

The Earliest Deployment Option -- Sea-Based Defenses

by

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The Clinton Administration's preference for the Anti-Ballistic Missile Treaty -- that should have become history along with the Soviet Union -- has precluded serious consideration of the most effective missile defense concepts that could be deployed quickly. Nowhere is this more clear than in the potential of sea-based defenses if development, testing, and deployment bans were dropped.

From a technical perspective, sea-based defenses offer the earliest opportunity to provide a global defense to protect Americans at home as well as our overseas troops, friends and allies. Furthermore, such defenses can be built for a relatively modest investment -- and quickly improved to become very effective indeed as part of a layered defense architecture involving ground-, sea- and space-based systems, preferably in an alliance context.

Because of the growing threat -- which will not be met in time by the administration's current National Missile Defense plan -- we recommend setting aside the ABM Treaty, assigning a high national priority to building effective sea-based defenses and establishing a fully funded Polaris-like streamlined management structure to make it happen quickly.

Urgent Threat, Inadequate Response

In June 1998, the bipartisan Rumsfeld Commission unanimously concluded that North Korea, among other nations, could build ballistic missiles "to inflict major damage on [the United States] within about five years of a decision to acquire such a capability." The commission also concluded that, during several of those years, the intelligence community "might not be aware that such a decision had been made."

The Clinton administration initially disputed the commission's findings. But, as if to emphasize this latter conclusion, North Korea launched a three-stage Taepodong I missile over Japan on August 31, 1998, and nearly to U.S. territory -- surprising the intelligence community and discrediting its objections to the commission's findings.

The intelligence community does not dispute that the Taepodong 2 missile, when developed, will be able to deliver nuclear weapons at least to the American Northwest. Furthermore, if it used the same staging technology demonstrated by the Taepodong I launch, it could reach all 50 states with chemical or biological weapons.

Because the Taepodong 2 program existed in 1998, North Korea could threaten the United States with ballistic missiles at least by 2003 -- according to an optimistic interpretation of the Rumsfeld Commission's 1998 conclusions, especially after the 1998 Taepodong I test demonstrated it might be used to threaten Alaska, Hawaii, and the American Northwest even sooner. The combination of these North Korean missiles could be used to threaten overseas U.S. troops, friends and allies over a wide area indeed.

Current ballistic missile defense programs are not responsive to this threat timeline and diplomatic efforts are not likely to discourage such threat missile developments. North Korean leader Kim Jong Il recently made the latter evident when he acknowledged that his comments to Russian President Vladimir Putin that he would halt his missile program were "just a joke." In particular, the current NMD program, which the administration acknowledges is "high risk," will not provide any U.S. defense before 2005 under the most optimistic scenarios -- and Philip Coyle, the Pentagon's top testing official, has publicly suggested 2007 as a more likely date.

A Faster Way

The current Navy Theater Wide program could be accelerated and built upon to provide a pathway to NMD capability years sooner. Indeed, this program is the only hope of beginning to defend American territory as soon as 2003, five years after the Rumsfeld report. But this could not be done under the current program. Instead, a top priority streamlined management approach is needed like the Navy used in the late 1950s to build -- in only four years -- our first strategic submarine and submarine launched ballistic missile. Like then, the program must be funded at a technology limited pace.

Aegis cruisers now deployed around the world can provide most of the needed infrastructure. Command and control procedures are in place, and, depending on the Aegis operating area, existing radar can detect and track missile launches through their boost phase and beyond.

In particular, limited technically achievable block improvements are needed to begin operations in the Sea of Japan to protect Americans at home as well as our troops, friends and allies in the Western Pacific region against missiles launched from North Korea. Even a single Aegis cruiser could provide substantial ascent-phase intercept capability. But to be fully effective in the future, the interceptor kill vehicle and associated sensors must be improved -- by block changes, as has been employed by many acquisition programs.

The figure below illustrates areas from which interceptors with various velocities could engage a nominal Taepodong missile launched at San Diego from the western side of North Korea. The scenarios assume that the interceptors are launched 50 seconds after the Taepodong lift off -- a challenging but achievable feat-- and intercept occurs wherever is kinematically feasible during ascent-phase -- either during boost-phase, while the rocket engines are still burning, or after burnout.

