Defending the Homeland

The Role of Missile Defense

The Independent Working Group on Missile Defense and the Space Relationship

Published by The Institute for Foreign Policy Analysis, Inc.
SPECIAL REPORT

On a Capitol Hill Briefing

Defending the Homeland
The Role of Missile Defense

Senate Visitors Center
Capitol Hill
June 25, 2013

Sponsored by
The Independent Working Group on Missile Defense and the Space Relationship

Organized by
The Institute for Foreign Policy Analysis, Inc.
The Independent Working Group (IWG) on Missile Defense and the Space Relationship was formed in 2002 to provide a forum for informed discussion of missile defense. The IWG has several goals: (1) to examine the evolving threats to the United States, its overseas forces, allies, and coalition partners; (2) to address missile defense requirements; (3) to assess current missile defense programs; and (4) to set forth general and specific recommendations for missile defense. The IWG contains members with a range of political–military and scientific-technical expertise, experience, and knowledge.

The Institute for Foreign Policy Analysis (IFPA), now in its 37th year, develops innovative strategies for new security challenges. IFPA conducts studies and produces innovative reports, briefings, and publications on national security and foreign policy issues. The Institute also organizes workshops and conferences. IFPA’s products and services help government policymakers, military and industry leaders, and the broader public policy communities make informed decisions in a complex and dynamic global environment. With offices in Cambridge, Massachusetts, and Washington, D.C., the Institute maintains a core staff as well as a global network of research advisors and consultants.
Mr. Ari Zimmerman  
Military Legislative Assistant  
Office of Congressman Trent Franks

**PROJECT ADVISORS**

**Dr. Gregory Canavan**  
Scientific Advisor, Physics Division  
Los Alamos National Laboratory

**Mr. John H. Darrah**  
former Chief Scientist  
U.S. Air Force Space Command

**Dr. William R. Graham**  
former Science Advisor to the President and  
former Chairman, Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack

**Dr. Jack Hammond**  
Senior Scientist  
Lockheed Martin Corporation  
former Director of Kinetic Energy and Directed Energy Programs  
Strategic Defense Initiative Organization

**Dr. John Norton Moore**  
Walter L. Brown Professor of Law  
Director, Center for National Security Law  
Director, Center for Oceans Law and Policy  
University of Virginia Law School

**Dr. Keith B. Payne**  
CEO and President, National Institute for Public Policy  
and Professor and Department Head  
Department of Defense and Strategic Studies  
Missouri State University in Washington, D.C.
INTRODUCTION

The Independent Working Group (IWG) on Missile Defense and the Space Relationship was formed in 2002 to provide a forum for informed discussion of missile defense needs. Our goals are several: (1) to examine the evolving threats to the United States, its overseas forces, allies, and coalition partners from the proliferation of ballistic missiles; (2) to address missile defense requirements in the twenty-first century security setting; (3) to assess current missile defense programs in light of technological opportunities in the post-ABM Treaty world; and (4) to set forth general and specific recommendations for a robust, multilayered missile defense (i.e., land, sea, and space) for the United States to meet the challenges of an emerging security setting that contains greater proliferation threats. The mission of the IWG is to educate policymakers, legislators, the media, and the American people on the need for a multilayered missile defense. Our goal is also to make missile defense as fully as possible a part of homeland security. In other words, our work cuts across national and domestic security and forms an indispensable part of U.S. national security strategy.

In pursuit of our objectives, the IWG meets several times a year. These meetings provide an opportunity not only to analyze issues directly related to missile defense, but also to identify other national security topics related to missile defense. The IWG is unique as an authoritative group that includes scientific-technical knowhow as well as public policy expertise working together to promote a greater understanding of missile defense in the policy community, on Capitol Hill, and at a broader public level. The IWG consists of a total of thirty-two members and project advisors (listed above). In addition, the IWG has eight sponsoring organizations.
The IWG has produced several publications, including major Reports such as *Missile Defense, the Space Relationship, and the Twenty-first Century* which summarize present and emerging threats from states as well as terrorists, potential technological options and opportunities, the role of space, international collaboration, political and technical arguments that have shaped the debates about missile defense, the U.S. science and technology base, and a series of conclusions and recommendations. Other IWG publications include *A Layman’s Guide to Missile Defense* and *Countering the EMP Threat: The Role of Missile Defense*. All can be accessed on the website of the Institute for Foreign Policy Analysis (IFPA), Inc. at [http://www.ifpa.org/research/researchPages/PostABM.php](http://www.ifpa.org/research/researchPages/PostABM.php).

In summary, the IWG brings together a distinguished and informed group of analysts to address key issues directly related to missile defense such as the Capitol Hill Briefing that forms the basis for this Special Report on *Defending the Homeland – The Role of Missile Defense*. 
I. MEETING PURPOSE, SCOPE, AND OVERVIEW OF THE ISSUES

On June 25, 2013, the Capitol Hill Briefing on Defending the Homeland: The Role of Missile Defense was convened. Sponsored by the Independent Working Group (IWG) on Missile Defense and the Space Relationship and organized by the Institute for Foreign Policy Analysis (IFPA), the meeting was held at the Senate Visitors Center in Washington, D.C. Participants included House and Senate staff members, U.S. government civilian and military officials, industry representatives, subject matter experts, and members of the IWG.

Dr. Robert L. Pfaltzgraff, Jr., IWG Chairman and President of IFPA, opened the briefing by outlining the purpose and goals of the meeting and the key topics that would be discussed. The meeting focus was the role that missile defense can play in U.S. homeland security. Specific topics included the emerging requirements for the Aegis sea-based missile defense program including Aegis Ashore, the potential to develop a third missile defense site on the east coast, the options for space-based missile defense, homeland security threats including electromagnetic pulse (EMP) as part of cyber and information warfare operations, and defense budget issues affecting missile defense programs and priorities.

