



JULY 23, 2014

ADAPTING U.S. MISSILE DEFENSE FOR FUTURE THREATS: RUSSIA, CHINA AND MODERNIZING THE NMD ACT

U.S. SENATE, COMMITTEE ON ARMED SERVICES, SUBCOMMITTEE ON STRATEGIC FORCES

ONE HUNDRED THIRTEENTH CONGRESS, SECOND SESSION

HEARING CONTENTS:

WITNESSES:

- **Mr. Phil Coyle** [\[View PDF\]](#)
Senior Science Fellow,
Center for Arms Control and Nonproliferation
 - **Honorable Robert G. Joseph** [\[View PDF\]](#)
Former Under Secretary of State for Arms Control and International Security
 - **Honorable James Woolsey** [\[View PDF\]](#)
Chairman,
Foundation for Defense of Democracies
-

COMPILED FROM:

- <http://armedservices.house.gov/index.cfm/2014/7/u-s-national-missile-defense-and-the-growing-threat-is-a-limited-defense-enough>

Prepared Statement before the:

House Committee on Armed Services,
Subcommittee on Strategic Forces

Adapting U.S. Missile Defense for Future Threats: Russia, China and Modernizing the NMD
Act.

Wednesday, July 23, 2014

2:00 p.m.

2212 Rayburn House Office Building

Philip E. Coyle, III

Senior Fellow

Center for Arms Control and Non-Proliferation

Chairman Rogers, Ranking Member Cooper, and Distinguished Members of the Strategic Forces Subcommittee, I very much appreciate your invitation to appear before you today to support your study of Adapting U.S. Missile Defense for Future Threats.

I am a Senior Fellow at the non-profit Center for Arms Control and Non-Proliferation, a Washington, D.C.-based national security study center. To help ensure our independence, the Center does not accept any funding from the Federal government, nor from any defense contractors.

I have considered it an honor to serve four U.S. Presidents. Most recently I served as the Associate Director for National Security and International Affairs in President Obama's White House Office of Science and Technology Policy.

In 2005 I was appointed by President George W. Bush to the nine-member Base Realignment and Closure Commission (BRAC).

For seven years during the Clinton administration, I served in the Pentagon as Assistant Secretary of Defense and Director, Operational Test and Evaluation. In this capacity, I was principal advisor to the Secretary of Defense and the Undersecretary of Defense for Acquisition, Technology and Logistics on test and evaluation in the DOD. I had OSD OT&E responsibility for over 200 major defense acquisition systems.

And during the Carter administration, I served as Principal Deputy Assistant Secretary for Defense Programs in the Department of Energy with responsibility for the nuclear weapons research, development, production and testing programs of the Department.

From 1959 to 1979, and again from 1981 to 1993, I worked at the Lawrence Livermore National Laboratory. Over those 33 years I worked on a variety of high technology programs, and retired from the Laboratory in 1993 as Laboratory Associate Director and deputy to the Director.

Opening Statement

In my opening remarks I want to describe why it would be unwise for the United States to pursue a missile defense against Russia and China. Here I'm referring to the strategic Intercontinental Ballistic Missile forces of those two countries. There are basically three important reasons. First, U.S. missile defenses, especially U.S. defenses against ICBMs can at best deal only with limited attacks, and even that goal remains a major technological challenge. All missile defense systems can be overwhelmed. All missile defense systems have limitations and those limitations can be exploited by the offense. By definition, it is only if the attack is limited that the defense can have a hope of not being overwhelmed. If the enemy also employs countermeasures such as stealth, radar jamming, decoys, and chaff, as Russia and China do, U.S. defenses are even more vulnerable. The technology simply is not in hand to deal with an all-out Russian or Chinese ICBM attack. The U.S. has experimented with many different ideas for decades hoping to find a way. A few examples are the nuclear-bomb pumped x-ray laser, "Brilliant Pebbles" (a constellation of perhaps as many as 1,000 orbiting interceptors), and the Safeguard ABM system deployed in North Dakota that the U.S. Congress canceled because Russian ICBMs could overwhelm it. These and other systems were canceled as unworkable, ineffective, or too costly as when Secretary of Defense Robert Gates ended the Airborne Laser program.

The second reason is cost. In 2002 the Congressional Budget Office estimated the cost of several different DOD missile defense programs, assuming they all would continue through 2025 as parts of a layered missile defense system.¹ The CBO estimated that a system of ground-based interceptors, analogous to the current Ground-based Midcourse Defense (GMD) system would cost between \$26 and \$74 billion. A system of interceptors launched from ships, similar to the Navy Aegis system would cost \$50 to \$64 billion, and a Space-Based Laser system would cost \$82 to \$100 billion. Inflated to today's dollars, the 2002 CBO estimate for the Space-Based Laser could be as high as \$132 billion. CBO cautioned against adding all these numbers together because the systems might share some common elements such as early-warning satellite systems, and CBO did not estimate the cost of a full, layered system. Of course the GMD system and the Navy Aegis system are ongoing today. The Space-Based Laser program office was shut down in 2002 and its research transferred to the MDA Laser Technologies Directorate. All of these systems were for a "limited" defense. CBO didn't estimate the costs of a massive system designed to stop all of Russia's and China's ICBMs, as there was no such program in 2002.

The third reason is strategic stability. If the U.S. had missile defenses that could handle the ICBM arsenals of Russia and China, a kind of Maginot Line against ICBMs, and if - unlike the Maginot Line - those defenses could not be defeated, it would be strategically destabilizing. Russia and China would need to respond with all manner of new forces, perhaps even more attacking missiles, perhaps extensive deployment of cruise missiles against which our ballistic missile defense systems are useless, or perhaps deployment of large numbers of troops in regions that are currently stable and peaceful. Then our missile defenses would have upset the strategic balance and provoked new military responses from Russia and China.

Of course, under such conditions, Russia would certainly not agree to further reductions in their strategic nuclear arsenals, as the U.S. and Russia have been doing under START, the Strategic Offensive Reductions Treaty, and New START. Russia might consider aggressive new U.S.

missile defense programs as justification to withdraw from New START and other agreements that have significantly reduced the threat from nuclear weapons.

In his May 28 talk at the Atlantic Council, Vice Chairman of the Joint Chiefs of Staff Admiral James A. Winnefeld, Jr. summarized why limited defenses are in the best U.S. interest.² “As you know,” he said, “we’ve told Russia and the world that we will not rely on missile defense for strategic deterrence of Russia because it would simply be too hard and too expensive and too strategically destabilizing to even try.” Later the Admiral reiterated this point, saying, “And let me be clear once again: it’s not the policy of the United States to build a ballistic missile defense system to counter Russian ballistic missiles.”

