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Defense of the U.S. Homeland Against Ballistic Missile Attack

By Baker Spring

Briefing Highlights

Rogue states, such as Iran and North Korea may come to possess long-range missiles capable of reaching U.S. territory from within their national borders

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Nations with less-developed missile capabilities could accelerate their ability to hold U.S. territory at risk by deploying short-range ballistic missiles on surface ships close to American coasts.

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Upgrades to existing Aegis-based BMD capabilities and the establishment of a non-GMD East Coast test bed for missile defense would provide a substantive capability to address the EMP threat.

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The global missile defense system the Obama administration is pursuing is heavily skewed in the direction of advancing regional missile defense capabilities, with far less emphasis placed on the development of homeland defense capabilities.

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The most effective overall BMD system is one that can provide a layered defense, with opportunities to intercept attacking ballistic missiles in all three stages of flight.

Today, the Obama administration and Congress have a variety of options before them for strengthening the defense of the U.S. homeland against ballistic missile attack. The word "options," however, should not be interpreted as an either/or choice. Official Washington should not—indeed, cannot—choose between defending the homeland against ballistic missile attack and erecting regional capabilities against the threat. Rather, it is necessary to treat the variety of programs available for this purpose not as options, but as components of a global plan for development and fielding: essentially, an "all of the above" approach. Only in this way can America achieve the proper balance between missile defense capabilities for the protection of the United States and the protection of our friends and allies and forces in various regions around the world.

Threat Matrix

Evaluating our capabilities must start with a stark realization: America's capacity for defending itself against ballistic missile attack is behind the threat curve. It will take a full-court press for U.S. capabilities in this area to overtake the expansion of the threat and provide a truly effective level of defense for the U.S. homeland.

Long-range Ballistic Missiles. China and Russia, while not currently adversaries of the U.S., both possess long-range ballistic missiles that are capable of reaching U.S. territory. In the future, the threatening states of Iran and North Korea may come to possess similar long-range missiles, and have the same capability to target U.S. territory from within their national borders. Both are certainly moving in that direction with their ballistic missile modernization efforts. Russia's current fleet of long-range ballistic missiles includes SS-18, SS-19, SS-25 and S-27 land-based intercontinental ballistic missiles (ICBMs) and SS-N-18, SS-N-23 and SS-N-32 submarine-launched ballistic missiles (SLBMs).[1] China's fleet includes DF-4, DF-5 and DF-31 ICBMs and JL-1 and JL-2 SLBMs.[2] Both Iran and North Korea, meanwhile, have been launching rockets that are capable of placing satellites in orbit—vehicles which can be converted into ICBMs.

Medium- and Intermediate-range land-based missiles. At the same time, some countries closer to U.S. territory may also come to obtain ballistic missiles, most likely from outside sources. In these cases, ballistic missiles of medium- and intermediate-range will be capable of reaching the U.S. from launch points located on their territories. Here, the historical analogy is relevant; Cuba

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obtained such a capability from the Soviet Union for a brief time in the early 1960s, and it led to one of the most dangerous moments in the Cold War era. Currently, Venezuela could obtain such ballistic missiles, perhaps from an outside source like Iran, with little advanced notice.

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Short-range ballistic missiles forward-deployed on ships. In its 1998 report, the Commission to Assess the Ballistic Missile Threat to the United States (colloquially known as the Rumsfeld Commission) assessed that nations with less-developed missile capabilities could accelerate their ability to hold U.S. territory at risk by deploying short-range ballistic missiles on surface ships close to American coasts.[3] The scenario remains relevant today, because a number of nations—including Iran and North Korea—have the requisite short-range ballistic missiles to do so.

Ballistic missile configured for the delivery of electro-magnetic pulse (EMP) weapons. When a nuclear weapon is detonated high above a nation's territory, it releases a burst of electrons, called an EMP, which will damage key components of that nation's electric grid and by extension other critical elements of its infrastructure. Ballistic missiles of various ranges, depending on launch points, are the ideal means for delivering an EMP strike against the U.S. A 2004 report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack, or EMP Commission, clearly showed that the EMP threat is extremely serious—and that the U.S. is critically vulnerable to such an attack.[4]

Currently, however, the Obama administration is ignoring missile defense options for addressing this threat by downgrading and degrading ascent-phase missile defense capabilities. Indeed, a September 2011 report of a task force of the Pentagon's Defense Science Board concluded that the early intercept of ballistic missiles, which is essential to providing a defense against EMP attacks with ballistic missiles, "is not a particularly useful goal or protocol for design of a regional BMD system."[5] Yet comparatively modest measures—such as upgrades to existing Aegis-based BMD capabilities and the establishment of an East Coast test bed for missile defense—would provide a substantive capability to address the EMP threat.

