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Space and Missile Defense Challenges:

Army Theater Missile Defense—Challenges for 2010 and Beyond

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

Progress—and Change—Since Operation Desert Storm

Nearly a decade ago, Army Patriot interceptors fought the world's first active defense battles against ballistic missiles. Since the Gulf War, the Army and the other services have steadily progressed toward the goal of fully integrated joint theater missile defense (TMD). The Army established the 32nd Army Air and Missile Defense Command (AAMDC), commanded by a general officer, to perform theater-level air and missile defense planning, integration, coordination and execution functions for the Army Forces/Joint Force Land Component Commander. The Army, with Navy participation, has forward-deployed Joint Tactical Ground Stations (JTAGS) in Europe and Korea, providing regional commanders in chief a limited in-theater capability to receive, process and disseminate space-based infrared sensor information on tactical ballistic missile launches. The range of the Army Tactical Missile System (ATACMS) is being extended, forcing our adversaries to pull their missile launchers and associated command and control systems further back from our forces, reducing their lethal battlespace. The Army is demonstrating the warfighting value-added of an elevated sensor, the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS), to detect and track low-flying cruise missiles and to support the development of the Single Integrated Air Picture (SIAP). Today, continental United States (CONUS)-based computer models and simulations virtually train TMD forces deployed overseas.

Since Desert Storm, the Army has fielded three incremental upgrades to Patriot. These upgrades collectively provide Patriot with a lethal capability to defend nearly twice the battlespace as compared to the system fought in Desert Storm. These upgrades also significantly improve Patriot's capability to integrate with joint air and missile defense systems. One more major upgrade is planned for Patriot, to include a new hit-to-kill missile (Patriot Advanced Capability 3, or PAC-3), that will provide a seven-fold increase in lethal battlespace as compared to what could be defended during Desert Storm. The upgrade will assure destruction of weapons of mass destruction (WMD) at ranges and altitudes that protect our forces from lethal agents. PAC-3 is in Low Rate Initial Production with a First Unit Equipped (FUE) of Fiscal Year 2001 (FY01).

The Army is also looking ahead to longer-term joint and combined TMD needs. These needs stem from a threat which has evolved to a family of increasingly capable theater ballistic missiles, land attack cruise missiles, large-caliber rockets, and unmanned aerial vehicles. Adding to this is the ability of many of these systems to deliver weapons of mass destruction. It is this varied threat set that is driving the evolution of joint and Army TMD in the following areas.

- **TMD has evolved into joint theater air and missile defense (JTAMD).** There is increased emphasis on jointness and combined operations. Five major joint initiatives are being incorporated into air and missile defense systems: capability to develop, disseminate and exploit a SIAP; improved combat identification, both to protect friendly platforms and to eliminate restrictive rules of engagement currently imposed on ground-based systems; automated battle management aids to reduce the timelines in assessing threats and prosecuting engagements; integrated fire control to assure tactical units use the optimal weapon to prosecute the engagement; and a joint defensive planner to assure that tactical commanders implement the most capable defense to achieve the warfighter's force protection objectives.
- **A variety of engagement options against an expanded threat set are being analyzed.** There is a need to intercept and destroy shorter-range ballistic missiles and large-caliber rockets, and there is a need to intercept land attack cruise missiles at longer ranges, destroying them over enemy territory or, as a minimum, before they can disperse WMD over friendly forces.
- **Strategic deployability and tactical mobility are receiving renewed emphasis.** Assured access for our forces is a growing concern. The emerging capstone concept places a premium on getting to the fight rapidly, organizing quickly and transitioning into combat operations to thwart antiaccess strategies.
- **There is continued improvement of attack operations against time-critical ground targets.** Advances in information, space and sensor technologies are collectively providing opportunities to improve surveillance and focus reconnaissance in support of attack operations. Improvements in munitions ranges, selection, accuracy and lethality among all services are also enhancing attack operations capabilities.

Joint TMD for 2010 and Beyond

Seven representative efforts illustrate the Army's broad-based approach to tomorrow's TMD. Each is being developed in the context of joint and combined operations, while leveraging the Army's core competencies in land-based air and missile defense operations, and the Army's space support to land force operations.

- **Theater High Altitude Area Defense (THAAD).** THAAD provides high endo- and exoatmospheric intercepts of theater ballistic missiles to provide wide area coverage and, when supplemented with a lower-tier intercept capability such as that provided by Patriot, supports a "near-leakproof" two-tiered defense of critical assets. THAAD employs a hit-to-kill missile for assured destruction of any ballistic missile warhead, to include weapons of mass destruction. Additionally, THAAD's sophisticated X-band radar provides the theater with broad area tracking of ballistic missile threats. THAAD entered engineering manufacturing development earlier this year. It will achieve fielded capability in FY07 with a "Capabilities I" increment. Full capabilities will be achieved by FY12 with the fielding of a "Capabilities II" product improvement package. The Army plans to procure two battalions of four fire units each of the THAAD system.
- **The Joint Land Attack Cruise Missile Defense Elevated-Netted Sensor System (JLENS).** The Army is leading development of JLENS, a joint Acquisition Category II program, to provide lightweight, advanced technology, 360-degree surveillance and precision track and illumination radars for the detection of low-flying cruise missiles and other airborne and ballistic missile targets. Additionally, it will contribute to the development of the SIAP using the Joint Tactical Information Distribution System (JTIDS) and the Navy's Cooperative Engagement Capability (CEC). JLENS' sensor(s) and communication packages are attached inside the windscreen under the 71-meter

tethered aerostat. JLENS passes target tracks and data to air defense systems on the ground, at sea or in the air, so tactical units can destroy cruise missiles and other airborne threats. In so doing, JLENS provides joint forces the ability to share over-the-horizon radar data across a series of communication networks and defense platforms. The JLENS Joint Project Office plans to have an aerostat prototype ready as early as 2005. The production plan is to fund a total of 12 complete JLENS systems, containing both fire control and surveillance radars, for a total of 24 aerostats. JLENS fielding is currently planned to begin in 2010.