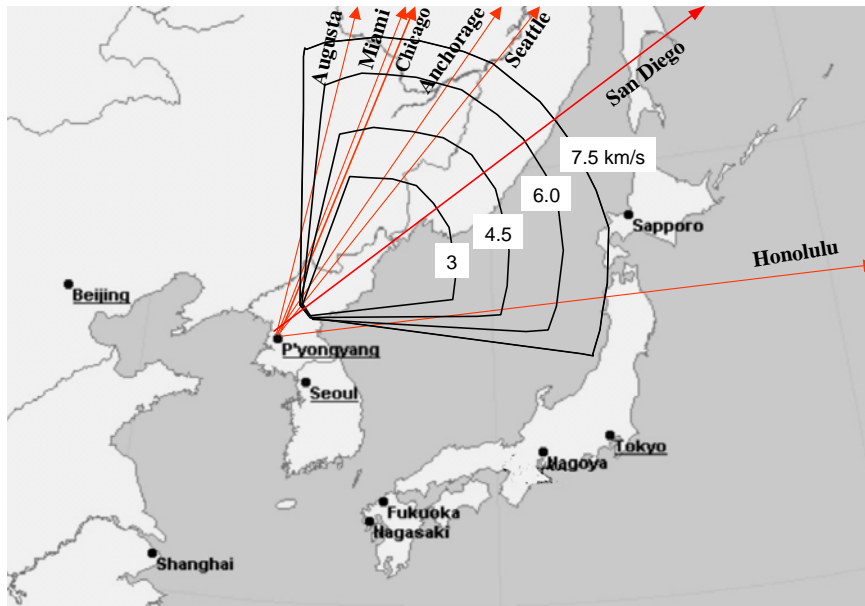


Figure 1. Launch Areas for Ascent-Phase Intercept

The “velocity fans” over the Sea of Japan indicate where Aegis cruisers might operate and have ascent-phase shots at missiles launched at San Diego. (Areas in China -- and, for high velocity interceptors, in Russia -- could provide ascent phase intercept opportunities if interceptors were based there. While such basing is unlikely in China, it may be possible in

Russia, depending on progress in negotiations on the recent joint boost-phase defense proposal by Russian President Putin.) The higher the velocity, the larger the potential operating area. Smaller operating areas would result from a similar set of velocity fans created for boost-phase intercepts only. By rotating such velocity fans for boost- and ascent-phase intercept cases around the various trajectories, one can make several important observations:

1. If based near the North Korean coast, even three km/sec. interceptors -- somewhat slower than the NTW interceptor being developed -- could have ascent-phase intercept opportunities against missiles launched at Hawaii, Alaska, the entire West Coast, the Southwest and into the Midwest and South-central states. However, they probably would not protect U.S. cities east of a line between Chicago and Miami. Higher velocity interceptors over six km/sec. could have ascent-phase intercept opportunities for North Korean missiles launched at any U.S. city. Additionally, ships armed with these higher-speed missiles could benefit from a much larger operating area.

2. The slowest interceptors would also have boost-phase intercept opportunities against missile launches at Hawaii, limited parts of the Northwest and along the West Coast. High velocity -- and, even more importantly, high acceleration -- interceptors are needed to achieve boost-phase intercept protection for all U.S. cities.

3. The best coverage would probably be provided by two cruisers -- one of which might have to operate "in harms way" near the North Korean coast to gain boost-phase intercept opportunities for missiles launched at cities east of a line between Chicago and Miami. The other -- based further away from North Korea -- could protect all U.S. cities with ascent phase intercepts, once the higher velocity interceptors are deployed.

These observations suggest an acquisition strategy based first on making the NTW system "all it can be" and then on instituting block improvements to enhance its capability via faster and more capable interceptors.

Near-term Interceptor Option

The current NTW interceptor involves adding a new "front end" kill vehicle to the Navy's operational air defense interceptor, the Standard Missile 2 Block IV. After demonstrating this NTW capability -- planned in early 2001 -- the Navy could achieve operating status with at least two cruisers and at least 50 interceptors by late 2003 at a cost of about \$2 billion over current budgets for that period. Further, this capability could be available at least two years before the developing land-based NMD system becomes operational in Alaska.

But the current NTW program is under-funded; the Clinton plan will not reach deployment before 2008. The production version of the NTW interceptor, now called the Standard Missile 3 Block I, will have a velocity somewhat greater than three km/sec.

As then-Defense Secretary John Deutch indicated in 1995, this interceptor was planned as a midcourse interceptor and not to have NMD capabilities. This was because: 1) its kill vehicle did not have effective sensors to defeat intercontinental ballistic missiles in midcourse; 2) it was not enabled by external sensors via the Cooperative Engagement Capability (CEC) network being developed for fleet air defense; and 3) it was not launched until after target missile burn out, mandating a tail chase after a faster ICBM -- a losing endeavor.

On the other hand, the SM-3 Block I interceptor will meet kinematic conditions as laid out in figure 1 to have significant boost-and ascent-phase intercept capability against North Korean missiles. Some kill vehicle sensor improvements may be needed, but the benefits are clear. If a North Korean missile can be hit on its way up, it doesn't matter where its target is, including in the United States.

If the X-band radar of the land-based NMD system, once deployed on the Aleutian island of Shemya, is appropriately tied into the command and control network of the Aegis Cruisers

outfitted with SM-3 Block I interceptors, the NTW system would also have the kinematic capability to provide late-midcourse defense for a major portion of the U.S. population against long-range missiles. This could require, however, improved sensors on the kill vehicle for it to be effective as a midcourse interceptor, especially against responsive countermeasures.

If late-midcourse intercept capability is desired before completion of the Shemya facility, radar modules of the Army's developing Theater High Altitude Area Defense system could be deployed on a container ship by 2003 for \$300 million to \$500 million to provide this late-midcourse defense capability. And the sea-based X-band radar, Cobra Judy, could also augment this limited late-midcourse NMD capability. Such sea-based radar could alleviate the anxiety of some of our allies associated with dependence on NMD radars located on their territory.