In March 2013, Secretary of Defense Hagel announced a new missile defense architecture that leaves the United States without a third missile defense site to protect against missile threats, especially from Iran.¹ As part of the shift, the administration cancelled the phase-four elements of the European Phased-Adaptive Approach (EPAA) missile defense program that was to be the

---

third site and announced that 14 ground-based interceptors (GBIs) would be added to the existing ground-based missile defense (GMD)\(^2\) site in Fort Greeley, Alaska. However, this simply restores the number of GBIs that the Bush Administration had originally deemed necessary for the defense of the U.S. homeland but which President Obama subsequently canceled. As a result, the United States has only two sites, in Alaska and at Vandenberg Air Force Base in California, for defense against ICBM attack. This is despite the fact that the Commander of U.S. Strategic Command, General Robert Kehler, testified before the Senate Committee on Armed Services that this leaves the United States with less than “optimum posture.”\(^3\)

The IWG Capitol Hill Briefing addressed the implications of decisions related to missile defense for policy, the budget, and program options. Important questions that need to be considered include U.S. vulnerabilities following cancellation of the EPAA phase four. What homeland vulnerabilities could be lessened by enhanced missile defenses? What are the effects of sequestration on Missile Defense Agency (MDA) budgets and the missile defense architecture? How will potential cuts to international missile defense programs affect our relations with allies, particularly with Japan? How can, and should, sea-based and

---

\(^2\) GMD is the primary program for homeland defense, designed to provide limited protection of the United States against intermediate- and intercontinental-range ballistic missiles. It currently consists of communications systems, fire control capabilities, and thirty ground-based exo-atmospheric interceptors capable of detecting, tracking and destroying (in the late-mid-course phase) ballistic missiles by utilizing multiple sensors including space-based assets.

\(^3\) General Robert Kehler, Commander of U.S. Strategic Command, testified before the Senate Committee on Armed Services in March 2013 that he was “confident we [the U.S.] can defend against a limited attack from Iran, although we are not in the most optimum posture to do that today... it doesn’t provide total defense today.”
space-based missile defense contribute to the defense of the United States? What should U.S. programmatic priorities be? What can be done to facilitate communication and cooperation among the various stakeholders – i.e., Congress, the Department of Homeland Security, and the Department of Defense – to mitigate ballistic missile threats?

Several recommendations for missile defense as a key component of homeland security emerged. They are described in detail in section IV of this report. They include:

- Realign U.S. missile defense priorities and spending to correct the imbalance between U.S. homeland defenses and regional missile defenses to give greater emphasis to growing threats to the U.S. homeland
- Strengthen missile defenses, especially for the eastern seaboard and southeastern regions of the United States
- Continue to build and strengthen the U.S. Navy Aegis missile defense program, including Aegis Ashore
- Promote space as a key component of the U.S. missile defense architecture
- Designate a U.S. official responsible for addressing the electromagnetic pulse threat
- Highlight the importance of the Secure High-Voltage Infrastructure for Electricity from Lethal Damage (SHIELD) Act
- Counter the arguments that missile defense will “weaponize space”
- Reject international codes governing space
- Reject unilateral reductions to the U.S. nuclear arsenal
- Implement the nuclear modernization initiatives related to New START
II. PRESENTATION SUMMARIES ON THE ROLE OF MISSILE DEFENSE IN DEFENDING THE HOMELAND

Five panelists gave presentations on a range of missile defense issues and priorities. What follows is an analytic summary of the discussions, as well as priority recommendations for homeland security and missile defense.

Trends and Priorities for the U.S. Navy Aegis Program

Vice Admiral J.D. Williams, USN, (Ret.), President of Williams Associates International and the former Deputy Chief of Naval Operations for Naval Warfare, discussed the U.S. Navy’s Aegis ballistic missile defense (BMD) program and the testing successes of the Standard Missile-3 (SM-3) Block IA and IB hit-to-kill interceptor. The increasing reliability and capability of the Aegis system led to its primary role in the European Phased Adaptive Approach (EPAA). Announced in 2009, this program is designed to defend Europe from ballistic missiles and consists of deployments of the Aegis missile defense ships in the Mediterranean Sea and the Aegis Ashore program to counter the Iranian missile threat to Europe and the United States using land-based versions of the Standard Missile interceptor and the AN/SPY-1 radar. No current U.S. missile defense system possesses such deployment flexibility and range of missile defense capabilities and missions.

The Aegis sea-based missile defense system affords great operational flexibility largely unencumbered by the legal, logistical, time, and cost issues and constraints associated with the deployment of land-based missile defense systems in foreign nations (or even by the many environmental and political obstacles attending a missile defense deployment within the United States). Currently there are 28 Aegis missile defense ships (5 cruisers and 23 destroyers) in the U.S. Navy inventory, 16 in the Pacific Fleet and 12 in the Atlantic Fleet, with plans for an additional 8
ships by 2018. Since January 2002 through May 2013, the *Aegis* ballistic missile defense system has conducted 25 successful intercepts in 31 tests and included interdiction of two targets by two Standard Missiles during a single test.\(^4\)

While the SM-3 was originally intended to intercept short and medium-range ballistic missiles, it has proven capable of intercepting long-range missiles, including ICBMs. SM-3 Block IA margins are sufficient to interdict ICBMs. This was confirmed in 2008 during Operation Burnt Frost when a modified SM-3 shot-down a failed U.S. satellite whose orbit was beginning to decay. The decaying satellite was travelling at 7.8 km/sec. That is slightly faster than the speed of a North Korean ICBM, which suggests that the SM-3 Block IA would be successful in intercepting such a missile. Apart from a potential future space-based system such as a twenty-first-century Brilliant Pebbles (more below), no U.S. missile defense system possesses such deployment flexibility and range of missile defense capabilities and missions.

However, even though the *Aegis* BMD is one of the most reliable and effective systems in the U.S. ballistic missile arsenal, Vice Admiral Williams asserted that it is still not “all it can be.” Radar, command and control, and SM interceptor upgrades and enhancements should be funded and developed that would improve the system’s fire control, tracking and discrimination capabilities as well as both the Standard Missile’s interception range and the types of ballistic missiles it could interdict. He added that the mobility of *Aegis* BMD means that it could be deployed in a position to interdict missiles coming from the south flying a polar orbit, the path a fractional orbital bombardment system (more below) would follow.