The National Missile Defense Act of 1999

The discussion above explains why the word “limited” is necessary in the National Missile Defense Act of 1999. As this Committee well knows that Act reads, “It is the policy of the United States to deploy as soon as is technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack (whether accidental, unauthorized, or deliberate) with funding subject to the annual authorization of appropriations and the annual appropriation of funds for National Missile Defense.” In the Clinton years the emphasis was on stopping an accidental or unauthorized launch from Russia or China, and was not intended to effect global strategic stability with Russia and China. In the Bush years the emphasis shifted to North Korea and Iran, and to the threat those countries pose to their neighbors in the region. But we were still talking about a limited attack. One or two missiles.

President Obama continued the policies of his predecessors, sustaining the Ground-based Midcourse Defense System (GMD) deployed in Alaska and California, still focusing on North Korea and Iran, while also to have the capability of stopping an accidental or unauthorized launch from Russia or China. In addition, President Obama announced September 17, 2009, the Phased Adaptive Approach in Europe that was focused first on near term threats to Europe from the Middle East, shorter-range threats first, longer range threats later. At first, the shorter-range of these missiles would be slower-moving missiles capable of reaching only the southernmost part of Europe, certainly not ICBMs which Iran didn’t have then or now. The EPAA consists of interceptors, such as THAAD and SM-3, with ranges too short for ICBMs and is not aimed at Russia or China.

For the EPAA, President Obama also set a goal of hopefully being able to handle “raids” that is, more than one or two incoming ballistic missiles, but say 20 incoming missiles at once. That capability has not been developed, let alone demonstrated. And the EPAA is not intended to, nor capable of defending against Russian ICBMs in any number.

Five important questions

In the balance of this testimony I address each of the five important questions the Committee posed for today’s hearing, and take each one in turn.

1) How do you see this threat emerging? What will it look like in 2020? 2025?

In 2020 or 2025, how we will see the threat from Russia and China will depend on our relations with those countries. At the end of the Cold War, it appeared to many observers that the prospect of all-out nuclear war had faded; after all, the specter of possible nuclear conflict had loomed for many years between the Soviet Union and the United States or, less likely, China and the United States, and all sides had worked successfully to avoid it. With Russia and China nuclear deterrence still works, and is a more dependable factor in sustaining the peace than missile defenses. In 2020 or 2025 I expect the strategic situation will be much the same as it is today unless something arises to upset today's strategic stability, such as dramatic changes to U.S. missile defense policy.

The conflicts that have developed over the Russian seizure of Crimea, Russia's interference in Eastern Ukraine, the situation in Syria and other places have undermined relations between the United States and Russia, but do not make a nuclear confrontation any more likely than since the end of the Cold War.

However, five or ten years from now, the threat from terrorism may still be growing. As this Committee well knows, there is much unrest in the world today. We need only to look at the situation in Syria and Iraq to imagine further turmoil in that region. If terrorist groups acquire more of the usual rockets and missiles, U.S. missile defenses may need to focus on short-range conventional rocket threats, not on ICBMs from Russia or China.

2) Does a policy of limited missile defenses against limited threats continue to make sense in today's threat environment?

The current articulation of the "threat" does not meet the test of common sense. From time to time the Missile Defense Agency (MDA) produces a map showing the countries it considers a threat because those countries possess short or medium range missiles. The list has included Libya, Egypt, Iran, Yemen, Pakistan, India, Belarus, Ukraine, Syria, Turkmenistan, Kazakhstan, Vietnam, and North Korea. While some of these countries, like Belarus, Ukraine, Turkmenistan and Kazakhstan possess Scud missiles, these countries are hardly a threat to the United States or Europe. Pakistan and India may be a threat to each other, but not to Europe or the United States. Libya, Egypt, Syria, and Yemen have experienced internal political turmoil, but again they are not a missile threat to Europe or the United States in the near term. To the extent that MDA buys into the notion that any country with short or medium range missiles is a threat to Europe and the United States, MDA clouds its thinking about the nature of the missile defense systems we need and where we need them.

While the North Korean and Iranian missile programs are certainly of great concern, it can be asked whether either country would be so suicidal as to attack the United States, whether Iran would be so suicidal as to attack Europe, or North Korea so suicidal as to attack Japan. In each case, such an attack would justify massive retaliation by the U.S. military and others. Iran and North Korea have done some reckless things, but they are not so reckless as to bring about their own destruction and an end to their regimes.

I am not suggesting that North Korea or Iran is NOT a threat, only that things can change and that U.S. policies need to be responsive to those changes. Recall the 1998 Rumsfeld Commission report that said North Korea and Iran would have nuclear-armed ICBMs that “would be able to inflict major destruction on the U.S. within about five years of a decision to acquire such a capability.”³ That was 16 years ago.

A new look at the threat is warranted, and whether the U.S. needs to consider every nation that possesses even short-range missiles a threat to America. The proliferation of missiles of all sizes around the world is a growing problem, but expecting U.S. missile defenses to deal with all those missiles everywhere is unrealistic.

The proliferation of offensive missiles should be fought and is being fought in many ways. However, the idea that say, Russia or China will give up or relax their offensive capabilities because of U.S. missile defenses is not supported by the facts. Those countries use U.S. missile defenses as justification for building more and more capable offensive missiles; and from the results of U.S. missile defense tests they can see that the easiest way to defeat those defenses is by building more and more offensive missiles to overwhelm U.S. defenses.

There is now a worldwide arms race in missile defense. Russia, China, India, Pakistan, South Korea, Japan, and Israel all claim to have effective missile defenses, and these claims push military planning by their adversaries in unwanted directions as they in turn build more and more offensive systems and/or new decoys and countermeasures to defeat those defenses. At the same time, there are serious questions whether any of these countries have an effective defense against long-range missiles.

3) Does this “limited” policy impact the programs we develop and deploy?

Today, America has missile defense systems deployed all around the world. This includes the Ground-based Midcourse Defense (GMD) system in Alaska and California, the Phased Adaptive Approach in Europe (EPA), and regional systems in the Middle East to protect Iran’s neighbors from Iran, and in Asia to protect North Korea’s neighbors from North Korea. At the Atlantic Council Adm. Winnefeld explained that “Going forward, we will continue to emphasize the importance of developing regional ballistic missile defense systems.” I expect that emphasis on regional missile defense systems to continue for the next five or ten years, and note that these regional systems - THAAD, Aegis SM-3, and PATRIOT – now have a much better track record in successful flight intercept tests than does the Ground-based Midcourse Defense (GMD) system. However, as Adm. Winnefeld noted, the deployment of regional U.S. missile defense systems “is a very politically sensitive topic for several of our regional allies.” Accordingly, deployment of regional U.S. missile defense systems is being undertaken on a case-by-case basis with the support of our friends and allies who may be affected by such decisions.

4) Does this policy need to evolve or change? Why? If so, how?

The missile defense systems the U.S. deploys will be first and foremost a function of the threat, which might go up or down depending on geo-political developments. If, for example, negotiations with Iran to reduce the scope of its nuclear program to clearly peaceful civil purposes are successful, then – depending on the details of what is agreed - the emphasis on the

European Phased Adaptive Approach (EPAA) could be reduced. Similarly, the argument for an East Coast missile defense site could be weakened.

