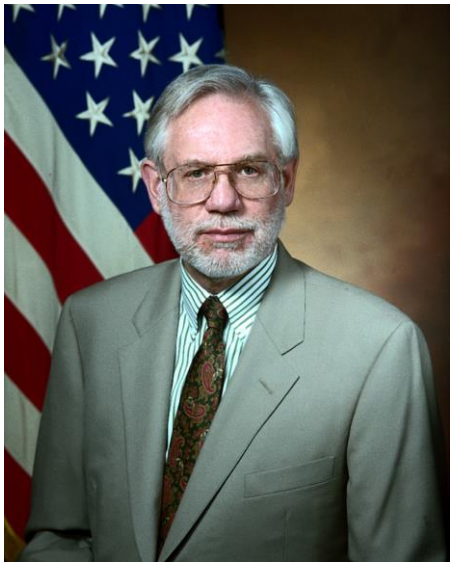
Ask an Expert: Philip Coyle on National Missile Defense



In this installment of Ask an Expert, staff at the Center for Arms Control & Non-Proliferation spoke with Philip Coyle about the U.S. National Missile Defense program. Coyle, who is a Senior Science Fellow at the Center for Arms Control and Non-Proliferation, has a wealth of experience on this topic, having served as Director of Operational Test and Evaluation at the Pentagon from 1994 to 2001 and as Associate Director for National Security and International Affairs at the White House Office of Science & Technology Policy from 2010-2011.

As part of the interview, Coyle discusses the history of the program, its current level of effectiveness, and the merits of various congressional proposals to adjust the scope and scale of the program.

Center for Arms Control & Non-Proliferation (CACNP): How do you define National Missile Defense and how does it differ from other missile defense programs?

[On the history of national missile defense: From World War II to Star Wars]

Philip Coyle: National Missile Defense (NMD) is a program to develop the means to shield the entire United States from attack by ballistic missiles such as Intercontinental Ballistic Missiles (ICBMs) or other, shorter-range ballistic missiles carrying nuclear warheads.

The history of the concept goes back to World War II and the missiles that Nazi Germany launched against England, France, Belgium and the Netherlands. In the 1950s, following WWII, the U.S. military undertook a series of programs to develop missile defenses. Thus, the United States has been trying to develop national missile defenses for over 60 years, evidence of how difficult the technology has been.

While over the decades the names and architectures have changed, the basic idea has remained more or less the same. In March 1983, President Ronald Reagan made his famous "Star Wars" speech announcing that national missile defense would be expanded under the Strategic Defense Initiative (SDI). SDI was intended to include battle stations in space, some with high-power lasers powered by nuclear explosions or by chemical means. The planned use of nuclear weapons as power sources for SDI became very controversial, and the technology was not successfully demonstrated.

In January 1991, President George H.W. Bush refocused and renamed U.S. national missile defense as GPALS: Global Protection Against Limited Strikes. This new policy recognized that it would be impractical as well as destabilizing for U.S. missile defenses to try to defend against all-out attacks from Russia or China – impractical because of the technological obstacles and costs, and destabilizing because open-ended U.S. missile defense plans would only encourage U.S. adversaries to build more and more offensive weapons to overwhelm those missile defenses, exactly the opposite of what the U.S. would want.

"Open-ended U.S. missile defense plans would only encourage U.S. adversaries to build more and more offensive weapons… exactly the opposite of what the U.S. would want." - Coyle

GPALS included ground-based interceptors and radars. It did not include lasers and neutral particle beam weapons powered by nuclear weapons, but added Brilliant Pebbles, orbiting non-nuclear interceptors in space intended to fly down to intercept enemy missiles. Concerns in Congress about the scope, cost, and effectiveness of Brilliant Pebbles, and early test failures, led to declining budgets. After having been converted to a long-range research program and renamed Advanced Interceptor Technology, Brilliant Pebbles was cancelled by the Ballistic Missile Defense Organization on December 1, 1993. From October, 1989 through November 1993, the total cost of the Brilliant Pebbles program was about $1.1 billion.

Recognizing the inherent limitations of the technology, the Clinton administration shifted the program toward defense against a few missiles from a rogue state such as Iran or North Korea, or from an accidental or unauthorized launch from Russia or China. The Administration continued to test the concept in flight intercept tests, but failures caused President Clinton to decide in September 2000 not to authorize

deployment of the planned but limited NMD system because "the system as a whole is not yet proven."