Executive and Congressional Priorities for the U.S. Missile Defense System

Dr. Robert Soofer, Professional Staff Member on the U.S. Senate Committee on Armed Services (SCAS), provided a congressional perspective on missile defense. He outlined the missile defense plans of the previous and current administrations. President Bush developed two GMD sites in Alaska and California for defense of the west coast and more limited protection for the east coast. Recognizing the need to enhance east coast defenses, the Bush Administration planned an additional GMD site in Poland with a radar complex in the Czech Republic designed to defend both Europe and the United States against the burgeoning Iranian missile threat. However, in September 2009 President Obama reduced the number of GBIs from 44 to 30 and cancelled the proposed European GMD site. In its place the president proposed the European Phased Adaptive Approach, a four-phase program that included the deployment in 2020 of 24 SM-3 II B interceptors in Poland during the EPAA’s fourth phase. This yet-to-be-developed missile was to be a replacement for the ten GBIs slated for deployment in Poland under the Bush Administration. Apart from defending NATO Europe, the SM-3 IIB, with its enhanced speed, improved sensors, and a new kill vehicle, was also intended to provide the U.S. east coast protection against Iranian ballistic missiles.

However, on March 15, 2013, citing growing threats and budgetary and development issues, Defense Secretary Hagel and other DOD officials announced a new missile defense program.

Defending the Homeland: The Role of Missile Defense

Secretary Hagel stated that the increasing threats from North Korea, evidenced by its long-range ballistic missile test in December 2012 as well as its third nuclear test in February 2013, demonstrated that we could not wait until 2020 for the additional coverage from the fourth phase of the EPAA program. Moreover, the SM-3 IIB had slipped by at least two years, in part due to Congress underfunding the missile. As a consequence, he cancelled phase four and its core-element, the SM-3 IIB missile (the first three EPAA phases will continue). At the same time he restored the 14 GBIs cancelled in 2009 bringing the number of interceptors back to the 44 planned originally. Funds from the terminated SM-3 IIB program were redirected to the deployment of the additional 14 GBIs in Alaska by 2017 and for the new common kill vehicle technology development program.

During the markup of the FY2014 Senate Defense Authorization bill, SCAS Chairman Carl Levin (D-MI) supported the administration request to restore the 14 GBIs. The SCAS also required that MDA undertake a study to examine how the defense of the homeland could be improved, focusing specifically on the costs and benefits of an east coast missile defense test bed. However, Republican SCAS members, including Senators James Inhofe (OK), Jeff Sessions (AL), Kelly Ayotte (NH), and Deb Fischer (NE), introduced an amendment to fund a third missile defense site plus an X-band radar for the east coast to counter the Iran threat. Dr. Soofer said the cost of a third site would be approximately $3 billion and take 5 to 6 years to complete. Their amendment was ultimately defeated, but the Senators did succeed in obtaining funding for an X-band radar, or comparable sensor, at a “location optimized to support the defense of the United States homeland against long-range ballistic missile threats” which would cost between $400 and $700 million. The House Armed Services Committee (HASC) authorized the
actual east coast interceptor site. Therefore, when the House and Senate meet to reconcile their bills, they will be faced with the Senate proposal for an east coast site feasibility study plus authorization of an east coast radar versus the House proposal to fund development of the entire east coast missile defense site in the context of sequester budget cuts.

The Budgetary Environment and Missile Defense
Baker Spring, F.M. Kirby Fellow in National Security Policy at the Heritage Foundation, provided a perspective on the implications that sequestration, if left in place, will have on missile defense programs and priorities as well as more general trends in missile defense funding during the Obama Administration.

The automatic spending cuts that were established in the Budget Control Act of 2011 are being applied in the current fiscal year. For the Missile Defense Agency, the administration requested $7.8 billion for FY2013, while Congress appropriated $8.3 billion. However, sequestration requires a 9 percent across-the-board cut to all projects, programs, and activities within the defense budget, with the exception of military personnel. This means that if the budget impasse remains in place

---

6 The full House has passed its version of the FY2014 National Defense Authorization Act (NDAA); the Senate Committee on Armed Services passed its markup of the NDAA in June but a vote by the full Senate has not been scheduled and is not expected until later in the fall of 2013. After the full Senate vote the bill will proceed to a House/Senate conference committee for reconciliation.

7 The BCA, which went into effect on March 1, 2013, mandated $1.2 trillion over ten years in debt reduction. The law requires the cuts be split equally between defense and non-defense accounts. If sequestration is fully implemented, the defense budget is expected to face cuts of approximately $492 billion over a decade. These cuts are in addition to the $487 billion in reductions over ten years begun under then-Secretary of Defense Panetta. The defense budget could, therefore, be facing cuts of nearly $1 trillion.
and sequestration is applied for the entirety of this fiscal year, which now appears likely, funding for the U.S. missile defense would drop to $7.6 billion. In other words, Congress’ $500 million dollar increase from the original Administration FY2013 request would be more than offset by the automatic spending cuts.

For fiscal year 2014, it is likely that all missile defense accounts will face a ten percent reduction. These cuts would bring the funding levels down to $8.4 billion, which is well below the Administration’s request, and even further below what Congress is currently considering in its appropriation and authorization committees. The administration proposed $7.7 billion for MDA while the figures for the House and Senate Authorization Committees are $7.95 billion and $7.85 billion, respectively. Assuming the funding level settles around the House-proposed $7.95 billion, sequestration would reduce funding for the MDA to $6.9 billion. FY2014 is the last year covered by the final budget submission of the Bush Administration. In that budget, the MDA was seeking about $9.8 billion. To drive home the full effects of the cuts, sequestration could effectively reduce MDA’s FY2014 budget from a projected $9.8 billion to approximately $6.9 billion.

Mr. Spring asserted that the downward trends are expected to continue. For example, the five-year spending plan that General O’Reilly, former MDA director, produced in FY2012 was going to allocate $43.5 billion dollars over that timeframe. Current MDA Director Admiral Syring saw his FY2013 budget request for the next five years reduced to $37.6 billion, representing a $6 billion dollar cut. As a consequence, Admiral Syring has $1 billion less per year to spend on missile defense than his predecessor had just two years ago. This is the budgetary and fiscal environment in which future missile defense proposals, priorities, and funding will take place. Since all missile defense accounts fall subject to sequestration, there will be across-the-board cuts. For
example, for midcourse-phase missile defense interceptors and elements of the sea-based system, the administration requested $1.034 billion. House appropriators sought slightly higher funding of $1.1 billion. Under sequestration that figure would drop to approximately $993 million.

The co-development of the SM-3 block IIA interceptor with Japan is also threatened by sequestration. The administration requested $308.5 million, the same level which the House later appropriated. Sequestration would reduce funding to $277.6 million. These cuts would have a disruptive impact not only because they would slow program development and deployment but also because they might signal a lessened U.S. extended security commitment. In turn this might have ramifications across the Asia Pacific area and call into question the Obama Administration’s Asia-Pacific rebalance strategy.

