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Space and Missile Defense Challenges:

National Missile Defense—
Your Army Protecting Our Homeland

(First in a series of three Background Briefs based on information obtained from U.S. Army Space and Missile Defense Command)

We are affirming that there is a threat, and the threat is growing, and that we expect it will soon pose a danger not only to our troops overseas but also to Americans here at home. . . . On August 31st, North Korea launched a Taepo Dong I missile. . . . The Taepo Dong I test was another strong indicator that the United States in fact will face a rogue nation missile threat to our homeland against which we will have to protect the American people.

William S. Cohen, Secretary of Defense, 20 January 1999

Next summer, our nation's leadership will make a critical defense decision that will affect our defense posture well into the next millennium. After fifty years of research and development of ballistic missiles and missile defense systems, and many aborted attempts to field systems designed to provide a limited missile defense for the homeland, our nation's leadership will decide whether or not to deploy a national missile defense (NMD) system to meet the growing threat to the homeland from ballistic missile attack. If the President decides to deploy, a limited NMD system with ground-based elements manned by the Army could be operational in 2005.

A historical perspective. The defense of the United States is and always has been a soldier's most sacred responsibility. From the beginning, in 1775, the U.S. Army has played a pivotal role in the defense of the homeland. In 1794 the U.S. Congress charged the Army to build and staff coastal defense forts. As the threat changed from big-gunned ships to bomb-laden aircraft, the Army changed the focus of its defense from coastal forts to antiaircraft installations around American cities. In World War II, advances in missile technology allowed the threat to surpass existing defensive capabilities.

The process to develop a defense against missiles began in February 1946, when the Army Air Force awarded two contracts for the purpose of developing the characteristics for antimissile systems. In November 1956, following a lengthy debate between the Army and Air Force—both conducting antiballistic missile (ABM) research and development programs—Secretary of Defense Charles E. Wilson issued a memorandum assigning the Army responsibility for the development, procurement and manning of land-based surface-to-air missile systems for point defense.

In 1957, the development of a strategic defense system took on a new sense of urgency when the Soviet Union launched SPUTNIK I. In 1965, the People's Republic of China exploded their first nuclear

device and announced that they were experimenting with missile technology. Strategists then began to contemplate limited strikes by nations other than the Soviet Union.

In September 1967, the administration decided to deploy an ABM system—Sentinel. This decision called for the defense of urban and industrial targets, with the expansion capability to defend selected American intercontinental ballistic missile (ICBM) bases. No sooner was the Sentinel program underway than a series of events caused changes to the program. Rising public opposition to American involvement in the Vietnam War and the military in general, and the realization by the people who lived in the cities where Sentinel sites were to be built that the missiles contained nuclear warheads, caused a change in the deployment of this ABM system. In February 1969, Secretary of Defense Melvin Laird ordered all work on the Sentinel base construction to cease.

In March 1969, President Richard Nixon decided to deploy only ABM defenses of ICBM sites. This deployment, called Safeguard, called for 12 sites, with construction to begin immediately at two sites—Grand Forks, North Dakota, and Malmstrom Air Force Base, Montana. Follow-on construction would take place at the other 10 sites, based upon an annual threat evaluation. When completed, Safeguard would provide limited protection against a small attack by the People's Republic of China or an accidental launch by anyone else.

In 1972, the United States and the Soviet Union signed the Anti-Ballistic Missile Treaty limiting each nation to two ABM sites—one at a location selected by the signatory and one at each National Command Center (Washington, D.C. and Moscow, respectively). In 1974 a protocol was added to the treaty limiting each side to only one ABM site.

With the arms limitation agreement in effect, Congress determined that, once completed, the continued operation of Safeguard was not justified. The Safeguard system attained full operational capability on 28 September 1975. On 10 February 1976, the Joint Chiefs of Staff, in response to congressional direction, ordered the termination of the Safeguard mission. Only the early warning radars were exempted from this order. They were transferred to the Air Force as part of the Defense Early Warning System (DEWS).

Despite reduced funding levels for ABM research through 1984, research and testing did continue and on 10 June 1984, as part of the Homing Overlay Experiment, the Army proved that an exoatmospheric intercept of an ICBM mock reentry vehicle with a nonnuclear warhead was possible.

A new era in ABM defense began on 23 March 1983 when President Ronald Reagan announced his concept for the Strategic Defense Initiative (SDI). His goal was to create a nationwide defense shield against ballistic missiles that would make nuclear weapons impotent and obsolete. On 25 March 1985, President Reagan issued National Security Directive 85, which implemented his plans for the Strategic Defense Initiative. Funding for research, development and testing of missile defenses increased significantly.

Over the next 10 years the world saw many changes. The Berlin Wall fell, resulting in a united Germany. The Soviet Union disintegrated into its component parts, and some former Soviet Bloc countries elected non-Communist leaders and joined NATO. Operation Desert Storm demonstrated to potential adversaries the futility of attacking U.S. forces head on. However, it also provided a vivid reminder of the destructive capabilities of ballistic missiles—with the largest loss of American lives coming when one ballistic missile penetrated our limited theater missile defenses and killed 28 American soldiers. Ballistic missile development efforts increased significantly in many countries considered hostile to the United States and our allies. The proliferation of missile technology to nations not wealthy enough to have their own indigenous development infrastructure also increased.