The resulting system of boost, ascent, and late-midcourse capability would enable a layered sea-based defense that could, in three years, begin providing a marked improvement over America's total vulnerability even to a single North Korean missile today. And this layered defense could be achieved for less than \$2.5 billion more than is currently in the NTW budget.

Rapid Block Improvements

There are two ways to improve rapidly -- within five years (by 2005) -- the initial ABM capable NTW system: by developing 1) a lighter, more capable kill vehicle and 2) a bigger, faster interceptor missile.

If the SM-3 Blk I had an advanced kill vehicle based on lightweight sensor, propulsion and data processing technology developed under the Reagan and Bush administrations' space-based interceptor program, it could achieve a velocity of at least four-and-a-half km/sec. Furthermore, this lighter kill vehicle could have a much more robust sensor suite to determine important range/rate values for a successful endgame performance against an accelerating rocket in boost-phase, or to perform midcourse discrimination and intercept. The maturity of this technology was demonstrated in 1994 by the award-winning Clementine mission that mapped the Moon in 15 spectral bands.

With achievable propulsion improvements, this kill vehicle could perform endgame intercept maneuvers more effectively, relieving current command guidance constraints. Propulsion to give boost-phase interceptors thrust-on-demand and axial/divert trade-offs was demonstrated before the Clinton administration terminated these important technology programs.

This advanced kill vehicle could be built using Clementine-heritage technology within five years for \$500 million to \$1 billion. This program could deliver interim improvements to enhance Block I intercept capability, incorporating LIDAR sensors, for example, to distinguish the rocket plume from the rocket's body during boost-phase, and to aid discrimination for post-boost intercept.

The Bush administration planned a four-and-a-half km/sec. interceptor to fit into the 8-pack Vertical Launch System. This program, killed by the Clinton administration, should be reinstated as the second block of the SM-3. The SM-3 Blk II could be developed within 5 years for \$3 billion to \$4 billion.

If the advanced kill vehicle was placed on the SM-3 Blk II, well in excess of six km/sec. could be achieved. Such an interceptor could have a boost-phase capability to protect the entire United States as well as a major part of the entire world against ballistic missiles launched from North Korea. It would also have more robust capability as a midcourse interceptor than any current NMD or theater missile defense.

Deployed on Aegis cruisers operating around the world, this fully capable SM-3 Blk II system, integrated via CEC with appropriate radar and other sensors already being built or upgraded during the next five years as part of the land-based NMD program, could provide

multiple shot opportunities against ballistic missiles launched from almost anywhere in the world.

Most important would be to accelerate deployment of an appropriately designed low-altitude component of the Space-Based Infrared System (SBIRS-Low) that could be built in five years for under \$5 billion to greatly improve midcourse discrimination.

Furthermore, radar and interceptors deployed on allied or friendly ships and/or territory could help provide a global layered defense with boost-, ascent-, and later midcourse-phase capability, based on a variety of ongoing missile defense programs. A global defense capability could be developed in an alliance context; this should be the basis of diplomatic initiatives to enable effective defenses, however based. Our objective should be building effective defenses against ballistic missiles, rather than continuing to worship at the Mutual Assured Destruction (MAD) altar of the ABM Treaty.

Closure

Sea-based defenses could provide the leading edge to a global layered defense architecture, and, in our view, compose the only option to begin defending America by 2003 -- five years after the Rumsfeld Commission concluded that a rogue state threat might develop within a five-year period. But this will not occur if the ABM Treaty continues to reign supreme.

This global architecture lends itself to diplomatic initiatives to enable, cooperatively, the defense of our overseas troops, friends and allies as well as Americans at home. The Navy has already made initial steps to accomplish such ties with Japan and within NATO. These initiatives should become a basis of a broader global defense initiative, perhaps including the boost-phase intercept efforts proposed by Russian President Putin.

Our recommended Navy program is affordable. The Navy needs an additional \$2.5 billion to provide boost, ascent, and late-midcourse intercept capability within three years and \$5 billion to provide interceptor and kill vehicle block improvements within five years. In addition, we recommend that an additional \$500 million to \$1 billion be programmed per year to restore key basic technology programs abolished by the Clinton administration.

An effort like the Advanced Ballistic Re-Entry Systems (ABRES) program, funded at \$200 million per year during the 1960s -- which corresponds to \$1 billion to \$2 billion per year in current dollars -- is required to assure that defenses stay ahead of potential offensive countermeasures. ABRES conducted innovative research and development on penetration-aids to defeat Soviet ABM systems. Such a program -- now to assure that defenses stay ahead in the measure-countermeasure game -- would be an important adjunct to any serious ballistic missile defense program that aspires to protect the American people.

Most of all, a top national priority should be assigned to building an effective sea-based global defense as soon as possible, and the Navy should establish and fully fund a Polaris-like program to accomplish the task, using engineering management procedures that worked so well 40 years ago.

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