**Priorities for Space and National Security**

Jeffery Kueter, President of the George C. Marshall Institute, examined the contributions of space to missile defense as well as the implications for U.S. national security if America lost the use of its space-based assets. Mr. Kueter stated that space systems are an essential, effective, efficient, and complementary capability that is indispensable to all U.S. military missions, including of course homeland defense. Space is integral to how the nation fights conventional wars and how it deters foes. However, the impact of space does not stop at national security. It also applies to critical components of everyday life. Daily weather forecasts and car-enabled GPS systems would become obsolete if we did not have space-based systems to provide these services.

Although the United States has an undeniable lead in space capabilities it cannot take this ascendency for granted as other
countries are investing in the technologies to narrow the gap. China, for example, is making major improvements in its space-based systems. In June of 2012 the Chinese *Shenzhou*-9 docked with the *Tiangong*-1 spacelab making China only the third country, after the United States and Russia, to accomplish such a docking in low-earth orbit. Chinese space plans include a permanently manned space station by 2020 and establishment of a manned moon base in the second quarter of this century.

Not only are countries advancing their own capabilities, but they are also developing the means to deny or destroy U.S. space assets, a particularly dangerous situation given our reliance on space. For example, China has a multi-dimensional program to increase its capabilities to limit or prevent the use of space-based assets by adversaries during times of crisis or conflict. In January 2007, China demonstrated the capability to attack satellites in low-earth orbit by successfully destroying one of its weather satellites using a direct-ascent, anti-satellite (ASAT) weapon and in the process creating over 3000 pieces of space debris. A year earlier China beamed a ground-based laser at U.S. military satellites orbiting over its territory. More recently, in July 2013, China launched three small satellites which conducted unusual maneuvers and according to U.S. officials were part of its ASAT program. In May of this year it is believed that China tested a new ASAT interceptor (the *Dong-Ning* 2) demonstrating that it could reach targets at higher altitudes than previously was the case. In addition, there is a growing threat to U.S. space capa-

---


abilities from cyber attacks. If denied the use of its space assets, the United States would face substantial difficulties in projecting power into regions of major strategic importance such as the Persian Gulf and the Asia-Pacific area.

It is essential that we leverage space as a part of a layered architecture that integrates land-, sea-, and air-based missile defenses to protect the United States as well as its forward-deployed troops, and friends and allies against ballistic missiles. Space is the lynchpin to the layered defense approach enabling the United States both to access locations that cannot be reached via the other domains as well as to attack a missile in the each phase of a ballistic missile’s flight, i.e., the boost, midcourse, and terminal stages. Currently, U.S. systems are capable of intercepting ballistic missiles in only the midcourse and terminal phases. The optimum phase for interception is the boost-ascent phase prior to the release of warheads and decoys/countermeasures. Space-based missile defense has been neglected for too long. Much to the detriment of U.S. security, there is no space-based missile defense (or air-based) system currently under consideration.

Although today’s politics make unlikely the development and deployment of a global constellation of space-based interceptors that builds on the original Brilliant Pebbles (BP) technologies and system concept, Mr. Kueter asserted that the United States should develop a more limited BP capability that could provide

---

10 The boost phase begins immediately after launch while the ballistic missile is emitting exhaust gases that are relatively easy for sensors to detect and track. During the ensuing midcourse phase in space the ballistic missile warhead(s) and decoys/countermeasures are released; this is followed by the terminal phase when the warhead(s) reenters the atmosphere and descends to the target(s). The term “ascent phase” is the period immediately following boost phase which ends when the missile reaches its apogee prior to the discharge of warhead(s)/decoys.
concentrated coverage with updated technologies incorporating advances since the early 1990s in interceptor/kill vehicle technologies, miniaturization of sensors, computers, and other critical systems. Such interceptors could be inclined over the region and latitude of the threat, such as Iran and North Korea. Approximately, 10 to 15 percent of the constellation could be orbiting over the target area at all times ready to intercept a missile launched by either country. Such a limited constellation would reduce the technical and operational demands on any one missile defense layer, while vastly decreasing the number of systems required in orbit compared with a global space-based missile defense.

In 1990 Brilliant Pebbles was a fully approved, vetted program with realistic budget estimates to develop and deploy a 1,000-satellite constellation designed to engage and destroy as many as 200 nuclear warheads launched from anywhere in the world. The total cost of the system encompassing 1,000 BP satellites and 1,000 replacements would have been $11 billion in 1989 dollars – or $20.71 billion in 2013 dollars adjusted for inflation – over twenty-years of operation. Current advances in miniaturization to reduce the size and weight of components, sensors, and computers, together with the innovative government-sponsored development of expendable space launch vehicles by the private sector, would further reduce the already low launch

---

11 Twenty-Year Cost estimate breakdown for Brilliant Pebbles in 1989 U.S.$ and in 2013 U.S.$ adjusted for inflation: RDT&E – $7.35 billion and $13.84 billion; production of 2,000 BPs – $850 million and $1.60 billion; launch costs – $800 million and $1.50 billion; and operating costs – $2 billion and $3.77 billion.

12 In May 2012 the Falcon 9 rocket, built by the SpaceX company under a contract with NASA, transported cargo to and from the international space station. SpaceX has signed a contract with NASA to develop a vehicle to ferry astronauts to the international space station, a mission that since the retirement of the U.S. Space Shuttle is performed by the Russian Soyuz spacecraft.
price tag of the original BP program. Depending on its specific architecture, the cost today for the limited BP-constellation architecture would be significantly less in 2013 dollars than that originally projected for a 1000-constellation system.

Mr. Kueter questioned why, despite all of the advances made in space-based missile defense technologies over the past three decades, the United States is not making the necessary investments to deploy such a system. Three common refrains frequently advanced by those opposed to U.S. space-based missile defense provide flawed justification for opposing BP. First, the system is said to be too expensive. Second, it is contended, despite studies and evidence to the contrary, that such a system is not technologically feasible. Third, such a system would allegedly “weaponize” space leading to future warfare in this domain. Each contention is belied by the facts, as suggested above.