If on the other hand, North Korea becomes more aggressive towards its neighbors, increased U.S. missile defenses in that region may be part of the response.

If tensions break out in new parts of the world, our government will need to respond to those circumstances as well.

Here it is also worth noting that there have been significant reductions in Scud inventories. These have come about for a variety of reasons but the net effect has been a reduction in SRBM missiles. International Traffic in Arms Regulations and Missile Technology Control Regime restrictions also have made an important difference, as they are observed by reputable vendors and nations alike; and so today, with the exception of Russia, China, and the U.S., there is no other demonstrated, current ICBM capability, and SRBM/MRBM numbers are not increasing.⁴

5) How does the U.S. deal with the Russian Federation and the People's Republic of China, in particular, which are both developing missile defenses and nuclear weapons targeting the U.S.? What programs and policies need to be in place to deal with these potential threats and adversaries?

All missile defense systems can be overwhelmed. Russia and China could overwhelm the missile defense systems we have today even if they worked as intended. That's why Vice Chairman of the Joint Chiefs of Staff Admiral James A. Winnefeld, Jr. made a special point in saying in his May 28 talk at the Atlantic Council that U.S. missile defenses are not aimed at Russia. To quote the Admiral, he said, "As you know, we've told Russia and the world that we will not rely on missile defense for strategic deterrence of Russia because it would simply be too hard and too expensive and too strategically destabilizing to even try." Later the Admiral reiterated this point, "And let me be clear once again: it's not the policy of the United States to build a ballistic missile defense system to counter Russian ballistic missiles."

Similarly the U.S. can overwhelm the missile defenses of Russia and China. Both countries make announcements about their missile defenses but they know, as we do, how difficult missile defense is, and that their missile defenses can be overwhelmed also.

It is very difficult for Americans not to want to rely on technology. Technology has produced some amazing advances, such as personal computers and the Internet that have changed our lives at home and at work. But too often America relies on technology as the last, best hope to save us from our problems. We see this in defense, in health, and in the environment. By appealing to a single-point technological fix, we hope we can avoid dealing with a long-term problem. In defense, as in other fields, we use our hope for technological relief as an excuse to avoid accommodating or dealing with our adversaries in the global environment in which we all exist.

Moving Forward

Going forward, here are some important considerations:

The existing U.S. missile defense systems have many important needs. These include the Ground-based Midcourse Defense (GMD) system in Alaska and California, the Phased Adaptive Approach in Europe (EPAA), and regional systems in the Middle East and Asia. Unfortunately these systems lack workable architectures, and many of the required elements either don't work or are missing. Notwithstanding the recent test success, GMD performance in tests has gotten worse with time, when it ought to be getting better. The latest GMD test did not involve an ICBM-range target and the MDA has never tried to defend against an ICBM-range target in a missile defense flight intercept test. I would hope that both sides of the aisle would work together to address these needs.

America's missile defenses face an enduring set of issues, especially target discrimination in the face of even limited attacks designed to overwhelm the defenses, such as stage separation debris, chaff, decoys, and stealth. Dealing with target discrimination while also replacing, upgrading, or adding to the many needed elements of U.S. missile defenses will present new budget challenges. Adding to this burden, America's allies overseas expect a substantial commitment in U.S. defense dollars. They see the United States as well able to afford missile defenses, and in good measure hold the U.S. responsible for the defense of its friends and allies. In fact, the capability to defend America's friends and allies is a declared objective for U.S. missile defense systems. This work will produce better results than trying to build an impregnable defense against Russian and Chinese ICBMs.

The biggest challenge facing both the GMD and EPAA systems is target discrimination; that is, the ability of the interceptors and the sensors that guide them being able to tell the difference between debris from stage separations, and/or chaff and decoys made to resemble the target reentry vehicle. The National Academy of Sciences/National Research Council (NAS/NRC) commented on threat discrimination in a April 30, 2012 letter to Congress before the full report "Making Sense of Ballistic Missile Defense" was released, saying, "There is no effective ballistic missile area defense that does not require dealing with midcourse discrimination (or shooting at all potential threat objects!)."⁵ The NAS/NRC comment about shooting at all potential threat objects related to the limited number of interceptors that could quickly be exhausted by the defense trying to shoot down everything whether threatening or not. "Moreover," the NAS/NRC panel explained, "early" intercept, even if achievable from a forward-based interceptor system, cannot obviate the need for midcourse discrimination, because countermeasures and payload deployment can be achieved very rapidly (as historical experience shows) after threat booster burnout."

In a March 9, 2013 hearing before the Senate Armed Services Committee, J. Michael Gilmore, the DOD Director, Operational Test and Evaluation, put it plainly, "If we can't discriminate what the real threatening objects are, it doesn't matter how many ground-based interceptors we have. We won't be able to hit what needs to be hit."⁶

The Defense Science Board was the first official DOD entity to break the ice on the need for target discrimination, even though independent scientists have been pointing out the need for decades. As the DSB Task Force explained in its September 2011 report, "Science and Technology Issues of Early Intercept Ballistic Missile Defense Feasibility,"⁷ "These analyses ... did not account for interceptors launched at non-warhead bodies." "If the defense should find

itself in a situation where it is shooting at missile junk or decoys, the impact on the regional interceptor inventory would be dramatic and devastating.” The DSB Task Force was pointing out that if the defense must shoot at non-threatening objects, the supply of interceptors would soon be exhausted.

For this reason, both the DSB and the NAS/NRC panel discussed the doctrine of “Shoot-Look-Shoot.” The current doctrine might be called, “Shoot-Shoot-Shoot;” that is, just keep shooting hoping that the defense will hit all the incoming enemy missiles in the midst of confusing chaff or decoys. Just to overcome the poor test record of the GMD system could require firing five, six, or seven interceptors at each incoming missile, quickly exhausting the available interceptors.⁸ Unfortunately, while “Shoot-Look-Shoot” is an appealing concept, it is still an impractical dream. Shoot-Look-Shoot requires “Looking”, that is kill assessment, knowing whether or not a target has been hit and killed. That kill assessment must be done between each attempt to bring down an enemy missile, and it must be done rapidly. This would require sensors, discrimination, and communication systems we don’t have, or yet know how to build.

The Ground-Based Midcourse (GMD) system with interceptors in silos based at Fort Greely, Alaska, and at Vandenberg AFB in California has never had a complete architecture. For example, the Sea-Based X-Band Radar intended to be deployed at Adak, Alaska, is often put in for repairs and maintenance in Hawaii or Seattle, and has proven to be so unreliable that the MDA considered mothballing the system to reduce costs. Also, the satellite systems required for early detection, tracking, and characterization of enemy targets, and to provide that information to the GMD system, have never been completed.