Ballistic Missile Defense (BMD) Options

It has long been understood that the most effective overall BMD system is one that can provide a layered defense, with opportunities to intercept attacking ballistic missiles in all three stages of flight. This is because ballistic missiles are more vulnerable to different types of interceptors in each of these phases, and crafting countermeasures for overwhelming or confusing defensive capabilities in one are not necessarily applicable in another. A layered capability, moreover, is inherently more responsive and effective due to the higher level of redundancy in each of the phases of a ballistic missile's trajectory. These are:

The boost/ascent phase, when the missile is still under powered flight and shortly thereafter, but prior to the separation of the payload. When a missile is under powered flight, it is easy to detect and track and is moving relatively slowly, which presents certain advantages for the defense. During the ascent phase (following burnout) the chaff, decoys and other countermeasures that can overwhelm or confuse the defense in the midcourse phase (see below) have not yet been released, and can be destroyed as a unitary target, as they would with boost-phase intercepts. The challenge of boost/ascent-phase intercepts is for the defensive interceptor to be able to reach its target very quickly.

The midcourse phase, when the missile or its re-entry vehicle picks up speed while it is traveling through space. The advantage here is that the midcourse is the longest of the three phases, particularly for long-range missiles, permitting longer intercept timelines. The challenge for the defense in the midcourse phase is to find the target and discriminate between the real warheads and the variety of countermeasures.

The terminal phase, when the missile or re-entry vehicle

comes back into the atmosphere. The advantage for the defense here is that it permits a long timeline for performing the intercept, and the atmosphere strips away the countermeasures, revealing the real warheads. The problem with terminal defenses is that they protect only relatively small areas, and therefore are—in and of themselves—an inefficient and costly means of defense.

Sensors and Command and Control

The bedrock of the global missile defense system which the United States is putting into place is the combined elements of sensors and command and control systems and structures. On the sensor side, this includes land-based and ship-borne radar and satellite sensors, among others. Some of these systems also perform missions apart from ballistic missile defense (such as tactical warning). The global command and control network includes a variety of assets and is designed to furnish targeting information collected by the sensors to the interceptors. These sensors and command and control systems are of paramount importance to homeland defense against ballistic missiles.

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BMD Systems

Patriot: An Army system, the Patriot was originally an air defense system that was converted for use in countering shorter-range missiles during 1991's Operation Desert Storm and afterward. During the intervening years, the Patriot system has been upgraded in several iterations and is now much more capable than it was during Desert Storm.[6] Nevertheless, it remains focused on countering shorter-range missiles that threaten point targets by intercepting them in the terminal phase of flight for the protection of forward-deployed U.S. expeditionary forces and allies. While Patriot could provide protection against shorter-range ballistic missiles launched from ships off the U.S. coast, as a point defense it is not designed to provide the broad area of protection necessary for most elements of the homeland defense mission.

Medium Extend-range Air Defense System (MEADS): MEADS is a multi-national development program between the U.S., Germany and Italy.[7] It is designed to be the follow-on to the Patriot system. As such, it is not ideally suited for providing for the defense of the U.S. homeland for the same reasons as the Patriot. Further, the Obama administration is terminating MEADS. Specifically, on February 11, 2011, the Defense Department announced that the U.S. was walking away from the MEADS program—a decision which has left its international partners, Germany and Italy, hanging.[8]

Standard Missile-6 interceptors (SM-6): The SM-6 is derived from the existing sea-based Standard missile air defense airframe. It is to be deployed on cruisers and destroyers and will provide air defense against fixed- and rotary-wing aircraft, unmanned aerial vehicles, and land-attack anti-ship cruise missiles in flight. In the area of ballistic missile defense, the SM-6 will assume U.S. Navy's Sea-Based Terminal (SBT) role and will provide defense against ballistic missiles in their terminal phase of flight, succeeding the existing Standard missile-2 Block IV (SM-2 Blk IV). The initial version of this system is to enter service around 2015, with a later version to enter service around 2018.[9]

Like Patriot and MEADS, the SM-6 is designed largely to provide a point defense against ballistic missiles by intercepting them in the terminal phase of flight. As a ship-board system, it is fair to say to that the SM-6 is more geared to providing self-defense capabilities to the U.S. Navy fleet against both air and certain kinds of ballistic missile threats. Fortunately, the Navy has other interceptors in the Standard missile family that are both deployed and being developed that are better suited to providing an effective defense to the U.S. homeland. They are described later.

