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BALLISTIC MISSILE DEFENSE

Theater and National
Missile Defense
Programs Vital to
National Security

by Major Terence M. Dorn

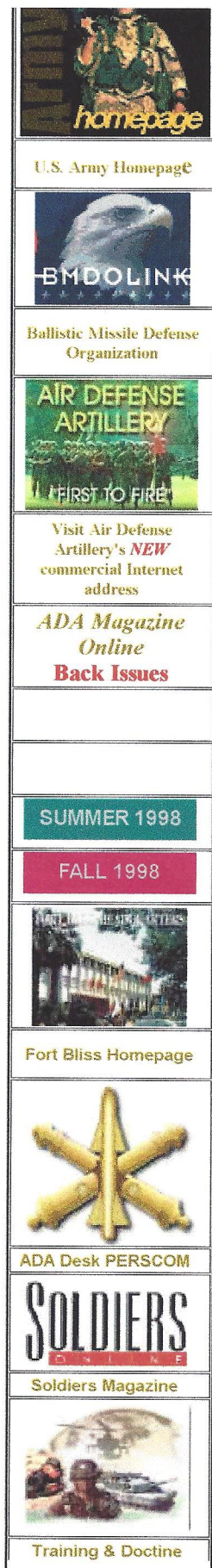


According to an exit poll conducted during last November's elections even "soccer moms" worry about ballistic missile defense. One exit poll question asked: "If you knew that countries such as North Korea, Iraq, and Iran may soon acquire missiles capable of reaching the United States, would you want to start building a missile defense system now?" Seventy-five percent of women with children responded that we should "definitely" or "probably" start.

A similar poll asked: "If an American city was attacked by a missile with a chemical, biological, or nuclear warhead, whom would you blame the most for not defending against a missile attack?" Thirty-seven percent responded that they would blame the president; 30 percent Congress; and 27 percent the military.

We have struggled for decades to develop and field ballistic missile defense systems to protect deployed forces and the American homeland against ballistic missile attacks, but now that soccer moms are on our side, victory seems no longer in doubt.

Today, the Department of Defense's campaign to field upper-tier Theater Missile Defense (TMD) systems is rapidly advancing on a broad front. Candidate systems from the Army, Navy and Air Force are being tested, and we may end up deploying not a single system but a system of systems. Meanwhile, renewed efforts to deploy a National






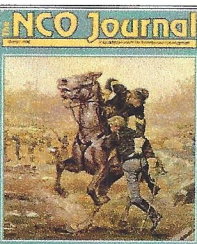
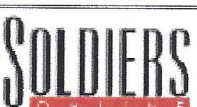
Missile Defense (NMD) system capable of protecting the continental United States from limited long-range ballistic missile strikes appears on the verge of success.

Air defenders have worried about ballistic missiles since the first V-2 Rocket hit London during World War II, but the technology to cope with ballistic missiles evolved during the Cold War. In the early sixties, the U.S. Army developed and began to deploy the Safeguard anti-missile system. The system actually consisted of two separate nuclear warhead-tipped interceptor missiles. The Sprint was only six feet tall but capable of speeds well in excess of Mach 10 out to a range of twenty-five miles. The Spartan stood forty five feet tall and flew at Mach 10 out to a range of 365 miles. If inbound enemy missiles were detected, defenders would launch the Spartan interceptors first. If the Spartan interceptors failed, or if the number of inbound missiles overwhelmed the Spartan interceptors, then the defenders would launch Sprint interceptors as a last effort. Due to the 1972 Anti-Ballistic Missile (ABM) Treaty with the former Soviet Union, which placed sever restrictions on the deployment of ABM systems, the United States canceled the Safeguard program and shut down the single Safeguard site that had become operational.

In the late seventies, the U.S. Army's Homing Overlay Experiment (HOE) demonstrated the feasibility of intercepting reentry vehicles with hit-to-kill technology. Following this, there were further tests and successes involving the Flexible Lightweight Agile Guidance Experiment (FLAGE) and the Exoatmospheric Reentry Vehicle Interceptor System (ERIS). Together these systems demonstrated that kinetic kill technology was effective, cost efficient, and the best method for destroying weapons of mass destruction (WMD), including nuclear, biological, and chemical warheads.

