The Committee on the Present Danger

fighting terrorism and the ideologies that drive it

The Honorable R. James Woolsey
The Honorable George P. Shultz
Co-Chairmen

Senator Jon Kyl
Senator Joseph Lieberman
Honorary Co-Chairmen

For information contact:
Barbara Dlugos, 202/778-1032
email: info@fightingterror.org
July 15, 2005

UNLEASH NAVY'S SEA-BASED MISSILE DEFENSE PROGRAM; ADD NEW SPACE-BASED PROGRAM--PAPER URGES

In a new policy paper published today, the Committee on the Present Danger recommends that the U.S. Navy's sea-based missile defense program be given higher priority, with new emphasis on defense of coastal areas against short-range missiles. At the same time, the paper calls for the revival and updating of technology for a space-based missile defense program.

The CPD paper calls for the space-based program to have as its first objective a demonstration in space within three years of "the feasibility of a constellation of space-based interceptors to intercept ballistic missiles in all their phases of flight: boost, midcourse and terminal."

The paper notes that a missile's boost phase lasts a few minutes while the missile's rockets accelerate it to near-orbital speeds. The midcourse phase of about 20 minutes takes the missile out of the atmosphere to its highest point and begins its reentry. The terminal phase of a few minutes plunges it toward its target. The nation's ground-based system in Alaska is designed to intercept missiles only in the midcourse phase.

According to the paper, "Boost-phase defenses are the most effective from a technical point of view, because they can destroy a missile...while its burning rockets make it very visible and vulnerable before it can deploy its warhead and decoys."

The paper also calls for assigning a high priority to the Navy to enable its "Aegis air defense interceptors to defend U.S. coastal area from short-range missiles (SCUDS) launched from ships." SCUDS, particularly if armed with nuclear weapons, are considered an especially dangerous threat. The CPD estimates this upgrade can be done for "a relatively small investment" of less than $100 million.

"Upgrading the Navy's Aegis system is currently limited by fiscal constraints. It should be limited only by technological restraints," said the paper's lead author, Henry Cooper, former

director of the Strategic Defense Initiative (SDI) and former ambassador and chief negotiator at Geneva defense and space talks with the Soviet Union. "The same should be true for the space-based missile defense," he added. "Fifteen years ago, we had a mature technology for this. It should be upgraded today, constrained only by the limits of latter-day technology."

Other members of the CPD's missile defense policy paper team were Robert L. Pfaltzgraff, Ph.D., Tufts University; William Van Cleave, Ph.D., director of the Center for Defense and Strategic Studies, Southwest Missouri State University, and Lowell Wood, Ph.D., the Hoover Institution.

###

The Committee on the Present Danger

fighting terrorism and the ideologies that drive it

The Honorable R. James Woolsey
The Honorable George P. Shultz
Co-Chairmen

Senator Jon Kyl
Senator Joseph Lieberman
Honorary Co-Chairmen

A Committee on the Present Danger Policy Paper:

MISSILE DEFENSE FOR THE 21st CENTURY*

BACKGROUND

The decades-long debate over whether to protect the American people from the threat of ballistic missile attack moved sharply to the affirmative side when Congress passed by an overwhelming majority the National Missile Defense Act of 1999, stating: "It is the policy of the United States to deploy as soon as 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)." This act was signed into law by President Clinton in July 1999.

In 2002, President Bush took a major enabling step by withdrawing from the ABM Treaty, which had blocked even the development and testing of effective defense components for 30 years. Since then, ground-based defense concepts, previously permitted in restricted Treaty-limited configurations, have been improved by 1) enabling deployment of defensive interceptors at a previously precluded location (Alaska) to permit broader coverage and 2) including mobile (primarily sea-based) components to extend the defense coverage and improve its ability to identify, track and intercept threatening warheads in space. Also, sea-based interceptors, previously constrained by the Treaty to a limited theater defense role, are being improved to intercept long-range ballistic missiles previously given a free ride over our ships at sea.

Still, some of the most effective defense concepts, precluded by the ABM Treaty precisely because they offered the greatest promise as effective defenses, have not yet been emphasized in the on-going missile defense development activities. In particular, deploying mobile defensive systems and components offers benefits over proliferating fixed ground-based defenses. In particular, those based at sea and in space can provide substantial improvements in effectiveness at lower cost and with reduced demands for overseas basing rights. Serious programs to develop and test the key technology to build such systems are required if the future defenses are to meet 21st century challenges, which include a proliferating and growing threat of ballistic missiles that can attack U.S. cities with weapons of mass destruction.