The Terminal High Altitude Area Defense (THAAD): THAAD is a globally transportable, rapidly deployable capability to intercept and destroy ballistic missiles inside or outside the atmosphere during their final, or terminal, phase of flight. While it is designed to intercept and destroy shorter-range ballistic missiles in the terminal phase of flight, as does Patriot, MEADS and the SM-6, it can do so at a higher altitude than those other terminal de-

fense systems.[10] This gives THAAD the ability to defend a larger area than the other three terminal defense systems listed above. As a result, there is somewhat stronger argument for deploying THAAD interceptors in U.S. coastal areas to provide a defense against shorter-range ballistic missiles that can be launched from ships off the coast. Nevertheless, there remain other systems that are versatile enough to counter this and other kinds of missiles aimed at U.S. territory.

The Standard missile-3 (SM-3) family of interceptors: SM-3 interceptors are ascent and midcourse defense interceptors and initially have been deployed on ships using the modified Aegis Weapons System. Further, interceptor tests to date have demonstrated the SM-3's capability of countering short- through intermediate-range ballistic missiles. Analysis done for The Heritage Foundation has determined that the SM-3 could be capable of countering long-range ballistic missiles as well, as long as additional radar and other sensor assets are made available.[11]

Given the flexibility of the SM-3 family of interceptors, this system could be used to defend the U.S. homeland in several ways. First, it could be used to counter shorter-range missiles launched at U.S. soil from ships off the coast. Second, it could be used to counter long-range missiles launched from the territories of countries such as China, Iran, North Korea and Russia. Finally, the SM-3 interceptor, admittedly under limited circumstances, could be used to counter shorter-range missiles used to deliver an EMP strike against the U.S. This is because, in 2002, an SM-3 interceptor successfully demonstrated an ability to destroy a shorter-range missile in the ascent-phase of flight, and therefore prior to the delivery of an EMP warhead to an appropriate location in space.[12]

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The Obama administration, however, is planning to buy an insufficient number of SM-3 interceptors. Its plan puts the Aegis system at the center of its Phased Adaptive Approach (PAA) to missile defense. Then-Secretary of Defense Leon Panetta, however, indicated in 2011 that with sequestration the Obama administration may terminate the European component of the PAA. Now that sequestration is in effect, it is uncertain what will happen to the SM-3 procurement program. In its proposed FY 2013 budget, the Administration asked for $389 million to procure 29 SM-3 Block IB interceptors for that year.[13] With sequestration, it could be the case that the Navy will have procured just 26 of those interceptors during this fiscal year. The request for FY 2014, meanwhile, indicates that the Administration will seek 52 interceptors, but this again does not account for the impact of sequestration. A proper homeland defense, meanwhile, would include 500 sea-based SM-3 missiles to address several different types of missile threats, although only a portion of these interceptors would available for the homeland defense mission at any one time.

Aegis Ashore: The Administration's PAA also includes the deployment of SM-3 interceptors on land in Europe, starting in Romania. This option is called Aegis Ashore. None of these interceptors would provide a defense to the U.S. homeland. Although the Obama administration has no plans to do so, it is entirely plausible to locate additional Aegis Ashore units on U.S. territory to provide protection where gaps exist in the sea-based Aegis anti-missile capability. This could be used to counter missiles deployed on ships off the U.S. coast, as well as on land in a country like Venezuela. An example of a gap in coverage is along the Gulf of Mexico coast. If two Aegis Ashore sites are located on U.S. territory, it would add some 40 to 50 interceptors to the homeland defense mission.

Airborne Laser (ABL): The Airborne Laser development program modified a Boeing 747 airframe to carry an anti-missile laser weapon for destroying ballistic missiles in the boost phase of flight. The system performed a successful intercept in 2010.[14] Nevertheless, the Obama administration chose to mothball it in 2012. The nation would have been better served had Administration continued this development program and built one or two additional prototype aircraft with an accompanying plan to hold them in reserve for use in emergency operations. With some advanced intelligence and in permissive air environments, the ABL demonstra-

tors could contribute to homeland defense. For example, they could be used destroy short-range ballistic missiles launched from ships off the coast before they would be used to detonate EMP warheads. Also, the ABL could be used to intercept long-range missiles directed against U.S. territory from abroad if they are positioned in forward basing areas. In this case, the intercepts would be performed prior to the release of countermeasures designed to confuse or overwhelm midcourse defenses.