It was in the early eighties that the U.S. Army recognized that the technology existed to satisfy the need to defend its forward-deployed forces (initially in Germany) from tactical ballistic missile (TBMs). The Patriot air defense system, originally called the Surface-to-Air Missile-Defense (SAM-D), was originally conceived in the late sixties as a replacement for Hawk. It was developed in the early 1970's to counter air breathing threats (ABTs), primarily fixed-wing aircraft and helicopters, although the system's prime contractor was given leeway to explore Patriot's potential as a anti-tactical ballistic (ATBM) missile system.

The decision to enhance Patriot by upgrading it with ATBM capabilities resulted from an earlier analysis performed in the European Theater that focused on countering the large numbers of Soviet TBM forces. Today's Patriot Advanced Capabilities 3 (PAC-3) system provides high- and medium-altitude defense against a variety of targets, including aircraft and TBMs. It is a much advanced version of the system that deployed and successfully battled Iraq in its use of Scud missiles during the Gulf War. The Patriot system has a fast reaction time, is highly mobile, can track

Command

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and engage over fifty targets simultaneously, can conduct engagements beyond thirty-seven nautical miles, and can operate in a severe electronics countermeasures environment.

As a direct result of the Gulf War, the U.S. Congress recognized "an immediate need for a system capable of defending large areas and cities against TBM attack." In 1991 the U.S. Congress passed the National Defense Act and the Defense Appropriations Act, both of which established a requirement for a "deployable demonstration system in order to provide a highly effective upper-tier TMD for U.S. forward deployed forces and those of its allies." It further directed that a mature system be available by "the turn of the century."

There are four major programs involved in the race to develop a deployable TMD system or system of systems (TMD systems may be procured and deployed independently of one another or simultaneously in a complementary fashion).

The Army's **Theater High Altitude Area Defense (THAAD)** system is currently receiving the preponderance of Congressional funding and is the closest to being fielded. The Army's megawatt class, continuous wave Deuterium Fluoride Chemical Laser Experimental Program, part of the Nautilus program, known as the **Mid-Infrared Advanced Chemical Laser (MIRACL)**; the **Navy's Theater Wide (NTW)** upper tier system for Theater Ballistic Missile Defense (TBMD); and finally the Air Force's reusable multi-shot chemical **Airborne Laser (ABL)**.

THAAD

The THAAD system is a state-of-the-art, next-generation evolution of the lower-tier Patriot air defense system. THAAD was designed from the onset to function as an upper tier ATBM system to complement Patriot. It was also intended as the forerunner upon which the U.S. National Missile Defense system would be based.



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Patriot air defense system.

THAAD can conduct endoatmospheric and exoatmospheric (within and outside of the Earth's atmosphere) engagements of short and intermediate range theater-class ballistic missiles at much higher altitudes and further downrange from the targeted areas. This thereby reduces damage due to debris or chemical agent fallout while providing multiple engagement opportunities.

Unlike the Patriot PAC-2 system, THAAD utilizes hit-to-kill interceptors, which have been proven to provide "a much greater degree of lethality compared to interceptor missiles designed with fragmentary warheads." It will augment the lower tier Patriot system and other planned systems to provide a "near leak-proof" umbrella of critical theater assets.

The THAAD fire unit's Battle Management/Command, Control, Communications, Computers, and Intelligence (BMC4I) center serves as the Tactical Operations Center. A Ground Based Radar (GBR) system, the most powerful tactical radar system in the world, acquires, tracks, discriminates, and assesses engagement results. The GBR, support both passive defense and attack operations by providing impact point predictions and launch point estimates. Eight Palletized Loading System (PLS) launchers, can carry up to 12 hypervelocity, kinetic energy interceptor missiles, although road weight restrictions will probably limit the number to 10 per launcher. Other THAAD equipment include a 1.2 Megawatt prime power generator; a Cooling Equipment Unit (CEU), an Electronics Equipment Unit (EEU) containing a VAC-7000 computer (a "mini-Cray" supercomputer) that can process thousands of complex equations a second; along with a number of other ancillary pieces of equipment.

