is benefit in continued innovation in managing the missile defense program. A further, supplemental step can be taken to improve the integration of Service and MDA program and systems engineering. The Department has determined that it would be useful to transition to MDA/Service program offices to ensure that missile defense systems are not only developed through MDA’s highly integrated systems engineering process but also meet the doctrine, organizational, training, leadership, personnel, and facility needs of the Services. These “hybrid” program offices are intended to develop missile defense systems that are fully interoperable and thus leverage all the capabilities of the “network-centric” ballistic missile defense system, while



being operationally effective, suitable, and survivable within each Service's force structure. The initial hybrid program office for the Sea-Based X-band radar (SBX) was established in 2008. The THAAD and AN/TPY-2 hybrid program offices are due to become a reality in 2010. Other hybrid program offices are in the planning stages.

An additional measure of Department oversight is represented by the planned MDEB reviews of the BMDS elements. For example, USD(AT&L) chaired an MDEB in November 2008 to conduct a comprehensive review of the THAAD program's progress and readiness for warfighter operation, with the intent to assess the program's progress before awarding a THAAD hardware contract. The review successfully provided detailed information needed for the MDEB to endorse THAAD acquisition plans. Such element reviews will be undertaken whenever the Missile Defense Agency prepares to add to the missile defense inventory. Plans are in place for the next review, involving the AEGIS BMD program element. These reviews enable detailed departmental oversight and provide the flexibility for adjustments to a system composed of multiple systems.

### *External Transparency*

The special responsibilities granted to MDA in 2002 left concerns about congressional oversight and the adequacy of the external transparency provided by the Department on its missile defense programs, priorities, and commitments. This report is intended in part to signal the commitment of the Administration to full transparency and to informed national and international discussion and debate on these topics. It reflects the ongoing high-level engagement of Department leadership in communicating with Congress about the missile defense program.

One illustration of this engagement is the unusual intensity of the Department's reporting to Congress on this particular topic. MDA, the Military Departments, and the Office of the Secretary of Defense are engaged in a sustained effort to keep members of Congress, the relevant committees, and interested staff informed about policies and priorities. In the budget process, this begins with detailed reports on program content typical of all major acquisition programs. (As these budgets shift from mostly research, development, test, and evaluation to a mix of RDT&E and procurement, military construction, and operations and maintenance, external transparency will



*THAAD FLIGHT TEST. White Sands, NM. Successful test of the Terminal High Altitude Area Defense system at the White Sands Missile Range. The launch was an integrated flight test of THAAD components, including the launcher, radar, fire control and communications and interceptor.*

be further enhanced.) But there is much more. MDA produces numerous reports on areas of particular interest to Congress, usually between six and ten per year. MDA and DoD have also supported congressionally commissioned studies carried out by the Government Accountability Office—more than 20 in-depth studies since 2002. Congress has also commissioned independent studies of the agency and of emerging capabilities, and the Department has helped facilitate these as well.

From the Department's perspective, this is a very high degree of transparency and meets the needs of legislative oversight. DoD welcomes sustained and substantive executive-legislative discussion of the nation's missile defense agenda.



# CONCLUSION

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Under the direction of the President and in accordance with congressional legislation, the Department has conducted a comprehensive review of U.S. missile defense policies, strategies, plans and programs.

The Ballistic Missile Defense Review has taken a broad view. It has surveyed the spectrum of threat capabilities and possible intent. It has assessed the current state and potential growth of U.S. BMD technical capabilities. It has considered opportunities for cooperation with allies and partners in missile defense. It has considered the underlying technical, organizational, and programmatic structure of U.S. missile defense. The result is a refocused policy and a comprehensive strategy to improve our missile defenses.

The key policy priorities set out earlier are to

- Defend the United States homeland against the threat of limited ballistic missile attack;
- Defend against existing regional missile threats to U.S. forces while protecting our allies and partners and enabling them to defend themselves;
- Test our developing capabilities to ensure that they can reliably and effectively help U.S. forces accomplish their mission;
- Develop and field BMD capability that is fiscally sustainable over the long term;
- Base BMD planning on reasonable judgments about current and prospective threats to the United States and its allies and ensure that capabilities are adaptable; and
- Seek to lead expanded international efforts for missile defense with allies and partners that will provide pragmatic, cost-effective capability.

The review determined that the United States possesses sufficient capability to defend the homeland against a ballistic missile attack from states such as North Korea or Iran for the foreseeable future. Moreover, it identified steps that will strengthen homeland defense in the years ahead. The advent of new sensor capabilities and the development of a comprehensive integrated plan for testing and evaluation will better enable us to understand, employ, and further improve BMD capabilities.

One of the most significant changes resulting from the review has been the decision to pursue regional phased adaptive approaches that are tailored to the threats facing each region, the capabilities available, and the technologies best suited for deployment. These phased adaptive

approaches comprise many components and are not limited to European defense, though to date the European Phased Adaptive Approach has received the most attention.

Phased adaptive approaches will enable a flexible, scalable response to BMD threats around the world by incorporating new technologies quickly and cost-effectively and by maintaining a focus on current threat assessments. These approaches will provide warfighters with the BMD capabilities required now, while also maintaining the flexibility necessary to respond to new threats as they materialize. In addition, such approaches will provide a number of additional opportunities to create interoperable and shared missile defenses with BMD allies and partners. The combined effort will be a substantial improvement in regional deterrence and defense architectures.

The review has also conducted a thorough assessment of the organizational and programmatic structure for the development, fielding, operation, and maintenance of BMD capability. The current structure, as recently revised, appears to be working well. With each budget cycle the process will be improved. The report addresses some actions and identifies areas for further study regarding specific smaller aspects of the process. Departmental efforts subsequent to the review are already beginning or will be initiated in the near term. These include comprehensive planning for the management of missile defense forces and elements on both a global and regional basis across the combatant commanders' areas of responsibility, as well as the alignment of emerging capabilities and systems with individual Services for training, manning, deployment, and sustainment. These actions will be enacted in consultation with Congress and officials within the executive branch. We look forward to making progress on those areas as soon as possible.

Throughout the review the efforts of all the participants within DoD and across the interagency have been focused on the interaction of the many different factors—strategy, tactics, technology, force capability, fiscal requirements, and international engagement—that are essential to providing effective ballistic missile defense. This review, by enabling us to consider all of these challenges and opportunities in a comprehensive manner, will result in an enhanced defense of the United States and its forces, allies, and partners from the danger of ballistic missiles wherever and whenever they threaten us.