Notwithstanding the still primitive state of the technology, on December 16th, 2002 President George W. Bush signed National Security Presidential Directive 23 calling for deployment by 2004 of an operational national missile defense system. Also in 2002, the name Ground-based Midcourse Defense system (GMD) was adopted for NMD.

[On how NMD differs from other programs]
National missile defense differs from regional or theater missile defense programs in that the latter seeks to defend a regional area, that is, South Korea, Japan, or America's friends and allies in the Middle East. In theater missile defenses, the threat is expected from shorter-range missiles, which fly slower and lower than ICBMs.

For more information on theater-based programs see THAAD, Aegis SM-3, PATRIOT.

CACNP: What is the current status of the Ground-based Midcourse Defense program?

Philip Coyle: So far the GMD system has cost about $40 billion. A total of 30 Ground-Based Interceptors have been deployed in silos, 26 at Fort Greely in Alaska and 4 at Vandenberg AFB in California, and 14 more are planned at Fort Greely. Overall, since flight intercept testing began in 1997 the GMD system has failed about half the time. Because the Exo-atmospheric Kill Vehicle (EKV) has been so unreliable, a new kill vehicle called the Redesigned Kill Vehicle (RKV) is being designed. The radar systems associated with the GMD system are also incomplete. A single new radar is being designed, called the Long Range Discrimination Radar, but even once deployed in Alaska, it would not provide adequate coverage to deal with even a "limited" threat.

The success rate of the GMD system in flight intercept tests has been dismal. Furthermore, the performance of the GMD system has been getting worse over time when it ought to be getting better. Since 1999, GMD interceptors have failed to kill the mock enemy target in nine of 17 flight intercept tests. But since 2004, six of nine tests have failed, and since 2010, three of four have failed. In 2015, the Director of Operational Test and Evaluation summarized that

"The success rate of the GMD system in flight intercept tests has been dismal."- Coyle

more than fifteen years of GMD testing have been "insufficient to demonstrate that an operationally useful defense capability exists."

CACNP: Despite problems with the current system, we have seen a push in recent legislation to expand the National Missile Defense system to a site on the East Coast. What are your thoughts on the proposed plans for a third Ground-based Midcourse Defense site on the East Coast?

> *"There is no validated military requirement to deploy an East Coast missile defense site." – Adm. Syring & Lt. Gen. Formica (2013)*

Philip Coyle: The Department of Defense has said repeatedly that it has no military requirement for another missile defense site on the East Coast. For example, Vice Admiral James Syring testified before Congress that the Missile Defense Agency (MDA) does not need or want funding for a third Site, and Adm. Syring and his Army counterpart wrote the Chairman of the Senate Armed Services Committee that, "There is no validated military requirement to deploy an East Coast missile defense site."

The existing sites at Fort Greely, Alaska and Vandenberg AFB, California would provide adequate coverage of the United States if the GMD system actually worked. Building a third site by deploying more of the same unreliable hardware would not improve U.S. security. The expense of a third site would take funding away from conventional U.S. defenses, the two existing GMD locations, and the many improvements needed to make the GMD system work.

Nevertheless, in 2012, the U.S. House of Representatives directed the MDA to study candidate locations in the northeastern United States. Five sites were initially selected for study. Later that list was narrowed to three sites for which MDA conducted Environmental Impact Studies (EIS). The draft EIS was published in the Federal Register on May 31, 2016. The period for public comment ended on August 17, 2016. The final selection by the MDA is pending.

**The three sites are Fort Custer in Michigan, Camp Ravenna in Ohio, and Fort Drum in New York.*

CACNP: What are your reflections on proposals from some members of Congress that call for the term "limited" to be removed from the responsibilities of National Missile Defense?

Philip Coyle: As I explained in a recent article in *Breaking Defense*, for the past two decades, under both Democratic and Republican presidents, U.S. national missile defense policy has focused necessarily on intercepting a "limited" nuclear attack from North Korea and/or Iran. This has been U.S. policy for three good reasons:

1. The GMD system is unreliable and can't even perform its limited mission.
2. Attempting to build a bigger system to defend against all-out missile attacks from Russia and China would only encourage those countries to build more offensive missiles to further overwhelm our defenses, the opposite of what the U.S. would want.
3. For the foreseeable future, it will not be technically feasible that the GMD system will be capable of defending against an all-out attack by Russia or China.

Some lawmakers claim that the word "limited" has been the obstacle to success. It hasn't. The truth is that "limited" national missile defense has been a necessary recognition of the intractable scientific and technical obstacles still preventing the GMD system from success. The word "limited" in U.S. policy also recognizes the need to avoid a new arms race with Russia and China. If we were to expand our defensive capabilities, then Russia and China would feel justified expanding their offensive systems to overwhelm our missile defenses, leading the U.S. to build more offensive missiles, and so on.