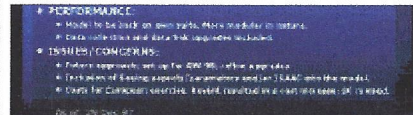
Although much of THAAD's operational capabilities are classified, for comparison purposes, it can protect an area more than 20 times larger than Patriot PAC-2 against TBM attack.

MIRACL

In a test conducted in February 1996 at the White Sands Missile Range, New Mexico, the Army's MIRACL, which should not be confused with the Tactical High-Energy Laser system demonstrated during Roving Sands 98, successfully destroyed a short-range rocket. The milestone significance of the test, aside from the fact that this was the first time that a laser engaged and destroyed a rocket during flight, was that the laser actually locked on and destroyed the warhead located in the nose cone of the rocket.

NAVY THEATER WIDE TBMD

The Navy Theater-Wide TBMD system is an upper-tier system based on a Light Exoatmospheric Projectile (LEAP) designed to complement their upgrades to the lower-tier Aegis Cruiser's Standard Missile air defense systems, which will soon have a pre-Gulf War Patriot ATBM capability. The LEAP system provides an



NEW YORK (AFP) -- Colonel Charles W. Pinney, deputy program manager for the Airborne Laser program examines Popular Science magazine's annual "Best of What's New" award. The Airborne Laser was one of the awardees at ceremonies in New York's Central Park Nov. 13. The 21st century advanced laser system was developed to defend against theater ballistic missiles. The laser was one of 100 products and technologies selected by the magazine from among thousands of items. The award was presented to the program office, which is located at Kirtland Air Force Base, New Mexico, and three key contractors: Boeing, TRW, and Lockheed Martin. (Click on briefing charts at right to view enlargements.)

(Click on yellow hyperlinks to read Air Force articles about the Airborne Laser.)	Airborne Laser System Gets Authority to Proceed
Airborne Laser Produces 110-Percent Power	Airborne Laser Gives Air Force Futuristic Weapon

Based upon the success of this program, the next logical evolution would be to further develop the laser technology and incorporate them into stationary space-based Laser (SBL) satellites. Initial studies have suggested that a 20-satellite constellation could provide the optimum TMD threat negation capability to the continental U.S., regardless of the threat location. Thus, the SBL could provide a robust, *global* missile defense.

The push to field TMD systems was only the prelude to a renewed campaign to deploy a NMD system. The salvos of Iraqi Scuds that rained on Saudi Arabia and Israel during the Gulf War, the demonstrated effectiveness of theater missile defense systems and the proliferation of ballistic missile technologies created a demand for systems that could protect the American heartland. Today, Republicans in Congress strongly support an NMD deployment, but the Clinton administration seems torn between placating Moscow, which insists on preserving the ABM Treaty, or yielding to Congressional pressure by making a firm commitment to NMD deployment.

Ballistic Missile Defense Organization

Department of Defense (DOD) Directive 5134.9 established the Ballistic Missile Defense Organization (BMDO). BMDO can actually trace its roots back to the Strategic Defense Initiative (SDI) program that President Ronald Reagan started in March 1983. SDI sought to find an alternative to the doctrine of Mutual Assured Destruction (MAD). In May 1984, Secretary of Defense Caspar Weinberger signed the charter establishing the Strategic Defense Initiative Organization. In May 1993, DOD changed SDI to BMDO in light of the radically altered international security environment.

It is the sole responsibility of BMDO to manage, direct, and execute BMD Programs. The BMDO's objectives are threefold: first, develop and deploy and increasingly capable TMD system; second,

develop and, if necessary deploy a NMD system to counter emerging long-range ballistic missile threats, and third, continue research and development of advanced ballistic missile defense technologies and to continually improve the capabilities of TMD and NMD systems.