Much work is needed on the GMD system. In particular, the Pentagon has yet to decide whether to take the advice of the 2012 National Academy of Sciences/National Research Council study and develop a new bigger and more capable Exo-atmospheric Kill Vehicle and a new faster two-stage booster for the GMD interceptors.

The Missile Defense Agency has announced that it will make improvement to the existing kill vehicle; but as Defense Undersecretary for Acquisition, Technology, and Logistics, Frank Kendall put it so well, "Just patching the things we've got is probably not going to be adequate. So we're going to have to go beyond that."⁹

In the wake of the successful June 22 flight intercept test, the Agency should build on that accomplishment to develop the next generation kill vehicle as recommended by the National Research Council. But the United States should not be blinded by one good test every five and one-half years to deploy more flawed interceptors. In pursuing a redesigned kill vehicle, it only makes sense to avoid past mistakes by taking the time to get it right.

¹ “Estimated Costs and Technical Characteristics of Selected National Missile Defense Systems,” The Congressional Budget Office, January 31, 2002. Available at <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/32xx/doc3281/nmd.pdf>

² Transcript: Admiral James A. Winnefeld, Jr. at Global Missile Defense Conference, The Atlantic Council. Available at <http://www.atlanticcouncil.org/news/transcripts/transcript-admiral-james-a-winnefeld-jr-at-global-missile-defense-conference>

³ The Report of the Commission to Assess the Ballistic Missile Threat to the United States, July 15, 1998. Available at <http://fas.org/irp/threat/bm-threat.htm>

⁴ “Characterizing the North Korean Nuclear Missile Threat”, RAND TR-1268, Marcus Schiller, ISBN: 978-0-8330-7621-2, available at http://www.rand.org/pubs/technical_reports/TR1268.html

⁵ Letter to Representatives Michael R. Turner and Loretta Sanchez, House Armed Services Committee, from L. David Montague and Walter B. Slocombe, Committee on an Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives, April 30, 2012.

Committee on an Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives, National Research Council, “Making Sense of Ballistic Missile Defense,” National Academy of Sciences, 2012, http://www.nap.edu/catalog.php?record_id=13189.

⁶ Hearing, Ballistic Missile Defense Policies and Programs, Senate Armed Services Committee, Subcommittee on Strategic Forces, May 9, 2013. Available at <http://www.armed-services.senate.gov/hearings/oversight-ballistic-missile-defense-policies-and-programs>

⁷ Defense Science Board (DSB), “Task Force Report on Science and Technology Issues of Early Intercept Ballistic Missile Defense Feasibility,” September 2011, <http://handle.dtic.mil/100.2/ADA552472>.

⁸ See Edward Aldridge Jr., Statement before the House Armed Services Committee, March 20, 2003, http://www.archive.org/stream/hearingsonnation2004unit/hearingsonnation2004unit_djvu.txt; Lt. Gen. Henry A. Obering, Statement before the Subcommittee on National Security and Foreign Affairs, House Committee on Oversight and Government Reform, April 30, 2008, <http://www.gpo.gov/fdsys/pkg/CHRG-110hrg48813/html/CHRG-110hrg48813.htm>.

⁹ “Pentagon plans work on new missile defense interceptor,” Andrea Shalal, *Reuters*

**DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION**

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(5), of the Rules of the U.S. House of Representatives for the 113th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Committee on Armed Services in complying with the House rule. Please note that a copy of these statements, with appropriate redactions to protect the witness's personal privacy (including home address and phone number) will be made publicly available in electronic form not later than one day after the witness's appearance before the committee.

Witness name: Philip E. Coyle, III

Capacity in which appearing: (check one)

Individual

Representative

If appearing in a representative capacity, name of the company, association or other entity being represented:

FISCAL YEAR 2014

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
None		zero	

FISCAL YEAR 2013

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
None		zero	

FISCAL YEAR 2012

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
None		zero	

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2014): _____ None _____ ;
 Fiscal year 2013: _____ None _____ ;
 Fiscal year 2012: _____ None _____ .

Federal agencies with which federal contracts are held:

Current fiscal year (2014): _____ None _____ ;
 Fiscal year 2013: _____ None _____ ;
 Fiscal year 2012: _____ None _____ .

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2014): _____ None _____ ;
 Fiscal year 2013: _____ None _____ ;
 Fiscal year 2012: _____ None _____ .

Aggregate dollar value of federal contracts held:

Current fiscal year (2014): _____ Zero _____ ;
 Fiscal year 2013: _____ Zero _____ ;
 Fiscal year 2012: _____ Zero _____ .

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2014): _____None_____;
Fiscal year 2013: _____None_____;
Fiscal year 2012: _____None_____.

Federal agencies with which federal grants are held:

Current fiscal year (2014): _____NA_____;
Fiscal year 2013: _____NA_____;
Fiscal year 2012: _____NA_____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2014): _____NA_____;
Fiscal year 2013: _____NA_____;
Fiscal year 2012: _____NA_____.

Aggregate dollar value of federal grants held:

Current fiscal year (2014): _____Zero_____;
Fiscal year 2013: _____Zero_____;
Fiscal year 2012: _____Zero_____.

Philip E. Coyle

Philip E. Coyle is a recognized expert on U.S. and worldwide military research, development and testing, on operational military matters, and on national security policy and defense spending. He is currently a senior science fellow at the Center for Arms Control and Non-Proliferation.

In 2010 and 2011 Mr. Coyle served as the Associate Director for National Security and International Affairs (NSIA) in the White House Office of Science and Technology Policy (OSTP). In this position he had primary responsibility for supporting President Obama and the Director of OSTP in developing and executing a wide variety of science and technology initiatives. This included supporting the Universities and Laboratories that comprise the R&D capabilities of the Department of Defense, the Department of Energy and other agencies and their research programs in fields such as homeland and national security research, development, testing and acquisition; nuclear, chemical, and biological defense; counterproliferation, cybersecurity; international science and technology cooperation; and nuclear security.

From 2001 to 2010, Mr. Coyle served as a Senior Advisor to the President of the World Security Institute and to its Center for Defense Information, a Washington D.C.-based national security study center.

In 2005 and 2006, Mr. Coyle served on the nine-member Defense Base Realignment and Closure Commission (BRAC), appointed by President George W. Bush and nominated by Speaker of the House Nancy Pelosi. Prior to this appointment, Mr. Coyle served on Governor of California Arnold Schwarzenegger's Base Support and Retention Council.

From September 1994, through January 2001, Mr. Coyle was Assistant Secretary of Defense and Director, Operational Test and Evaluation, in the Department of Defense, and is the longest serving Director in the 27 year history of the Office. In this capacity, he was the principal advisor to the Secretary of Defense on test and evaluation in the Department of Defense. While he served in this position, a 2001 New York Times profile by William Broad referred to him as "the technical conscience of the Pentagon." Mr. Coyle has 40 years experience in national security research, development, and testing matters.