There is currently a proposed European Union Code that seeks to govern space-based activities. While there are important aspects of that code to address operations in space, Mr. Kueter contended that the code itself is the wrong vehicle to do so. Space has already been “weaponized.” For example, as noted above China has a demonstrated ASAT capability to destroy satellites with a missile launched from a land-based site. Moreover, in the midst of the Cold War the Soviets tried to label the U.S. shuttle program as a space weapon. The label of “weaponization of space” was illogical and a farce then, and it remains so today.

The Role of Missile Defense in Deterring and Countering an Electromagnetic Pulse (EMP) Attack

Dr. Peter Pry, Executive Director of the Task Force on National and Homeland Security and former staff member of the Electromagnetic Pulse (EMP) Commission, discussed homeland security threats from cyber and information warfare operations
and the role that missile defenses could play in preventing an EMP attack.

He began his presentation by questioning whether the current administration fully understands the threat facing the U.S. homeland referencing North Korea to illustrate his concern. Despite the fact that the Central Intelligence Agency (CIA), Defense Intelligence Agency (DIA), and NATO intelligence agencies indicate that North Korea currently possesses ballistic missiles capable of carrying nuclear warheads, the White House nevertheless contends that North Korea does not have such a capability. This is even though North Korea continues, as recently as March of this year, to threaten to launch nuclear strikes against the U.S. homeland and U.S. forward deployed forces and allies. These contradictions suggest a lack of understanding concerning the nature of the threat, particularly as it relates to North Korea.

The EMP Commission received testimony in 2004 from Russian generals who asserted that Russia had aided North Korea in the creation of a super EMP nuclear weapon. An attack with such an EMP weapon would be a game-changing event because it could effectively put the U.S. back into a pre-industrial economy. A weapon detonated 400 to 500 km over the center of the United States would generate radio waves that would cripple the electric power grid, banking and finance, transportation systems, communications, and other critical infrastructure. The EMP Commission estimates that two-thirds of the American population would die within a year after such an attack from a combination of starvation, disease, and societal collapse.\footnote{Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack, April 2008; see www.emp-commission.org/docs/A2473-EMP_Commission-7MB.pdf.} An EMP attack could also be launched by a terrorist group or by a
An offshore attack could leave the United States with a warning time of five minutes or less.

Unlike a traditional nuclear weapon, the North Korean super EMP device is not designed to create a large explosion. Instead, it has a very low yield, and releases a tremendous burst of gamma rays which produce EMP. This is consistent with the results seen from the three known nuclear tests in North Korea which have produced yields of just a few kilotons. A low-yield nuclear weapon does not make sense if the enemy’s goal is to destroy a city. In fact, the yield resulting from the North Korean nuclear tests was only a small fraction of the bombs dropped on Hiroshima and Nagasaki which were approximately 15 and 20 kilotons, respectively. Dr. Pry also stated that an EMP attack would disable command and control systems and the sophisticated computers and electronics that are essential to the rapid retargeting of U.S. strategic forces. In addition, conventional deterrent forces containing large quantities of sensitive electronics could also be rendered inoperable by an EMP attack.

Dr. Pry asserted that the North Koreans not only possess the ability to strike the United States with a super EMP nuclear weapon, but it is also likely that they are developing a system known as a fractional orbital bombardment system (FOBS) first developed by the Soviet Union during the Cold War. In the early 1960s, the Soviets sought to overcome U.S. geographic advantages of forward bases in Turkey, Europe, and Asia from which shorter range missiles and bombers could attack the USSR. Placing missiles in Cuba that triggered the Cuban Missile Crisis was an attempt to remedy this situation; when the Cuba gambit failed in 1962 the Soviets proceeded with FOBS. Like the Soviet Union

---

14 EMP, Congress, and the SHIELD Act, by Peter Vincent Pry; see Academocracy.org/emp-congress-the-shield-act-exclusive.
in the 1960s, according to Dr. Pry, North Korea is developing a quick and relatively inexpensive FOBS capability to attack the United States.

FOBS is a weapon system in which a nuclear warhead would be inserted into a steeply inclined low-altitude polar orbit. It is difficult to detect because of its polar flight trajectory from the southern hemisphere where U.S. early-warning capabilities are less robust and because the FOBS warhead is small, would appear on a radar as a normal satellite, and could remain in orbit for a long duration before it is de-orbited to attack the United States. The first indication the United States would have of a FOBS attack would be the EMP produced by the nuclear detonation over its programmed target. Because an EMP attack entails detonating the warhead at high-altitude, above the atmosphere, the warhead would not need a heavy re-entry vehicle and heat shield, reducing the cost and complexity of producing a FOBS device.

A FOBS system is not limited to Russia and North Korea. As early as the 1998 Rumsfeld Commission on the ballistic missile threat it was reported that Iran had tested a short-range ballistic missile in a trajectory that indicated the flight profile of an EMP strike. Iran has launched three satellites into south polar orbits consistent with the characteristics of a FOBS attack. Furthermore, all the Iranian and North Korean tests of the satellites were at an altitude of approximately 500 kilometers, which is the ideal burst height for an EMP attack on the continental United States. U.S. Navy *Aegis* missile defense ships deployed on the U.S. east, west, and Gulf coasts could defend against the EMP threat given their

---

15 The Iranians have tested their SHABAB-3 missile with a detonation near apogee instead of near the target area in a manner similar to an EMP-style attack. For more information see: Frank Gaffney, “The Real EMP Threat,” *The National Review*, 13 December 2011, www.nationalreview.com/content/real-emp-threat.
ability to intercept both short- and medium-range ballistic missiles in the midcourse phase. In addition, the interceptors that form part of the now three-phase EPAA program, referred to as Aegis Ashore, if deployed in the United States, could defend the U.S. homeland against ballistic missiles and possible FOBS/EMP attacks. A final piece of the U.S. coastal defense architecture is unmanned aerial vehicles (UAVs) outfitted with advanced sensors and interceptors to detect and intercept FOBS.\textsuperscript{16}

III. A VIEW FROM THE FINAL FRONTIER: REMARKS BY MEAD TREADWELL, LIEUTENANT GOVERNOR OF ALASKA

In addition to the five panelists, the Honorable Mead Treadwell, Lieutenant Governor of Alaska and member of the IWG on leave, shared his perspectives about the critical linkages between missile defense and homeland security. While many of the panelists addressed policy at the national level, Lieutenant Governor Treadwell provided remarks focusing on the importance of states acting when the federal government has proven unsuccessful or unwilling. For example, Lieutenant Governor Treadwell reflected on what he referred to as a “network of states” in which the National Guard Association, the National Emergency Management Association, and other groups recognized that the threats to the U.S. homeland will also impact leaders at the state level. This year, an Alaskan chairs the National Emergency Management Association with the annual meeting in Anchorage. The goal of this forum is to ensure state officials are aware of the EMP threat as well as to inform them about the pending SHIELD Act legislation which is designed to organize and prepare the United States more effectively for a catastrophic contingency such as an EMP attack.