Based on the successful demonstration of hit-to-kill interceptor technology along with the greatly enhanced performance (range, discrimination and tracking) capabilities of the THAAD radar, BMDO has drafted several proposals for basing the currently proposed NMD system on more powerful, though stationary, versions of the mobile THAAD system. The NMD radar sets would be incredibly powerful and would consist of twice the number of radar array assemblies of the THAAD radar. These radars would be based in the northeastern and northwestern most reaches of the continental United States to monitor the most likely approaches of intercontinental ballistic missile (ICBM) would take if launched against the U.S. They would "see" hundreds of miles down range while discriminating between potential targets and geosynchronous satellites orbiting above the Earth's surface. Tied into the radar and the unit's battle management command, control, communications, computers and intelligence (BMC4I) headquarters would be a number of "missile farms" from which long-range, high-speed interceptors could be launched, repeatedly at the same or, if necessary, different inbound missiles.

As currently envisioned, this system would not be capable of engaging a massive well coordinated strike involving hundreds or thousands of missiles, but could counter a few launched "accidentally" by a renegade force, terrorist organization or rogue nation.

To date, every component of the THAAD system has performed flawlessly, with the sole exception of the interceptor missiles. Thus far, quality control problems at the Lockheed Sunnyvale, California, plant have accounted for a poor 0-5 record start against TBM targets during tests at the White Sands Missile Range. Due to the complexities involved in adapting new and improved approaches and technology to the problem of intercepting attacking missiles, some of which travel at speeds in excess of Mach 10, the dismal start is not entirely surprising. The Patriot system, likewise, had a poor start, but with each intercept attempt, valuable information was gathered and applied quite successfully, and the system was eventually procured and fielded in large numbers, not just by the U.S. Army, but also by many other governments as well.

National Missile Defense

The approach that the United States has undertaken to deal with the issue of NMD has thus far not been unified nor well coordinated. It was the initial belief of the Clinton Administration that some research and development in the area of NMD should be conducted, but since the threat did not yet exist, there was no present need for aggressive research and testing of a NMD system. Many members of Congress have publicly disagreed with

the Clinton Administration's stance and have stated that in their opinion that it would be foolhardy to wait for a threat to materialize before launching a concerted effort into the R&D, testing, and speedy fielding of TMD and NMD systems. In numerous documents, various senators and Congressmen have strongly addressed their philosophical differences with President Clinton over this issue of great security and strategic interest worldwide. Currently the BMDO has implemented the "3+3 program" whereby development, integration, and demonstration of the defense capability will occur within three years with a planned deployment of a production model within the following three-year period, once the deployment decision is made.

From a strategic perspective during the Gulf War, the Patriot system reduced the effectiveness of the Iraqi's most fearsome instrument of mass terror. Patriot denied Saddam Hussein his desire to drag Israel into the conflict, and as a result, he was unable to break the multinational coalition arrayed against him or destroy their political will to fight. "Patriot reduced the potential damage to civilian property and lives far below that which could have been expected without a TBM capable defense." In an interview after the Gulf War, Saudi Prince Bandar Bin Sultan Bin Abdulaziz said, "... I was there and the most beautiful sight in the world that I have ever seen in my life was that Patriot streaking across the capital of Saudi Arabia hitting those Scuds...." General (Retired) Uri Ram, commander of the Patriot forces in Israel during the war, stated, "Patriot was a success, but it wasn't perfect... Patriot was of enormous strategic significance and helped save lives in Israel from Scud attacks...." As part of the U.S. Army's testimony before Congress in April 1992, Congressman Horton (R-NY) summed up the testimony succinctly when he stated, "I believe Patriot's performance was superb and that it saved lives. I believe its psychological and actual impact on the enemy was immense."