During the Carter Administration, Mr. Coyle served as Principal Deputy Assistant Secretary for Defense Programs in the Department of Energy (DOE). In this capacity he had oversight responsibility for the nuclear weapons research, development, production and testing programs of the Department, as well as the DOE programs in arms control, non-proliferation, and nuclear safeguards and security.

From 1959 to 1979, and again from 1981 to 1993, Mr. Coyle worked at the Lawrence Livermore National Laboratory (LLNL) in Livermore, California. Over those 33 years Mr. Coyle worked on a variety of nuclear weapons programs and other high technology programs. Mr. Coyle also served as Deputy Associate Director of the Laser Program at LLNL. In 1993, Mr. Coyle retired from the Laboratory as Laboratory Associate Director and deputy to the Director. In recognition of his years of service to the Laboratory and to the University of California, the University named Mr. Coyle Laboratory Associate Director Emeritus.

House Committee on Armed Services
Subcommittee on Strategic Forces

“Adapting U.S. Missile Defense for Future Threats: Russia, China and Modernizing the National
Missile Defense (NMD) Act”

Prepared Statement of Dr. Robert G. Joseph

Former Under Secretary of State for Arms Control and International Security

July 23, 2014

Chairman Rogers, Congressman Cooper, and distinguished members present today:

Thank you for the opportunity to testify before the Committee. It is a privilege for me to appear before you and provide my views on the future of missile defenses to protect the American homeland.

Background

Since the U.S. withdrawal from the ABM Treaty in 2002, the United States has pursued a policy of limited missile defense. In broad terms, this has meant the development and deployment of active defenses to protect the U.S. homeland against relatively small ballistic missile attacks from states such as North Korea and Iran. In practice, the policy of limited missile defense has been implemented in fundamentally different ways by the Bush and Obama Administrations.

As articulated in 2002 by President Bush (NSPD-23), U.S. missile defense policy had the following objectives and characteristics:

- The development and deployment of a layered defense capable of protecting U.S. forces, U.S. allies, and the U.S. homeland against ballistic missiles of all ranges “in all phases of flight.” The focus was on hostile states that were “aggressively pursuing the development of weapons of mass destruction and long-range missiles as a means of coercing the United States and our allies.” This was assessed to be the principal threat at that time.
- The intention was to begin in 2004 the deployment of capabilities to protect the United States against such attacks. Until that time, the U.S. possessed no defense against these threats. This was seen not as a “silver bullet” but as a rudimentary capability that would be improved over time. In contrast to the normal DOD approach to development and procurement, this was to be a “starting point” for an “evolutionary approach” for fielding defenses capable of evolving “to meet the changing threat and to take advantage of

technological developments.” Instead of a traditional fixed architecture, the U.S. would pursue a range of capabilities that would be expanded taking into account the dynamic nature of the threat and rapidly changing technology. Presidential guidance stated that initial capabilities “may be improved through additional measures” such as: development of boost phase interceptors, enhanced sensors and the “development and testing of space-based defenses.”

- Countering the ballistic missile threat from states such as North Korea was described as “an essential element of the United States’ broader efforts to transform our defense and deterrence policies and capabilities to meet the threats we face.” President Bush stressed that “defending the American people against these new threats is my highest priority as Commander and Chief, and the highest priority of my Administration.”

Obama Administration policy, as reflected in the 2010 DOD Ballistic Missile Defense Review, also emphasized the priority of defending the U.S. homeland in the context of a layered defense. Beyond this rhetorical policy statement, the Administration’s actions have departed dramatically from those of its predecessor:

- The Ground-based Midcourse Defense (GMD) system was cut back significantly in President Obama budget submissions, with funding declining substantially in each successive proposed budget. The number of Ground-based Interceptors (GBIs) deployed at Fort Greely and Vandenberg AFB was reduced from the planned 44 (with an option of going to 100 or more) to 30. In addition to slashing the annual Missile Defense Agency (MDA) top line budget from about \$10 billion to about \$7.5 today, substantial funding was shifted from programs to protect U.S. territory and population centers to programs to defend against short- and medium-range missiles. In total, compared to the requests of the Bush Administration, the Obama Administration has reduced funding for missile defense programs over the past six years by approximately \$10 billion. Of that total, funding for capabilities to protect the United States – its stated first priority – has been slashed by about five billion dollars.

- Missile defense programs intended to keep pace with the threat from long range missiles were cancelled. This included all work on fast, including boost phase, interceptors such as the Kinetic Energy Interceptor (KEI), as well as the Airborne Laser that had intercepted and destroyed both solid and liquid missiles in flight. The Multiple Kill Vehicle (MKV), designed to provide a counter to the anticipated future deployment of countermeasures by adversaries, was ended without replacement. Even critical sensors were mothballed, including initially the sea-based X-band radar that provided the most effective capability for precision tracking. Collectively, these funding cuts and program cancellations sent a clear message to industry: the priority of homeland missile defense has been downgraded with the result that industry reduced substantially its own investments in related research and development.

- In stark contrast to his predecessor, President Obama and his top officials have repeatedly demonstrated a willingness to cut back on missile defenses in seeking other, presumably higher priority objectives such as Russian agreement to negotiate offensive arms control reductions.

This was evident in the 2009 cancellation of the original third site in Poland and the Czech Republic which would have increased by 10 the number of interceptors deployed to protect the United States from a future long range Iranian missile threat. It was also seen in the cancellation of Phase Four of the European Phased Adaptive Approach – the only phase that would have provided a capability to contribute directly to the defense of the U.S. homeland. Secretary Kerry carried the same message to Beijing last year when he reportedly offered to cut back on U.S. missile defense efforts in Asia for greater Chinese pressure on North Korea. Finally, and most telling, was President Obama’s 2012 hot-mike comment to then President Medvedev that, particularly for missile defenses, “after my election, I have more flexibility.”

Today’s Security Environment

While a welcome recognition of the need to strengthen U.S. defenses, last year’s decision to deploy 14 additional interceptors in Alaska and last month’s successful GBI intercept test do not alter the downward path of U.S. strategic defense programs. The result of deep budget cuts, cancelled programs and a clear shift in policy priorities is an inadequate and obsolescing missile defense capability to protect the U.S. homeland against a growing threat.

Members of this committee have access to highly classified assessments of the missile threats facing the United States. To provide context for the recommendations below, I would offer the following:

North Korea: Pyongyang under Kim Jong Un has continued the buildup of nuclear capabilities and ballistic missiles of all ranges. Last year, the North threatened preemptive nuclear attack on the United States and, in defiance of multiple UN Security Council resolutions, conducted its third nuclear test and numerous missile launches. Despite the hopes of many North Korean watchers, this provocative behavior has become even more frequent under the Dear Successor. Last week, Pyongyang conducted additional missile tests and reaffirmed its self-declared status as a nuclear weapon state with a growing arsenal derived from both plutonium reprocessing and uranium enrichment. The North’s proliferation activities also continue, including ballistic missile support to Iran. These activities, as seen in Syria, extend to the nuclear field.