700 12th Street, N.W., Suite 800
Washington, D.C. 20005-3949

Mailing Address: P.O. Box 65196
Washington, D.C. 20035-5196

Tel: 202/778-1032
Fax: 202/659-7923

E-mail: info@fightingterror.org

THREAT, NEEDS and OPPORTUNITIES

Rogue states – particularly North Korea and Iran – are working hard to acquire weapons of mass destruction (WMD) and the means to deliver them. Traditional competitors, Russia and China, are extending the sophistication of their strategic arsenals. And terrorist groups now pose a direct threat, with at least short- and perhaps medium-range ballistic missiles. No longer does the United States have the luxury of lengthy timelines to develop a defense against these existing and growing threats.

To counter these threats to America and our overseas troops, friends and allies, a plan is required to provide an effective global layered defense capability as soon as possible. Such an effective defense will provide multiple opportunities to intercept ballistic missiles along their trajectories, from launch point to target, each of which consists of:

1. A boost phase, which lasts for a few minutes while the missile's rockets burn to accelerate its payload to near orbital speeds;
2. A midcourse phase, which lasts for about 20 minutes during which the payload rises above the atmosphere to the trajectory's highest point (apogee) and descends toward reentry into the atmosphere; and
3. A terminal phase, which lasts for a few minutes as the payload plunges into and through the atmosphere to its target.

While plausible ballistic missile defense concepts to counter attacking ballistic missiles in each of these three phases of flight were defined over 40 years ago, the 1972 ABM Treaty limited serious development and testing of any except a midcourse and terminal defense for a very limited deployment area. The legacy of 30-years of such constrained thinking continues to limit the options available for defending America today. But the 2002 removal of ABM Treaty constraints frees today's designers to take full advantage of modern technology in providing effective defenses for all three phases of flight.

Boost-phase defenses are the most effective from a technical point of view, because they can destroy a threat missile, launched from anywhere at a target anywhere else, while its burning rockets make it very visible and vulnerable – before it can deploy its warhead(s) and decoys. Furthermore, if it can be destroyed early enough, the debris (including the bomb) will fall back on the territory of the launching nation – perhaps a consequence that could deter an attack in the first place. The defense must engage in a very short period of time, requiring an effective command and control system to launch a high-speed interceptor located close to the threatening missile's launch point, within a minute or so after the threatening rocket lifts off. A speed-of-light system can be further away, but it must also be at the ready. The airborne laser (ABL) is the only serious on-going boost-phase defense effort, and it is intended for a theater defense mission rather than a U.S. homeland boost-phase defense.

Midcourse-phase defenses have the most time to engage an attacking missile, but they must contend with a complex range of countermeasures, including numerous lightweight decoys. The current Alaska ground-based interceptor system is being designed to counter a restricted countermeasures threat presumed to be representative of North Korean capabilities in the near future. Sophisticated midcourse countermeasures, such as may already exist in the Russian and Chinese arsenal, would be difficult to defeat.

Terminal-phase defenses can exploit the fact that atmospheric drag will strip away lightweight decoys that may confuse the midcourse defenses, leaving the warhead for easy identification and interception. Maneuvering warheads, however, may make interception difficult--as was demonstrated by Patriot's difficulties in hitting tumbling warheads during the 1991 Gulf War. Debris from interceptions will likely fall on friendly territory.

Common sense and detailed technical analysis affirm that it is best to destroy attacking missiles as far from their intended targets as possible – and as early in their flight trajectories as possible. A layered defense, incorporating all three capabilities, is the best way to counter a dedicated, intelligent adversary armed with effective modern offensive ballistic missiles. Thus, the kinds of defense (midcourse and terminal) explored under the terms of the ABM Treaty must be supplemented with boost-phase defenses to achieve a robust defense capability against the eventual long-range ballistic missiles of a nation state such as North Korea.

Furthermore, there are nearer-term threats to the United States that will not be countered by the Alaskan defense alone. These threats may come from nation states or from terrorists, and at least some are well known. For example, Donald Rumsfeld has reaffirmed as Secretary of Defense the findings of his 1998 *Commission on the Ballistic Missile Threat* that SCUD missiles launched from ships off our coasts are already a serious threat – and over 60 percent of the American people who live near our coasts have no defense against these threats. More recently, the 2004 *Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack* identified a major societal threat that could result from a nuclear detonation over the U.S., including from a SCUD fired from a ship near our coasts. It would harm no one directly, but could literally shut down a major portion of the U.S. power grid, communication networks and other critical infrastructure dependent on sophisticated electronics and computers – creating havoc with major national and international economic consequences. The Alaskan site will not rectify either of these shortcomings, nor will any other missile defense program identified in the administration's public plans.