It would be nothing less than shortsighted ignorance if not gross negligence, for the U.S. not to aggressively pursue a NMD system at the earliest available opportunity. Ambassador Henry Cooper wrote in the March-April 1998 edition of High Frontier's newsletter, *The Shield*, that "The end of the Cold War did not end the need for effective defenses - in many ways, the need is greater today than before." Although touted as being extremely capable and able to provide round-the-clock surveillance, the intelligence gathering and interpretation capabilities of the U.S. **occasionally fail**. This could not be more clearly demonstrated that with the recent testing by the government of India of its nuclear weapons capability. Now that they have demonstrated that they have the weaponry, their ability to couple nuclear warheads to their medium-range Agni ballistic missiles, which have an estimated range of 1,200 miles, will have destabilizing effects on the entire region. India can not only threaten their long-time enemy Pakistan, but China as well. In the seventies, India's military was thoroughly routed and the Indian government badly humiliated by the Chinese after a border dispute broke out.

restraint or an inability to overcome technological difficulties, responded to India's nuclear test with follow with nuclear tests of their own. They, too, are developing both short-range ballistic missiles, a variant of the Chinese M-11, and with further Chinese assistance, they will soon possess the technology to build medium-range Hatf I and II ballistic missiles that can strike virtually any target within India.

In the past the North Korean government has built and exported their own variants of short-range Scud missiles (180 to 300 miles). They are now producing the No Dong I and II missiles, which are believed to have an estimated range of 600 to 900 miles. In the past, North Korean Scud missiles were a threat only to their rivals in the south. The significance of their No Dong missiles is that, for the first time, North Korea can threaten mainland Japan. The North Koreans are also believed to be working on the development of an entirely new class of ballistic missiles – the Taep'ong I and II. These new missiles are believed to have a range of between 900 and 3,600 miles.

The long-term consequences of an U.S. failure to adequately defuse the North Korean stalemate are frightening. A December 8, 1998 ABC News broadcast by ABC anchorman Peter Jennings put the North Korean nuclear/missile threat in chilling perspective.

Peter Jennings: The North Korean military establishment said it was determined to annihilate what it calls "U.S. imperialists, Japanese reactionaries, and South Korean puppets." This might be regarded as standard North Korean rhetoric if the U.S. were not also worried about a North Korean nuclear program they cannot get a good look at. Here's ABC's John McWethy.

John McWethy: Satellite images of the northern part of North Korea, intelligence sources say, leave little doubt that a massive underground nuclear project is now under construction. That would be a gross violation of the promise North Korea made four years ago to shut down its nuclear program in exchange for billions of dollars in aid from the U.S., Japan, and South Korea. It sounds a lot like Iraq. The U.S. is demanding that international inspectors be given access to North Korea's underground construction site. The North Koreans say "only for a price - 300 million dollars to take a look."

And as is the case with Iraq, the U.S. views North Korea as a potential threat to its neighbors and the world. But in many ways, North Korea, with its fanatical and unpredictable leadership, may be even more dangerous.

James Woolsey: [Former CIA Director]: I think that you simply have to take absolutely every precaution. They could do something absolutely nuts.

McWethy: And if a regime like North Korea were to add missiles that could hit the U.S., which it is working on, and nuclear weapons, the implications become terrifying.

North Korea's pursuit of nuclear capabilities pressures South Korea and Japan to initiate nuclear weapons programs of their own. The nuclearization of these two countries would greatly increase the anxiety felt by other Asian countries. Besides the satisfaction of becoming an acknowledged nuclear power, North Korea may hope to reap enormous financial benefit from the selling of nuclear weapons and long-range ballistic missiles to rogue nations or extremists organizations such as Iraq, Iran, Libya, or the National Islamic Front.

The North Korea situation illustrates the problems of containing the spread of nuclear weapons in a world devoid of bipolar superpower confrontation. North Korea has been isolated ever since the Soviet Union collapsed, its economy is in ruins, and its leadership may see nuclear weapons and delivery systems as nothing more than insurance policies and a means of generating badly needed revenues for the future.