Iran: Teheran possesses the largest ballistic missile force in the Gulf/Middle East and has rejected any limits on its modernization and expansion. Iran has successfully launched space satellites on multi-stage vehicles which has demonstrated the ability to execute the critical technologies associated with intercontinental range missiles. The 2014 Annual Report on Military Power of Iran notes that “Iran continues to develop technological capabilities that could be applicable to nuclear weapons and long-range missiles which could be adapted to deliver nuclear weapons, should Iran’s leadership decide to do so.” And intelligence officials have reaffirmed the assessment that Iran, with significant foreign assistance, could flight test an ICBM-class missile by 2015. Teheran has continued to stonewall IAEA inspectors on evidence of weaponization, reportedly efforts to design a nuclear payload for ballistic missile delivery.

Russia: Moscow has embarked on an aggressive, revisionist quest to re-establish Russia as a great power. This is reflected in the annexation of Crimea and its continuing pattern of support to the separatists in eastern Ukraine. It is also seen in the strengthening of its conventional forces following their poor performance in the 2008 invasion of Georgia and in the ongoing strategic modernization of its nuclear TRIAD and missile defense capabilities. Russia has increased reliance on nuclear weapons in its defense and deterrence planning. It is determined to expand its ICBM and SLBM nuclear forces on a scope and scale reminiscent of the Soviet Union. Unlike the U.S. nuclear force posture, which is limited by a self-imposed policy of “no new nuclear capabilities,” Russia is developing and deploying new missiles and warheads, along with new submarines and a new strategic bomber. Russian officials have identified its nuclear build up as the number one military priority.

Russian open sources have indicated that Moscow is also increasing funding for missile defenses, reportedly intending to spend more on these capabilities by 2020 than the United States. The goal, according to information provided to this Committee by the Joint Staff, is to “ensure defense of critical political and military targets in the Moscow area from a ballistic missile attack, either by the United States or any other nation with nuclear or conventional ballistic or cruise missile capabilities.” This is in contrast to U.S. statements that U.S. missile defenses are neither intended for, nor capable of, defending against Russian offensive forces. But it is consistent with President Putin’s public declarations that the primary threat to Russia comes from the United States.

China: The U.S.-China relationship is of vital importance to both countries. The complex interdependencies that exist make it essential that Washington and Beijing make every effort to manage and improve the relationship. Yet, the strategic uncertainties are enormous and the future of the relationship highly uncertain. The U.S. pivot or re-balance to Asia has been interpreted by Chinese leaders as a policy of containment, just as China’s expansive territorial claims and rapid military modernization, including of its nuclear forces and missile defenses, have been seen in the west as evidence of China’s growing and aggressive ambitions.

Two additional principles should inform any consideration of the future missile threat. First, while the deployment of ICBM-class missiles may take place in a longer time frame than assessed, the U.S. cannot wait until the confirmed appearance of the threat missiles before it deploys defenses. It is imperative to be ahead of the threat. Second, experience has demonstrated the enduring fact of strategic surprise with regard to both the capabilities and intentions of adversaries.

Need for a Policy Review

There is an urgent need for a fundamental review of U.S. missile defense policy and capabilities. This is a consequence of the downgrading and dismantlement of U.S. homeland defense programs in the past six years, the increasingly dangerous security environment described above, and the failure of Obama Administration policies to deal with these challenges.

Few would disagree that U.S.-North Korea policy has failed, going back three administrations. Denuclearization of the Peninsula, while still the stated goal, is increasingly unachievable as the North expands its nuclear and missile capabilities. China, while undoubtedly frustrated with its partner in Pyongyang, shows no sign of abandoning its longtime ally, or even threatening to withhold its assistance that is the lifeline of the regime.

U.S.-Iran policy, despite the hope of a “comprehensive agreement” on the nuclear program, is also best characterized by its failures. The objectives of suspending all of Iran’s enrichment activities and denying Iran a “nuclear weapons capability” have been replaced by the goal of extending Iran’s time for breakout from two to six or twelve months.

U.S.-Russia relations are at their lowest level since the Cold War. Both the Bush and Obama Administrations assumed a mostly benign Russia -- an assumption that has turned out to be false. Concessions by the Obama Administration, such as the abrupt cancellation of the original third site, did achieve the goal of getting Moscow to the negotiating table but did not lead to real reductions in Russian forces as New START requires only the U.S. to reduce warheads and launchers, while Russia is permitted to build up to these levels. More recent missile defense concessions, such as the cancellation of the SM3 IIB program that was to provide some European-based capability against Iranian long-range missiles, have been met by Moscow with demands for more concessions. Further U.S. unilateral cuts to its theater nuclear forces have not enticed Moscow to accept limits on this class of weapons, likely because it now enjoys an estimated 8 or 10 to one advantage.

There does not appear to be a comprehensive U.S. strategy to manage the relationship with China or to shape outcomes in which China and the United States have intersecting or competing interests. But it is apparent that U.S. restraint in offensive nuclear arms and missile defenses is not being practiced by Beijing. In January 2007, China conducted an ASAT test with a ground-launched ballistic missile. More recently, the PLA conducted a military exercise that highlighted nuclear attacks against U.S. cities. While U.S. officials have declared that U.S. missile defenses are not designed to counter China’s offensive missiles, Beijing has failed to reciprocate.

The consequence of these policy failures is likely a more proliferated and more dangerous world with greater uncertainties in key relationships and increased prospect for miscalculation on all sides. The implications for defending the U.S. homeland against missile attacks are significant.

Conclusions and the Path Forward

A number of conclusions concerning U.S. missile defense policy can be drawn from the above.

1. We must defend the U.S. homeland against ballistic missile threats from countries such as North Korea and Iran. While such threats are growing, our ability to defend U.S. territory against missile attack is atrophying and obsolescing. Through major budget cuts, multiple

program cancellations, and repeated concessions and policy failures, the U.S. capability to protect the United States has been undermined. The priority of homeland missile defense must be restored to keep pace with the quantitative and qualitative nature of that threat.