Airborne Weapon Layer (AWL): Another boost-phase intercept capability, the AWL is a proposed joint effort between the Air Force and Missile Defense Agency to develop a modified version of the Advanced Medium-range Air-to-Air Missile (AMRAAM) for countering aircraft to intercept ballistic missiles.[15] Specifically, it would carry a different warhead that is designed to destroy missiles shortly following launch. An earlier version of this technology successfully intercepted a missile in a test in 2009. While using a different technology, the AWL could offer the same kind of options for homeland missile defense described above for the ABL. The AWL, however, has the potential to operate in a less than permissive environment.

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Ground-based Midcourse Defense (GMD) interceptors: The sole fielded system designed to defend U.S. territory against missile attack is the GMD system. It is designed to destroy long-range missiles that may be launched against the United States by distant countries during the mid-course stage of flight. These interceptors are currently fielded in Alaska and California. The Bush administration, while in office, had proposed fielding 54 of these interceptors by supplementing the units in Alaska and California with a deployment in Poland. In 2009, however, the Obama administration proposed to scale those numbers back to 30, in part by forgoing altogether the fielding of 10 GMD interceptors in Poland. In a partial reversal of the 2009 decision, the Administration announced earlier this year that it will increase the number of interceptors in Alaska and California to 44. Also this year, the House of Representatives has advanced a proposal to construct an additional GMD site somewhere along the East Coast. While it is not yet certain how many interceptors would be fielded at an East Coast site, it is reasonable to expect that it would add about 20 interceptors overall. This would lead to a total GMD force of 64 interceptors.

Space-based Interceptors (SBIs): During the late 1980s, the Department of Defense was pursuing a program for developing and acquiring a constellation of missile defense interceptors in space called Brilliant Pebbles. An exhaustive series of studies was undertaken in that timeframe, which demonstrated that there were no "show stoppers" for the deployment of space-based interceptors, both in terms of effectiveness and in terms of cost.[16] In accordance with these positive studies, the Pentagon's Defense Acquisition Board (DAB) approved an acquisition plan for Brilliant Pebbles in 1990, and the Under Secretary of Defense for Acquisition directed execution of the plan.[17] Further, two contractor teams expressed their willingness to accept firm fixed-price contracts for the delivery of the interceptors under the plan.[18] Although much ground has been lost during the intervening years, the United States may decide to revive this acquisition program. According to a report adopted by the Independent Working Group on Missile Defense, the acquisition cost of a 1,000 interceptor constellation (with one replacement interceptor for each), which excludes launch and operating costs, will be approximately $17 billion in current dollars.[19]

The Obama administration's missile defense program, however, currently makes an inadequate commitment to space-based missile defense capabilities. The Obama Whie House has yet to recognize that the deployment of missile defense interceptors in space would provide the best possible protection to both the U.S. and its allies against missile attack. In light of the Administration's 2010 *Ballistic Missile Defense Review Report*, which states

that it is not the purpose of the U.S. missile defense program to deploy a system that could counter Chinese and Russian long-range missiles, it is reasonable to conclude that the White House erroneously believes that space-based interceptors would be destabilizing.[20]

Bolstering Defense of the Homeland

The federal government has a constitutional obligation to defend the American people to the best of its ability. Currently, the structure of the global missile defense system the Obama administration is pursuing is heavily skewed in the direction of advancing regional missile defense capabilities, with far less emphasis placed on the development of homeland defense capabilities. In order to provide better balance, the following is an appropriate objective missile defense interceptor force to field in the medium to long term:

- 550 SM-3 interceptors of various models fielded on land and at sea;
- Three ABL developmental aircraft, with a backup operational capability;
- 500 AWL interceptors;
- 64 GMD interceptors;
- 1,000 space-based interceptors, based on updated versions of Brilliant Pebbles technology.

Looking ahead

Ultimately, the United States needs a layered missile defense architecture in order to provide a robust defense of its homeland, in addition to its forward-deployed forces and allies, against ballistic missile attack. This architecture must include ground-based, sea-based, air-based and space-based interceptors, which are backed by a network of sensors and command and control systems.

The missile defense program currently being pursued by the Obama administration, in addition to being underfunded, is skewed in favor of deploying and deploying regional missile defense capabilities over those for the protection of the homeland. Congress should correct these shortcomings by authorizing and funding a more robust missile program, which will also provide a far greater degree of protection to the homeland than what is envisioned by the White House.

The views expressed in this article are those of the author and do not necesessarily represent the views of the American Foreign Policy Council.

Endnotes

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Defense Technology Program Brief

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