- **AAMDC Future Operational Capability (FOC) Tactical Operations Center.** In July 1999, under the aegis of the U.S. Army Space and Missile Defense Command's Space and Missile Defense Battle Lab, work began on the modernization of the AAMDC. Initial requirements were to reduce the footprint of the AAMDC in a theater by at least 70 percent; use a Windows environment; provide a single integrated air picture for theater missile defense operations; improve communications; and provide advanced visualization in 2-D and 3-D. What used to take two C-17s or one C-5 to transport has been downsized to the current prototype configuration, consisting of one High Mobility Multipurpose Wheeled Vehicle (HMMWV) with support truck and one Deployable Rapid Assembly Shelter (DRASH) Tent with Battle Studio. The Battle Studio is housed in a modular command post where the fiber optics and other wires are run through the pipe frame. The Battle Studio features surround sound, a white board, video and teleconferencing capability, and three large screens, as well as workstations. The FOC takes in all the basic communications feeds from current Army systems, and can interface with the Navy through the Cooperative Engagement Capability (CEC). The FOC can also receive video from unmanned aerial vehicles, as well as moving target data and synthetic aperture radar images from the Joint Surveillance Target Attack Radar System (JSTARS). The AAMDC recently tested this prototype configuration during joint air and missile defense exercise Roving Sands '00.

- **Joint Tactical Ground Station (JTAGS) Upgrades.** JTAGS provides theater commanders a continuous 24-hour capability, in theater, to receive and process space-based infrared data on tactical ballistic missile launches, and disseminates warning, alerting and cueing to the warfighter. The JTAGS processes data from up to three Defense Support Program satellites to determine launch point and time, azimuth of flight, and predicted ground impact point and time. With Space-Based Infrared System (SBIRS) High satellites and the funded Multimission Mobile Processor (M^3P) upgrade to JTAGS, the speed and accuracy of launch and impact point predictions will improve significantly. This will increase the probability of transporter/erector/launcher (TEL) detection and tracking to facilitate attack operations, will enable a higher-quality handover/cue to radars for active defense operations, and will significantly decrease the size of the warning area, allowing noneffected units to continue with their ongoing operations.

- **Medium Extended Air Defense System (MEADS).** MEADS, an international cooperative initiative, will defend the maneuver forces and fixed assets from short-range ballistic missiles, cruise missiles and other air-breathing threats such as aircraft or unmanned aerial vehicles. The role of MEADS in the ballistic missile defense architecture will be to bridge the gap between man-portable systems like the Stinger and the higher levels of the missile defense structure like PAC-3 or the THAAD system while providing continuous coverage for rapidly advancing maneuver forces. MEADS will be the Army's flagship for active missile defense of the Objective Force. This system will be more responsive, deployable, agile, versatile and sustainable than Patriot. It will be deployable on C-130 and C-17 aircraft. It will be capable of conducting engagements based solely on the data provided by other systems' sensors. It will be able to maneuver with Army forces on the battlefield. It will truly embody the "plug and fight" strategy that calls for developing sensors, battle management,

command, control and computer (BMC^3) systems and missile launchers to be interchangeable from one system to another. MEADS fielding is currently scheduled to begin in FY12.

- **Battlefield Ordnance Awareness (BOA).** BOA is a U.S. Army Space and Missile Defense Command program for application of modern space-based and aircraft-mounted sensor technology to address the needs of the Army warfighter. This unique sensor application will collect and process ordnance event data (e.g., time, type, rate and precise location) and provide this information to the commander in real time. This information will be useful for targeting, intelligence preparation of the battlefield, battlefield damage assessment, and even friendly ordnance expenditure. For TMD this capability will assist in attack operations following the launch of ballistic missiles and large-caliber rockets.
- **Enhanced Area Air Defense (EAAD).** The expected emergence of directed precision munitions launched on rockets or from artillery and mortar projectiles will change the paradigm for defending against these threats in the future. Currently, the enemy must fire large volleys of these munitions in an area pattern to achieve an expectation of accomplishing a military objective. This enables counterbattery fires to locate and effectively eliminate much of the threat. With directed precision munitions, the enemy's vollies can be reduced, making it more difficult to execute counterbattery fires. Active defense must play a larger role in protecting our forces from these new threats. EAAD is about to enter concept exploration to extend active defense into this new realm. EAAD will likely consist of both kinetic and directed energy weapons integrated into a "plug and fight" air and missile defense architecture that will exploit such joint initiatives as the SIAP and improved combat identification.

Staying the Course . . . Supporting Efforts to Find New Solutions

The Army continues to support the joint and combined focus on multielement TMD, acknowledging the need to fight TMD in coordination with ground and aerial air defense. Such fundamental requirements as a single integrated air picture, jointly interoperable systems, and redundant, robust and survivable high-capacity communications are essential. Also essential are the continuing development of the Army's multitier approach to active defense and the integration of that capability into sea-, air- and space-based platforms. Progressively evolving joint capabilities into a family of systems will ensure U.S. forces stay on the path to full-dimensional protection as described in the joint operational vision. Modernization of TMD forces has been synchronized with the Army Transformation process, assuring that TMD forces will provide the essential force protection needed by our soldiers across the spectrum of future military operations.