2. The GMD system, at the center of the homeland defense architecture, must evolve to meet the dynamic threat. Current problems with the ground-based interceptor, in particular the kill vehicle, must be fixed. Last month's successful test marked progress in this area but improved reliability of the system must be demonstrated through active testing and spiral improvements. The number of interceptors must be increased beyond the 14 announced last March. Cancellation of the SM3 IIB program, which was intended to be deployed in Europe to counter Iranian long-range missile threats to the U.S. homeland, makes additional GBI deployments at a third site in the United States essential. Even before the cancellation of the SM3 IIB program, the National Research Council recommended a third site in the continental United States.
3. The GMD system must also evolve over time with improved sensors, including in space, and with capabilities that can defeat countermeasures and provide greater cost efficiency for intercepting larger numbers of ballistic missiles. To start, the MDA should relook, and perhaps re-start, fast interceptor and MKV programs taking into account new technologies. At-sea capabilities that can contribute to the defense of the U.S. homeland should be supported recognizing the mobility and cost advantages offered by AEGIS-capable ships.
4. In addition to defending against limited missile threats from North Korea and Iran, the United States must reassess the role of missile defenses with Russia and China. Past calls for fielding a capability against accidental or unauthorized launches, such as that proposed earlier by Senator Nunn, are even more relevant today given the state of U.S. relations with Russia and China. Beyond protection against accidental and unauthorized launch, the United States should examine how defenses might contribute to deterrence of Russia and China. This is not a new concept but one that has been incorporated in presidential guidance of a number of past democrat and republican administrations. The Carter Administration envisioned a role for strategic defenses in defeating a Soviet nuclear warfighting strategy and President Reagan's SDI program defined requirements for missile defenses with the goal of complicating Soviet war planning, thereby strengthening deterrence. While today's security setting is much different from that of the Cold War, Russia's increased reliance on its nuclear forces and the greater prospect for miscalculation argue for a review of past strategic thinking.
5. We cannot defend against larger-scale missile attacks from Russia, or potentially China, in the same manner we are defending against rogue state threats. We likely cannot build or afford enough terrestrial based interceptors to counter such threats. What we can do is explore how non-kinetic approaches, such as directed energy, can be integrated into our

BMD architecture. We can also explore the full potential of space, for the deployment of sensors and interceptors, to meet future missile defense requirements. With advances in key technologies, including tremendous progress in computing and lightweight materials, space-based interceptors may provide, according to a 2010-2011 operational assessment by the Institute for Defense Analysis, “a unique capability when used as a boost-phase system...an effective defense layer against medium and long range threat missiles equipped with decoys and other countermeasures.” While the U.S. has made the policy choice of not pursuing space-based interceptor options following the cancellation of the GPALS system by the incoming Clinton Administration, Russia and China have not matched U.S. restraint. While both have called for outlawing the “militarization of space,” these calls are aimed at foreclosing U.S. missile defense options, not their own. The U.S. policy review should examine the strategic implications of deploying defenses in space and the strategic implications of not doing so in the projected security environment.

6. The way forward described above for homeland missile defense will require leadership at the policy and agency level. It will also require additional top line funding in a time of budget austerity. The amount likely will be far less than the cuts imposed over the past six years. Funding could also come from shifting resources from theater programs back to strategic defenses. Here, it is necessary to restore the balance between investments in theater capabilities and homeland defenses. These efforts should be complementary, working together in a layered defense architecture, rather than viewed as competitors for scarce dollars. The current balance, with about four out of every five dollars going to theater programs, is out of sync.

Robert Joseph is Senior Scholar at the National Institute for Public Policy. From 2005 through 2007, he was Under Secretary of State for Arms Control and International Security and Special Envoy for Nonproliferation. From January 2001 through November 2004, Ambassador Joseph served in the National Security Council as Special Assistant to the President and Senior Director for Proliferation Strategy, Counterproliferation and Homeland Defense. Earlier, he was Principal Deputy Secretary of Defense for International Security Policy and Deputy Assistant Secretary of Defense for Nuclear Forces and Arms Control. Dr. Joseph was also Professor of Defense Studies and the founder and Director of the Center for Counterproliferation Research at the National Defense University. He holds graduate degrees from the University of Chicago (MA) and Columbia University (PhD).

**DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION**

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(5), of the Rules of the U.S. House of Representatives for the 113th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Committee on Armed Services in complying with the House rule. Please note that a copy of these statements, with appropriate redactions to protect the witness's personal privacy (including home address and phone number) will be made publicly available in electronic form not later than one day after the witness's appearance before the committee.

Witness name: Robert Joseph

Capacity in which appearing: (check one)

Individual

Representative

If appearing in a representative capacity, name of the company, association or other entity being represented:

FISCAL YEAR 2014

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
NA			

FISCAL YEAR 2013

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2014): NONE;
Fiscal year 2013: NONE;
Fiscal year 2012: NONE.

Federal agencies with which federal grants are held:

Current fiscal year (2014): _____;
Fiscal year 2013: _____;
Fiscal year 2012: _____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2014): _____;
Fiscal year 2013: _____;
Fiscal year 2012: _____.

Aggregate dollar value of federal grants held:

Current fiscal year (2014): _____;
Fiscal year 2013: _____;
Fiscal year 2012: _____.

Robert Joseph is Senior Scholar at the National Institute for Public Policy. From 2005 through 2007, he was Under Secretary of State for Arms Control and International Security and Special Envoy for Nonproliferation. From January 2001 through November 2004, Ambassador Joseph served in the National Security Council as Special Assistant to the President and Senior Director for Proliferation Strategy, Counterproliferation and Homeland Defense. Earlier, he was Principal Deputy Secretary of Defense for International Security Policy and Deputy Assistant Secretary of Defense for Nuclear Forces and Arms Control. Dr. Joseph was also Professor of Defense Studies and the founder and Director of the Center for Counterproliferation Research at the National Defense University. He holds graduate degrees from the University of Chicago (MA) and Columbia University (PhD).

**U.S. National Missile Defense and the Growing Threat:
*Is a “Limited Defense” Enough?***

Amb. R. James Woolsey
Chairman, Foundation for Defense of Democracies
Former Director of Central Intelligence 1993-95

House Armed Services Committee
Subcommittee on Strategic Forces

Washington, DC
July 23, 2014



Mr. Chairman, Ranking Member Cooper and Members of the Subcommittee,

I am honored to be asked to testify before you today on this important subject.

I have incorporated in this testimony my answers to the five sets of questions sent to me by the Committee:

1). In my view, a policy of limited missile defenses against limited threats makes no sense in today's threat environment because the threat increasingly refuses to stay limited.

2). Although many types of increases and other changes will no doubt mark the development of threats in the years between now and 2020-2025, this testimony will concentrate on those posed by electro-magnetic pulses (EMPs) due to the seriousness of that threat and the role of ballistic missiles in its implementation.

EMPs are super-energetic radio waves that, in the form of coronal solar ejections by the sun, have been striking the earth since the two have existed. But it is only since the late 1850s that the existence of rudimentary electronics (e g telegraphs) have demonstrated that even the solar generation of such random pulses can destroy the electronics portion of our terrestrial infrastructure.

Then in 1962, as atmospheric nuclear tests were coming to a treaty-dictated end, some Russian and American atmospheric tests produced surprising results: destruction of electronics at great distances. It was not a nuclear blast that caused the destruction, but rather pulses generated by gamma rays and the fireball. And we have learned that modern electronics are a million times more

vulnerable to EMP than the electronics of the 1960's. In 1989, a solar-generated pulse effectively destroyed Quebec's electric grid.