Yet there are available near-term options to begin countering these threats. These options can be derived fairly rapidly by adapting on-going successful development programs, such as the Navy's sea-based defense program, which has amassed a five-out-of-six successful test record with its Standard Missile-3, Block 1 (SM-3, Blk1) interceptor, and now has deployed a limited operating capability against short- and medium-range ballistic missiles. Moreover, the Japanese

decided in 2004 to deploy sea-based missile defenses and are joining with the United States to fund further development of a system for the defense of Japan based on the existing Aegis architecture. This same capability is of interest to a number of other nations as well. Thus, within the next several years, an internationally capable global defense should evolve from current programs, which could be accelerated with greater funding.

Sea-based defenses, operating near our coasts, can provide a counter to the potential threat from SCUDs launched from ships off our coasts – whether by terrorists or nation states. After all, the ability of a nominal sea-based air defense interceptor to hit a rocket in its boost phase was first demonstrated in the 1960s, and there is no reason to doubt that the Navy's existing air defense interceptors can be given this same capability for a relatively small investment (under $100 million). Thus, we could have it operating near our coasts within a few months. All that is required is software improvements and the dispersal of available interceptors for the Navy to incorporate this mission with Aegis cruisers and destroyers operating in U.S. waters. Regular testing as part of East and West Coast Test Range activities can enhance its deterrent value.

Over the longer term the U.S. and Japanese governments have agreed to pursue a joint program to provide an improved sea-based interceptor missile defense capability. This jointly-funded effort will develop over the next 5-7 years a moderate-speed interceptor compatible with existing Aegis infrastructure, particularly a 21-inch diameter Standard Missile-3, Block 2 (SM-3, Blk 2) that fits in the existing Vertical Launch System (VLS) deployed on about 100 U.S. and allied ships, on station around the world.

The anticipated speed of this SM-3, Blk2 interceptor will be about 5 km/sec. A faster follow-on interceptor (about 7 km/sec) is needed to provide the boost-phase capability for many applications of interest – including giving ships in the Sea of Japan a boost-phase capability against North Korean missiles launched at the United States. A lighter kill vehicle is needed to provide this higher speed follow-on to the SM-3, Blk 2 interceptor and retain compatibility with the existing VLS and other important existing infrastructure on host ships around the world. (A lighter kill vehicle on the SM-3, Blk2 means that this VLS-compatible rocket can accelerate faster to a higher velocity. A heavier kill vehicle would require development of a new larger booster rocket that would exceed the VLS diameter, leading to an expensive retrofit program to accommodate the new interceptor and reducing its "universal" ability to fit into existing U.S. and allied Navy infrastructure.) Technology for such a light-weight kill vehicle was demonstrated over a decade ago, but was abandoned because it was associated with system concepts that could not be built under the terms of the ABM Treaty. With the necessary funding, such a lightweight kill vehicle can be tested within three years, and included as a block improvement of the currently-planned U.S. -Japanese acquisition program[1].

[1] Such a lightweight kill vehicle would also have other applications, e.g., heavier ground based interceptors could carry many such kill vehicles to help defeat midcourse countermeasures.

Space-based defenses are the optimum layered defense. Basing in space would maximize the ability of the defense to observe the developing threat and minimize the proximity between the defense and target to achieve an effective interception in all three phases of the attacking missile's flight trajectory. Such concepts were examined in detail during the 1980s and early 1990s and then abandoned in 1993 because they were contrary to the spirit if not the strict terms of the ABM Treaty. In fact, these were the most effective of all the technologies developed for the Strategic Defense Initiative investment of $30-billion between 1984 and 1993, when missile defense programs were redirected to consider only ABM Treaty compliant defense concepts.

Nevertheless, associated commercially available technology has advanced several generations beyond that employed in the most advanced concept of that era, which was formally scrubbed by numerous government and outside scientific groups during 1989 and which passed a formal Milestone I review by the Defense Acquisition Board in 1991. It met with congressional opposition in 1991 and 1992, and was officially canceled in 1993 for political, not technical, reasons[2]. At least some of the political opposition has been reduced since the ABM Treaty no longer restricts the development, testing or deployment of such a capability – nor does any other legal instrument.

Based upon the technology available over 15 years ago--and space-qualified on the award winning 1994 Clementine mission to the Moon--an effective development activity could be revived and, under competent management, provide a tested space-based defense option within about five years. The realism of this objective is reinforced by the fact that, during a five-year period in the mid 1990s, Motorola led a completely commercial effort to use SDI technology and operational concepts to build a 66-satellite communication satellite system (Iridium) for about $5 billion. The Defense Department uses it today. This rapid and effective acquisition effort was entirely consistent with the 1990 programmatic and cost estimates made by the Pentagon's independent costing group for a much larger constellation of more capable space-based interceptors. Updated for inflation, that approved plan indicates a global space-based defense could be operating within five or so years for a fraction of the investment already made in the Alaska site. Such an effort would reach an operational capability many years before called for in current plans for a space testbed, recently discussed by Lt. General Obering, Director of the Pentagon's Missile Defense Agency.