"Some lawmakers claim that the word "limited" has been the obstacle to success. It hasn't."
-Coyle

Former Secretary of Defense Robert Gates, when asked whether expanding national missile defense was a sound proposition, replied that such a system "would be enormously destabilizing, not to mention unbelievably expensive." By "enormously destabilizing," Secretary Gates understood a new nuclear arms race would jeopardize American national security. And he wasn't kidding about the financial implications – a 2003 study estimated the lifetime cost of a layered nationwide missile defense system at as much as $1.5 trillion, when adjusted for inflation.

CACNP: What are your reflections on proposals from some members of the House of Representatives for a new space-based missile interceptor program even though scientific experts have dismissed such proposals in the past?

Philip Coyle: Impatient with decades of research and development, some Members of Congress have called for a more aggressive program to produce a "layered" system with orbiting, space-based interceptors. These interceptors might be of the "Brilliant Pebbles" type, or battle stations in space using high power lasers to intercept enemy missiles, but such high power lasers do not exist.

> *"There's nobody in uniform that I know who believes that this is a workable concept." – Robert Gates, Then-Secretary of Defense (2009)*

Following experiments with a low-power prototype in the 1970s and 1980s, the U.S. Air Force initiated the Airborne Laser (ABL) program in 1996. The laser was carried on a modified Boeing 747 aircraft. However, the ABL laser turned out to be 20-30 times too weak and suffered from an impractical operational concept that would have required the aircraft to fly so close to its target that it could be shot down itself. In 2009, Defense Secretary Robert Gates effectively cancelled the program testifying before Congress, "There's nobody in uniform that I know who believes that this is a workable concept."

More recently the Missile Defense Agency is exploring the concept of a different type of laser carried on a long-endurance drone aircraft, but the technology is not up to the challenge. At a May 2014 conference at the Atlantic Council, "What's Next: Missile Defense in 2030," the assembled experts agreed that practical and effective high power lasers for missile defense are likely decades away.

Missile defense from space presents even more difficult challenges. Because the Earth rotates, many orbiting interceptors or lasers are required in order to reach the enemy territory. As the Earth turns, some interceptors or laser battle stations will be too far away, or even on the wrong side of the Earth.

In 2004, the American Physical Society completed a study of space-based missile defenses. The study showed that depending on flyout velocity, and warning time, hundreds or even thousands of orbiting interceptor satellites would be required. For example, President George H.W. Bush's GPALS system called for 1,000 to 5,000 space-based interceptors. The cost of so many satellites, and the space-launch requirements to place all those satellites in orbit in the first place, as well as to replenish satellites that decay out of orbit or fail, would be exorbitant.

A 2012 study by the National Academy of Sciences estimated that space-based missile defense would be "10 times as expensive as any other alternatives, at least $300 billion for a limited capability."

In its 2007 study, the Center for Strategic and Budgetary Assessments estimated the cost of a space-based interceptor system at between $60 billion and $290 billion depending on the flyout velocity required, and the cost of a space-based laser at $157 billion to $196 billion.

In testimony before Congress this spring, the head of the Missile Defense Agency Adm. James Syring expressed, "serious concerns about the technical feasibility of the interceptors in space, and I have serious concerns about the long term affordability of a program like that."

CACNP: Given the challenges, would you suggest we move forward in development of the National Missile Defense system, and if so, in what way?

Philip Coyle: As I recently wrote policymakers can produce better results by reforming the objectives of the Missile Defense Agency. That means promoting innovation, the best of American science, research and development, instead of buying more ineffective hardware. That also means allowing the production of interceptors only after they have been successfully tested under realistic operational conditions, a logical policy the agency has often avoided to meet arbitrary deadlines – only to then miss those deadlines anyway.

In U.S. policy, the term "limited" recognizes both the scientific realities of the GMD program, and the geo-political realities; the term "limited" is not the obstacle. The high rate of GMD flight test failures shows that the GMD system cannot combat even a limited attack from a rogue state. The Government Accountability Office (GAO) stated this in a recent report, saying, "The Missile Defense Agency (MDA) has not demonstrated through flight testing that it can defend the U.S. homeland against the current missile defense threat."

"New technology should be subjected to realistic operational testing before production and deployment." - Coyle

Moving forward, new technology should be subjected to realistic operational testing before production and deployment, following a strict "fly before you buy" policy so that the U.S. can develop a reliable missile defense system.