For the last half-century or so the certain destruction of electronics in a nuclear war has been considered by most policymakers and students of these phenomena to be just one of the many awful things that would happen in a nuclear exchange. We have eighteen critical infrastructures and seventeen of them (food, water, communications, finances, hospitals, law enforcement, etc.) all depend directly or indirectly on the eighteenth - the electric grid. But except for some electronic shielding of portions of our strategic forces, little attention has been paid for decades to the ease of an enemy's generating EMPs by detonating a nuclear weapon that is passing above us in orbit and thus bringing our civilization to a cold, dark halt.

But the recent declassification of a substantial amount of information about EMPs, the works of Dr. Peter Pry and others, and the thorough reports of two congressional commissions and numerous other major U.S. government studies that have dealt with the subject in detail, have begun to bring attention to the issue. There is now an increasing likelihood that rogue nations such as North Korea (and before long, most likely, Iran) will soon match Russia and China in that they will have the primary ingredients for an EMP attack: simple ballistic missiles such as SCUDs that could be launched from a freighter near our shores; space launch vehicles able to launch low- earth-orbit satellites; and simple low-yield nuclear weapons that can generate gamma rays and fireballs. In 2004, the Russians told us that their "brain drain" had been helping the North Koreans develop EMP weapons.

Further, the Russians invented years ago a way to launch satellites into orbit using a trajectory that does not approach us from the north, where our few modest ballistic missile defenses are located, but rather from the south. It is called a Fractional Orbital

Bombardment System (FOBS). A missile launched to put an EMP-carrying nuclear device into orbit can come upon us from the South, and does not require accuracy, size, or numbers to be effective.

The nuclear weapon would be detonated in orbit, perhaps during its first orbit, in order to destroy much of the electric grid from above the US with a single explosion. Some of the destructive effects would reach to the horizon; others, via transmission lines, can reach further. Unlike the situation if we are attacked with a traditional nuclear missile we may not know the source of what blacks out our electric grid. It might be the sun or it might be the Iranians. We might not be able to tell.

3). The impact on our ballistic missile programs of assessing only limited threats and deploying only limited defenses makes such defenses wholly ineffective against threats such as EMP.

4). To preserve our society against our the vulnerabilities from the destruction by coronal solar ejections and by any enemy, present or future, who can obtain a simple ballistic missile and a rudimentary nuclear weapon, we must change our policy to assess these threats and deploy defenses against them. The EMP Commission estimates that within 12 months of an EMP event two-thirds of the US population would likely perish from starvation, disease, and societal breakdown. Other experts estimate the likely loss to be closer to 90 percent.

5). First of all, we need to move rapidly to harden the grid against EMP attack. Much of what needs to be done could use simple devices that already exist. The EMP Commission's cost estimate is \$2 billion. (This is the equivalent of a one-time charge of seven dollars per American—roughly the cost of a Venti Frappuccino.)

We could consider taking other steps, such as advocated by William Perry and Ashton Carter (later Secretary and Deputy Secretary of Defense) in the Washington Post seven years ago—destroy all launch vehicles of North Korea before launch. But even with the backing of two prestigious and respected advocates, applying it only to probably the world's craziest dictator, this idea never got off the launch pad. And to be thoroughly effective against EMP, it would have to include pre- or immediately post-launch destruction of all nations' launches of all types, including Russia and China. It's hard to imagine an idea that more deserves the appellation "political non-starter."

Compared to what we have today, in spite of the greater flexibility, of some types of ballistic missile defenses that we've abandoned—Brilliant Pebbles and some space-based directed energy BMD systems that could shoot down space vehicles before their ballistic missile launchers could put anything into orbit—we still don't have a good answer to our toughest problem: EMP

We need to move extremely rapidly to build resilience into our electric grid and also to put the best minds we have on this problem of defending against EMP. Now.

**DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION**

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(5), of the Rules of the U.S. House of Representatives for the 113th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Committee on Armed Services in complying with the House rule. Please note that a copy of these statements, with appropriate redactions to protect the witness's personal privacy (including home address and phone number) will be made publicly available in electronic form not later than one day after the witness's appearance before the committee.

Witness name: Amb. R. James Woolsey

Capacity in which appearing: (check one)

Individual

Representative

If appearing in a representative capacity, name of the company, association or other entity being represented:

FISCAL YEAR 2014

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
n/a			

FISCAL YEAR 2013

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
n/a			

FISCAL YEAR 2012

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
<u>n/a</u>			

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2014): n/a ;
 Fiscal year 2013: n/a ;
 Fiscal year 2012: n/a .

Federal agencies with which federal contracts are held:

Current fiscal year (2014): n/a ;
 Fiscal year 2013: n/a ;
 Fiscal year 2012: n/a .

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2014): n/a ;
 Fiscal year 2013: n/a ;
 Fiscal year 2012: n/a .

Aggregate dollar value of federal contracts held:

Current fiscal year (2014): n/a ;
 Fiscal year 2013: n/a ;
 Fiscal year 2012: n/a .

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2014): n/a _____ ;
Fiscal year 2013: n/a _____ ;
Fiscal year 2012: n/a _____ .

Federal agencies with which federal grants are held:

Current fiscal year (2014): n/a _____ ;
Fiscal year 2013: n/a _____ ;
Fiscal year 2012: n/a _____ .

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2014): n/a _____ ;
Fiscal year 2013: n/a _____ ;
Fiscal year 2012: n/a _____ .

Aggregate dollar value of federal grants held:

Current fiscal year (2014): n/a _____ ;
Fiscal year 2013: n/a _____ ;
Fiscal year 2012: n/a _____ .

R. JAMES WOOLSEY

Ambassador R. James Woolsey, a former Director of Central Intelligence, chairs the board of the Foundation for Defense of Democracies, and is a Venture Partner with Lux Capital Management.

Ambassador Woolsey also currently chairs the Advisory Board of the Opportunities Development Group and the Strategic Advisory Group of Paladin Capital. He previously was a venture partner and senior advisor with VantagePoint Venture Partners. In 2009 he was the Annenberg Distinguished Visiting Fellow at the Hoover Institution at Stanford University and in 2010-2011 was a Senior Fellow at Yale University's Jackson Institute for Global Affairs. From 2002-2008 Mr. Woolsey was a Vice President of Booz Allen Hamilton in McLean, Virginia, specializing in energy and security issues, and prior to that a partner with Shea & Gardner in Washington D.C., specializing in commercial litigation and alternative dispute resolution (arbitration and mediation). He practiced at the law firm for 22 years on four different occasions and served in the U.S. Government 5 times for 12 years, holding Presidential appointments in 2 Republican and 2 Democratic administrations. In addition to serving as DCI, he was ambassador to and chief negotiator for the Conventional Armed Forces in Europe (CFE) Treaty (1989-91), General Counsel of the Senate Armed Services Committee, and Under Secretary of the Navy. He has served on numerous corporate and non-profit boards, including as a Trustee of Stanford University and as a Regent of the Smithsonian Institution. He speaks publicly and contributes articles to national newspapers and other major periodicals on such issues as national security, energy, foreign affairs and intelligence.