Conclusions: Thus, there are near-term options for building viable sea-based and space-based defenses within the next decade that would result in a comprehensive, global layered missile defense system. While the current deployed defenses may have only a limited capability, a fully funded program to build this global defense should assure a growing and viable effective defense capability, one that could dissuade would-be ballistic missile possessors from costly investments

[2] See the record of this important program as recorded by the Missile Defense Agency's Historian, Donald R. Baucomb, "The Rise and Fall of Brilliant Pebbles," *International Flight Symposium* sponsored by the North Carolina First Flight Centennial Commission, October 23, 2001; subsequently published in the *Journal of Social, Political and Economic Studies*, Volume 29, Number 2, September 2004, 99 145-190.

in ballistic missile technologies because they could not overcome the defenses. The strategic goal of such a global defense should be to make it impossible for any adversary to undermine U.S. decision-making in times of crisis or conflict by threats of WMD-armed ballistic missiles.

RECOMMENDATIONS

1. ***Empower the Navy to deploy sea-based defenses at a technology limited rate.*** In light of the Navy's demonstrated success and the growing international interest in sea-based defenses, greater priority should be given to enable the Navy to organize resource and manage the development of a fully capable, integrated global sea-based defense system. To this end, recommended actions are:

a. Realign the Missile Defense Agency to empower the Navy to manage more effectively its activities, and assure full funding of the associated development activities. Assign the Program Director, Aegis Ballistic Missile Defense, as the Director of a Navy Ballistic Missile Defense Program Office and Acquisition Executive for Navy related missile defense programs.

b. Immediately increase the funding for the Aegis Ballistic missile defense program to allow it to pursue its upgrade projects at a technologically limited pace as compared to the current fiscally constrained pace. Increase the budget of the Aegis Ballistic Missile Defense program to approximately $2 billion/year – roughly one fifth of the current budget associate with missile defenses.

c. Give priority to enabling Aegis air defense interceptors to defend U.S. coastal areas from short-range missiles (SCUDs) launched from nearby ships; and move as rapidly as possible with the joint U.S.-Japanese program to empower fully the 21-inch standard missile as a mid-course and boost-phase defense.

2. Initiate and fully fund a new program to test and deploy space-based defenses. A new initiative is required to revive the space technology that was mature 15 years ago and to bring it up to date. To exploit that technology which has since advanced by several generations, we recommend a streamlined technology-limited development activity to demonstrate in space within three years the feasibility of a constellation of space-based interceptors to intercept ballistic missiles in all their phases of flight: boost, midcourse and terminal. To avoid conflicts with existing acquisition programs focused on ground-based and sea-based defenses and to move ahead as rapidly as possible, this innovative effort should be undertaken separately by a special task force of \technical personnel experienced in developing innovative technology. With these thoughts in mind, recommended actions are:

a. Fund the Defense Advanced Research Projects Agency (DARPA), which specializes in innovation of defense systems via advanced technology, to assemble a small, very competent team (including members of the SDI government and industry team that worked on Brilliant Pebbles, if they can be located) to revive the concept for a modern space-based interceptor system and, within three years and based on today's commercially available technology, to perform boost, midcourse and terminal interception

tests against ballistic missiles of several ranges. The anticipated cost of this three-year program is $3-5 billion, and it could leave in place a testbed with limited interception capability.

b. Direct the Air Force Space Command to work with DARPA to develop the operational concept for a full constellation of space-based interceptors, with an anticipated hand-off to the Air Force in 3-5 years of an evolving capability that can be integrated into U.S. Strategic Command's global architecture.

c. Based on an event-driven acquisition strategy, as was the case for the 1990 Brilliant Pebbles plan, pursue an acquisition and deployment plan with an initial capability in 2010. While the 1990 costs should be updated and scrubbed in detail, inflation of those estimates indicates that the total cost of deploying a full constellation of space-based interceptors should be less than $10 billion.

3. Educate the public, congress and our friends and allies to the threat and the potentiality of current technology to provide an effective global defense. In light of the continuing debate over the importance and effectiveness of ballistic missile defenses, and especially in the context of growing debate about the "weaponization of space," an active educational program is recommended to inform the American public, congress and our allies and friends about the 21st century threats posed by ballistic missiles and the potentiality of existing technology to counter these threats in a timely way. Above all, this educational effort should emphasize the need to avoid arms control and other inhibitions that could limit a competent engineer's ability to take full advantage of advanced technology to protect America and our overseas troops, friends and allies from ballistic missile attack.

* *Lead author Henry Cooper, former director, Strategic Defense Initiative and former ambassador and chief negotiator at Geneva defense and space talks with the Soviet Union.*
Reviewed and contributions incorporated from Robert Pfaltzgraff, William Van Cleave and Lowell Wood.