Lieutenant Governor Treadwell cited Maine as an example of a state taking the lead when the federal government has failed to act. Introduced by Maine Representative Andrea Boland and signed by the governor, the Act to Secure the Safety of Electrical Transmission Lines enhances preparedness at the state level in the case of an EMP event. The legislation orders the state electric grid to be hardened against an EMP event and encourages other states to take similar steps. The Federal Energy Regulatory Commission (FERC) is conducting a study that will ascertain at no cost to Maine the most effective options for protecting the state electric grid from EMP. It is estimated that protecting the electric grid can be done inexpensively, at approximately 1-3% of the cost of new construction and expansion of the state electric grid that is currently underway.

IV. KEY PRIORITIES AND RECOMMENDATIONS FOR MORE FULLY LINKING MISSILE DEFENSE TO HOMELAND SECURITY

Several key conclusions and recommendations emerged from the presentations and discussions. They are summarized below:

- **Realign U.S. Missile Defense Priorities and Spending.** The current U.S. missile defense program exhibits an imbalance between homeland defenses and regional missile defenses. The regional defense mission is extremely important to protect U.S. forward-deployed and projection forces as well as allies against missile attacks. However, funding for regional missile defense in the


18 Ambassador Henry Cooper, “Remember Maine and June 6!” The High Frontier, Bulletin No. 130607, 7 June 2013, available online at: highfrontier.org/june-7-2013-remember-maine-and-june-6/.
Obama Administration’s various five-year defense plans has ranged between 3 to 5 times greater than for homeland defense. This disparity exists even as the threat to the U.S. homeland has grown and continues to do so. It includes the North Korean and Iranian ballistic missile and nuclear programs, as well as the possibility of terrorists acquiring launchers such as a SCUD outfitted with a nuclear warhead that could be fired from ships off the U.S. coastlines. Moreover, specific types of nuclear attacks are of particular concern and increasingly threaten the U.S. homeland. These include the difficult to detect fractional orbital bombardment system and an EMP strike. FOBS is a capability developed by the Soviet Union that both Iran and North Korea have demonstrated in ballistic missile tests. An EMP attack, which can be carried out by FOBS or via a more traditional ballistic missile sortie, could result in devastating damage to the United States.

The cancellation of the SM-3 IIB interceptor missile that was planned for deployment in Europe would have provided additional coverage to the under defended eastern seaboard of the United States. U.S. officials and missile defense experts acknowledge that the planned deployment of 14 additional GBIs in Alaska to offset the cancellation of the SM-3 IIB and provide additional homeland defense will actually do little to resolve the growing exposure of the eastern seaboard to the Iranian missile threat. If the U.S. homeland does not have sufficient protection against the North Korean and Iranian ICBM threat, the United States may well be deterred from projecting its forces overseas. In addition, with the New START reductions in U.S. nuclear forces, together with the possibility of additional cuts taken unilaterally by
the Obama Administration, a robust homeland missile defense system, including an east coast site, assumes even greater importance as a critical component of U.S. deterrence strategy.

In light of emerging challenges and threats, the United States must realign its missile defense priorities by placing greater emphasis on homeland defense. This should include:

- Initiating development of a third missile defense site on the U.S. east coast
- Accelerating the ballistic missile capabilities of the Aegis system and upgrading of the SM-3 missile to provide homeland defense as part of the third site on the east coast
- Upgrading and relocating the X-band radar currently at Kwajalien Atoll in the Pacific to the east coast to provide tracking and discrimination data of missiles and re-entry vehicles that approach the U.S. homeland from the east and south
- Accelerating the development of common kill vehicle technology that can be utilized across mission sets for homeland defense and regional defense and for intercepts in the boost, midcourse, and terminal phases of a ballistic missile’s trajectory. Similarly, another avenue for restoring a proper balance between regional missile defense and homeland missile defense programs is to pursue missile defense systems such as Aegis that can defend both the U.S. homeland and vital overseas regions
- Developing a coordinated sensor architecture encompassing ground-, sea-, air-, and space-based assets
(existing and future) to allow for early warning of ballistic missile attack from all flight trajectories, discrimination, tracking, cueing, and space situational awareness to enhance homeland defense.

- **Strengthen our Missile Defense, especially for the Eastern Seaboard and Southeast Regions of the United States.** The United States is vulnerable to a number of nuclear missile threats. Apart from Russia and China, these threats include North Korea, Iran, and terrorist groups gaining access to nuclear weapons and missiles. As noted above, we are vulnerable to FOBS and EMP attacks. While the two GMD sites in Alaska and California provide limited defense against threats from North Korea and Iran, they provide far less protection to the eastern seaboard of the United States. Cognizant of this situation, the Bush Administration planned a third GMD site in Poland designed to augment the defense of the eastern seaboard. However, the Obama Administration cancelled the third site. The Iranian threat – and the marginal missile defense coverage in the eastern seaboard – was to be addressed by the EPAA and the deployment in Poland of the SM-3 IIB interceptor in 2020. However, the SM-3 Block IIB was cancelled in March 2013. The planned deployment of 14 additional GBIs in Alaska will not substantially rectify the lack of defense coverage and exposure of the eastern seaboard to the Iran missile threat.

Thus, a third site to address this threat to the east coast of the United States is still required. In congressional testimony Commander of U.S. Northern Command General Charles Jacoby stated that a third site on the east coast would provide “increased battle space; that
means increased opportunity for me to engage threats from either Iran or North Korea.” An east coast site is the best solution because it is better positioned than the two existing GMD installations to interdict Iranian missiles given the flight trajectory they would follow. Other U.S. military officials, including Commander of U.S. Strategic Command, General Robert Kehler, Lt. General Richard Formica, Commander of Space and Missile Defense Command, and current and former MDA directors Vice Admiral James Syring, and Lt. General Trey Obering, USAF (Ret.) have all stated that an east coast test bed would promote U.S. national security. In addition, in its FY2014 defense bill the House of Representatives authorized an east coast interceptor site while the Senate mandated an east coast site feasibility study and authorized development of an east coast radar. Given the threat environment and the recent decision to cancel the SM-3 IIB, the United States should begin the development of a third missile defense site on the U.S. east coast.