While the end of the Cold War signaled an end to the threat of a global confrontation between the two superpowers, the threat from foreign ballistic and theater missiles has grown rapidly. In the May 1998 edition of the ROA National Security Report, Colonel (Retired) Alexander Gerry writes that, "For the most part, the American public is oblivious to the fact that U.S. troops overseas and American citizens and cities in the continental United States are vulnerable to missile attack." Colonel Gerry goes on to say that even more difficult to comprehend is the fact that, "...leaders in [the present] Administration, Congress, the State Department, and the Defense Department, ... are aware of the facts, but for obscure and irrational political reasons, refuse to take seriously this vital national security concern."

Ballistic missiles are an appealing weapon for developing nations. They serve as status symbols, have a long range and a short flight time, are low in cost, and have an ability to carry a number of different warheads. Defenses against TBM attack are not as mature or widely deployed as are defenses against aircraft or other delivery systems. While no hostile nation or organization currently possess the capability to threaten the U.S. mainland with a missile attack, the possibility of a limited, long-range threat from the third world sometime in the near future seems entirely plausible. The proliferation of weapons of mass destruction and missile delivery systems that could be used to transport them to their targets pose a direct and viable threat against the United States and its allies. Various governments have demonstrated their willingness to employ weapons of mass destruction and ballistic missiles in ongoing conflicts. Since 1980, ballistic missiles have been used in six regional conflicts. While adherence to the 1972 ABM Treaty is of paramount concern to the U.S. government, it is sobering to note that for nearly the past decade only one city on Earth has been protected with an active antimissile defense system... that city is Moscow, **the capital of the very government with whom the United States had an agreement that prohibited the deployment of such a system.**

and China possess long-range missiles capable of striking at the continental United States, it is only a matter of time before the transfer of technology or missiles to less responsible nations occurs. Since it took the United States an enormous amount of research and time to master the intricacies of long-range re-entry problems, staging, materials, and advanced guidance, some members of our government and intelligence community believed that third world or developing nations will also require a great deal of time to solve these problems as well. Not so, for the world is a much different place now than it was many years ago when the United States began to develop long range missiles. The unceremonious breakup and near economic ruin of the former Soviet Union has provided many opportunities for "cash for weapons" sales by disgruntled members of the Red Army struggling to get by if and when they are paid their paltry salaries. The economic instability of Mexico, Cuba, or other Caribbean nations makes it conceivable that a determined foe could bribe those in power or non-governmental factions to emplace and fire a TBM at the United States from an adjacent country. While the intricacies of accurately firing missiles from a seaborne platform are still quite daunting, it is likewise only a matter of time before these obstacles are overcome as well.

Lastly, in our nation the notion of "get rich quick regardless of the cost or consequences" is systemic and runs throughout our culture. I have had a number of opportunities to listen to former KGB and GRU agents of the former Soviet Union discuss their former profession and how easy it was to break into U.S. companies and to steal their secrets, or even easier yet, to bribe disgruntled employees for those same secrets. Too many Americans, driven by political idealism (Pollard and Israel) or financial greed, have proven willing to sell their country's secrets to agents of the former Soviet Union. Our democracy suffers from an inherent weakness from within that could all too easily be exploited.

Many years ago, Sun Tzu said, "If you want peace, prepare for war." The Heritage Foundation recently concluded that, "Codifying the Cold War's Mutual Assured Destruction Strategy no longer makes sense in a multipolar world of proliferating nuclear powers, if it ever did. Congress, and the U.S. Senate in particular, should seek ways to remove the obstacles to effective defenses posed by the [1972] ABM Treaty." We cannot and should not base our long term actions that are in the best interests of national security primarily upon the capabilities of our intelligence community to focus on a perceived or real TBM threat from terrorist organizations or rogue nations. The signal that United States' aggressive pursuit of an NMD system would send to our enemies, real and potential, would be one of significant resolve and deterrence... for neither the U.S. nor its allies would be susceptible to blackmail tactics by a TBM-equipped terrorist organization or rogue nation. However, if deterrence failed and hostilities commence, the continental United States, our forward-deployed troops, along with our allies, would be afforded a much greater deal of security under a 21st-century "air defense umbrella."

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