The Rumsfeld Report and North Korea's launching of a three-stage Taepo Dong missile this year heated up the debate over the missile threat to the United States. Knowledgeable people were quick to recognize the nation's vulnerability, and the unpredictability of the threat. On 22 July 1999, the National Missile Defense Act for 1999 was signed into law. This act states that:

> 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.

The leading edge of missile defense technology. Today, over 53 years after the United States began its efforts to develop defenses against missiles, the Army once again stands ready to field and operate a system to defend the United States. As a full partner with the Ballistic Missile Defense Office (BMDO) and its NMD Joint Program Office (NMD JPO), the Army is conducting and participating in materiel development activities such as the successful integrated flight test conducted on 2 October 1999. Training and Doctrine Command (TRADOC) and the Army Space and Missile Defense Command (USASMDC) have established a TRADOC System Manager (TSM) for NMD. This office functions as the Army user representative for NMD. The Army is also continuing to update the NMD force design; and refining the operational concepts, training plans and logistics support plans for NMD as the system concepts and specifications mature. In conjunction with BMDO and NMD JPO, the Army is also providing for the more distant NMD future by laying the groundwork required to move toward a robust NMD capability—should our nation chart that course. This effort has two major aspects:

- Basic and applied *research* needed to ensure we outpace the threat.
- Development of progressive operational ideas, including lessons learned from *theater missile defense* and applied to the NMD problem.

Collectively, these efforts and the Army's contributions to the ongoing joint NMD deployment readiness program form the main thrust in the Army's implementation of its responsibilities as the nation's lead service for defense of the United States against missile attack.

The NMD deployment readiness program is, to a large extent, a legacy of the space and missile defense research conducted by the Army in the past. Today, working in cooperation with BMDO and the other services, the Army is conducting research across a broad front to establish the technology base required for rapid solution development and insertion should the future missile threat warrant it.

Recognizing that countermeasures are inherent in the ballistic missile defense problem, the Army supports several efforts to prepare for and counter the threat's employment of penetration aids such as decoys. The Advanced Radar Technology program includes research in missile signatures, assesses our system's shortcomings, and develops solutions to prevent adversaries from exploiting those vulnerabilities.

Another effort, the Optical Signatures Code program, provides a tool to predict infrared signatures of the NMD threat complex, to include targets and decoys in all phases of their trajectory. This and other advanced technologies will enable discrimination between the warhead and nonlethal components. The miniature interceptor program, which has potential to counter the early release of submunitions, is another technology development program designed to counter future threat capabilities, keeping us ahead of the threat.

Analyzing the NMD problem through the theater missile defense (TMD) lens. Clearly, active defense (i.e., radars, interceptors and battle management systems) will remain the focal point of the Army's contributions to national missile defense. Army assets, such as the high-power signature radars at the Army's Kwajalein Missile Range in the Marshall Islands, monitor tests and collect data to increase our understanding of threat missiles. If detected early, a limited number of ICBMs and their warhead-bearing reentry vehicles can be tracked, engaged and destroyed in flight. The Army, however, is not ruling out other techniques for suppressing, neutralizing or minimizing the effects of missile attack against the United States. For example, in some geographical areas, forward-based capabilities can contribute to the national effort to detect and assess indicators of preparations for ICBM launch. In some instances, preemptive (or reactive) strikes may preclude an adversary from launching ICBMs.

The Army will also contribute to missile attack assessment and dissemination of warning with its Mobile Multi-Mission Processor capabilities, several C^{4}ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) capabilities, and the Army satellite communications and information distribution capabilities. Moreover, the Army is exploring the role of NMD within the broader mission area now termed *homeland defense*, which, in many aspects, resembles TMD passive defense operations. In short, the Army has become the nation's preeminent service for integrated missile defense operations and intends to apply its TMD experiences to NMD, when the comparison is appropriate.

The Army and other services are also anticipating an expansion of the designated NMD threat set. In general, threat estimates urge vigilance with respect to the deployment of land attack cruise missiles and forward-based ballistic missiles. These may be delivered from a variety of launch platforms to include launchers affixed to commercial ships, submarines and aircraft, or mobile ground-based launchers operated in remote regions in the Western Hemisphere. Recognizing the likelihood of such threats in the future, the Army is developing an overarching operational concept for its role in a robust national missile defense. While many solutions to such threats may be cost-prohibitive today, advances in information technology, sensors and weapon systems may enable fully integrated space, terrestrial and aerial capabilities to counter the full spectrum of missiles in a way that is affordable. The concept development process is defining the azimuth for subsequent analysis and experimentation, which will begin to outline solutions to the expanded NMD threat.

Tomorrow's NMD is on the drawing board today. Just as today's NMD program is a legacy of the research conducted by the Army in the past, experiments being conducted today in directed energy, advanced radars, miniature interceptors and advanced space-based sensors will lead to enhanced future NMD systems. The course to a robust NMD has many tributaries. The rapid growth of commercial space capabilities and advances in information technologies are accelerating some aspects of missile defense, but there is much to be done and competition for funding will remain keen. Nevertheless, the Army space and missile defense community is well aware of two facts: The threat *will* change; and outpacing it is best accomplished by the interaction of continuing research to explore the limits of technology and a progressive dialogue on operational concepts. Together, they lay out the approach to the Army's future NMD effort.