- **Continue to Build and Strengthen the U.S. Navy Aegis Missile Defense Program.** It is a critical near-term priority to continue to accelerate the Aegis program via the upgrade of the SM-3 missile. The Aegis is a superior system, as highlighted by its stellar test results of 25 successful intercepts out of 31 attempts, that continues to be one of the most reliable missile defense systems in our arsenal. Despite the fact that the SM-3 was only designed to intercept short- and medium-range missiles, it now has the potential to counter ICBMs. Aegis missile defense ships deployed on both coasts could also defend against the FOBS and EMP threat given the SM-3’s ability to intercept both short- and medium-range ballistic missiles.
during the midcourse phase. This would be an important deterrent to both current and future adversaries. The *Aegis* program together with U.S. space cueing efforts should continue to be funded even in light of sequestration cuts. It is also recommended that the Missile Defense Agency include a requirement in its budget to test the SM-3’s ability to intercept an ICBM. The midcourse interdiction noted earlier of a failing U.S. satellite travelling at ICBM speeds by a modified SM-3 missile in 2008 provides ample evidence that technical feasibility has already been established.

- **Promote Space as a Key Component of the U.S. Missile Defense Architecture.** Even though space represents the high frontier for U.S. security, there has been little analysis of the objectives of U.S. space efforts or how the United States can best leverage this domain in support of its interests. Currently, this priority is not explicit in the design of space systems. Present planning fails to identify what are the essential space capabilities and how they can be assured. This includes the requirements for space asset redundancy and timely replenishment which is particularly important given the possibility of EMP attacks in space, China’s ASAT program, and the growing threat posed to U.S. space capabilities from cyber attacks. In addition, while the United States currently fields missile defenses to intercept ballistic missiles in the midcourse and terminal phase, it has ceded for now any possibility of missile intercept in the boost phase which provide the greatest leverage. The boost phase is the ideal time for interdiction while the missile is still over the aggressor’s territory. Furthermore, should the interceptor be unsuccessful, it would allow for additional attempts
while the ballistic missile was in the midcourse and/or terminal phases. This is the premise of the “look-shoot-look” approach to missile defense. Space-based defenses represent the optimal option for boost phase intercepts.

A space-based system would also provide the capabilities essential to counter the threat posed by FOBS. Current U.S. warning radars are positioned to detect missiles coming from a northward polar-orbit trajectory but not the southern polar orbit a FOBS would follow. As a result, the answer is to look to space. Round-the-clock coverage with an early intercept capability is necessary to deter and defend against a FOBS device traveling on a south polar orbit. A boost phase interceptor would make the overall trajectory of the missile less relevant as it would destroy the missile in the earliest stages of the flight path. We should initiate an effort beginning with a limited constellation of space-based interceptors based on an updated twenty-first-century Brilliant Pebbles (BP) program that could evolve to provide global 24/7/365 operational coverage overtime. Official SDI documents from the 1990s provide the blueprints for the design, development, and deployment of a proven, cost-effective system. Those blueprints, coupled with the rapid technological advancements (i.e., miniaturization of sensors and kill vehicle technologies) developed over the last three decades, are key to realizing the goal of a round-the-clock space-based missile defense system. In this regard, the official SDI 1990s documents regarding the decision to proceed with Brilliant Pebbles should be made public and distributed on Capitol Hill to underscore that the design, development, and deployment of a space-based missile defense system was painstakingly scrutinized.
and approved then, and is achievable today. At the same time, a study should be undertaken to explore how technologies and systems developed since the 1990s could be incorporated into the Brilliant Pebble architecture to make a twenty-first-century BP program both more effective and even more affordable.

- **Designate a U.S. Official Responsible for Addressing the Electromagnetic Pulse (EMP) Threat.** There is broad agreement across the interagency regarding the threat posed by an EMP event whether it be from a nuclear weapon exploded over the continental United States by Korea or Iran or from a natural, geomagnetic sun storm. In 1989, a relatively small storm caused by a coronal mass ejection on the sun resulted in billions of dollars’ worth of damage in Canada and temporarily blacked out half of the country. However, almost every century a much more severe geomagnetic super storm occurs. The last such storm, known as the Carrington Event, took place in 1859 meaning we may be more than 150 years overdue for a similar event. The sun has now moved into an active period called solar maximum which is expected to peak in 2013 and which could spark a Carrington Event. It is likely that sooner or later, whether by nature or enemy attack, an EMP event is likely to occur. In December 2012 the intelligence community released a study called *Global Trends 2030* which stated that the recurrence of a geomagnetic storm similar to the Carrington Event is so great that it represented a “black swan” event that could change the course of global civilization before 2030.19

Nevertheless, the Department of Homeland Security does not include an EMP incident as one of the 15 National Planning Scenarios. Given the nature and likelihood of this threat materializing either by man’s doing or by the activity of the sun, the president should appoint an official responsible for EMP contingency planning and policy, interagency coordination, and congressional and public outreach. Israel, like the United States also vulnerable to nuclear and EMP attacks, has made a political decision to protect power grids and has taken the prudent step of appointing such an EMP official: we should follow a similar path.

- **Publicize the Importance of the SHIELD Act to Promote Its Passage.** Congressman Trent Franks (R-AZ) and Congresswoman Yvette Clark (D-NY) introduced H.R. 668, The Secure High-Voltage Infrastructure for Electricity from Lethal Damage (SHIELD) Act, to help counter the EMP threat discussed above. The Act would allow the U.S. Federal Energy Regulatory Commission (FERC) to mandate that electric power companies take active measures to protect the national grid from an EMP event. Furthermore, it would require the use of protective technologies including surge arrestors and faraday cages which are the same technologies that the Department of Defense has used to protect and harden military assets for over fifty years. Neither the SHIELD Act nor its predecessor, the GRID Act, has been enacted by Congress. The electric grid is the keystone of the U.S. critical infrastructure. If the electric grid is protected from EMP, it would greatly increase the likelihood that other elements of our critical infrastructure could be brought back into service quickly. The fact that the EMP threat is likely to become
more serious in the future as nations such as North Korea and Iran develop additional nuclear and missile capabilities makes passage of the SHIELD Act even more important. In addition, efforts should be made to educate the Senate Energy and Natural Resources Committee and the House Energy and Commerce Committees which have oversight for EMP issues and the SHIELD Act about the EMP threat posed by Iran and North Korea. South Korea and Taiwan have made significant strides in hardening their critical infrastructure because they are aware of the threat posed by both North Korea and China. The United States should respond to the EMP threat in an equally aggressive fashion.

- **Counter the Arguments that Missile Defense will “Weaponize Space.”** One of the primary objections to a space-based missile defense system is that it will “weaponize” or “militarize” space. However, this accusation is illogical and ignores the realities of the threats confronting the nation. U.S. space-based assets are targets for our opponents given the vital role they play in support of U.S. military efforts. Our enemies are actively targeting them to deny their use during military operations. As noted earlier, the Chinese have a robust ASAT program including kinetic kill, jamming, and cyber capabilities. These efforts and those of other adversaries are likely to continue and even accelerate. The present U.S. advantage in the use of space is fast eroding as others develop their own space-based capabilities. When considering efforts to control military activities in space it is important to ask one question: what is a weapon? A weapon is any object that can move in space. This is due to the fact that kinetic energy will destroy anything if you can find it
and launch another object into it. This includes satellites, space vehicles, and a number of additional assets. It is worth remembering that the Soviets tried to classify our shuttle program as a space weapon during the Cold War. Such arguments were illogical then and remain so today.

- **Reject International “Codes” Governing Space.** The United States must avoid international agreements that could have the effect of significantly limiting U.S. freedom of action in space while allowing other nations to circumvent the restrictions because the provisions of the accord cannot be adequately verified or monitored. The draft European Union (EU) International Code of Conduct for Outer Space Activities is the latest effort to develop norms that would likely be adhered to by the United States more steadfastly than by its competitors and adversaries. The proposed Code would be applicable to all outer space activities conducted by states or non-governmental entities and would include rules for both civil and defense space activities. The assumption of the Code is that entanglement of U.S. space capabilities and activities with those of other countries will provide the path to peaceful space operations. However, international agreements such as the European Union Code of Conduct for Space would threaten these capabilities.

  The result would be limitations that impede U.S. space capabilities, including space-based missile defense systems and the collection of intelligence while allowing less scrupulous signatories to flaunt the largely unverifiable EU Code. Moreover, the United States already has policies in place that cover much of what is contained in the proposed EU Code. The code would add an unnecessary layer of bureaucracy and confusion within the U.S. space
policy community. In addition, it is important to recall the impact of the 1972 Anti-Ballistic Missile (ABM) Treaty that significantly impeded the development of a robust U.S. missile defense system. Even after withdrawing from the treaty in 2002, the Bush Administration continued to face obstacles that hampered the development of U.S. missile defenses. Acceding to another treaty or “code of conduct” is likely to have similar effects that limit U.S. space activities, assets, and capabilities. This clearly is an instance where the United States should not let history repeat itself.

- **Reject Unilateral Reductions in the U.S. Nuclear Arsenal.** In promotion of a world free of nuclear weapons, President Obama is seeking a further reduction in the U.S. nuclear arsenal, potentially on a unilateral basis. This comes at a time when several nations are increasing their nuclear weapon and ballistic missile capabilities. For example, the Russians have developed a new maneuverable warhead that is designed to overcome U.S. missile defenses and will begin development of a new heavy ICBM to replace the SS-18 in 2014. Furthermore, Russia is also allocating enormous resources to its own missile defense programs. China is modernizing its land- and sea-based nuclear forces. The road-mobile, solid-propellant DF-31 and DF-31A ICBMs recently entered service with the latter capable of reaching most locations in the United States. China may also be developing a new road-mobile ICBM, possibly with multiple independently targetable re-entry vehicles (MIRVs). The JIN-class nuclear-powered ballistic missile submarine which will carry the new JL-2 submarine launched ballistic missile with an estimated range of more than 4,000 nautical miles will
give the Chinese its first credible sea-based nuclear deterrent. The DOD report justifying the proposed reduction in the U.S. nuclear arsenal discusses greater reliance on high tech conventional forces and less on nuclear weapons. Unfortunately, those high tech conventional forces contain a large volume of sensitive electronics highly susceptible to EMP effects.

By reducing –perhaps unilaterally – the nuclear arsenal in this manner the United States is actually making itself more vulnerable. For example, additional cuts to U.S. nuclear forces may encourage proliferation as other nations would have the incentive to acquire – or field a greater number of – nuclear weapons in order to move closer in parity with the U.S. nuclear arsenal and/or to neutralize U.S. advantages in conventional capabilities. Moreover, lower numbers would likely erode U.S. extended deterrence guarantees possibly prompting our allies to develop their own nuclear weapon.

• **Implement the Nuclear Modernization Initiatives Related to New START.** At the same time the Obama Administration is considering further reducing the nuclear arsenal, it has apparently reversed course on the nuclear modernization agenda it agreed to at the time of the ratification of the New START Treaty in 2010 as a quid-pro-quo for Senate support. The commitment to a robust 10-year $85 billion modernization program to ensure a safe, secure, and reliable nuclear arsenal began to unravel soon after New START was ratified. For example, life extension programs for replacement warheads have been delayed and modernization of nuclear facilities, including the construction of the Chemistry and Metallurgy Research Replacement Nuclear Facility
(CMRR-NF), have been deferred for at least five years. This is particularly worrisome given that the U.S. nuclear umbrella supports deterrence while strengthening alliance solidarity by removing the need for our allies to build up their own arsenals. A reduction in the arsenal as well as cuts to promised modernization funds will do little to reassure increasingly wary allies of our commitment to their security.

V. FUTURE IWG EVENTS

This meeting is the latest in a series of conferences and educational briefings on missile defense that the Independent Working Group has organized over the past several years on Capitol Hill. As detailed in this report, the role of missile defense for national security and Homeland Security was the focus of this meeting. The IWG will hold future meetings on this and other topics related to missile defense for Members of Congress and their staffs, and other select invitees in an effort to create a broader and deeper understanding of the vital relationships between missile defense, homeland defense, and national security.