DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE COMMITTEE ON ARMED SERVICES

SUBCOMMITTEE ON STRATEGIC FORCES

UNITED STATES SENATE

SUBJECT: Ballistic Missile Defense Programs

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(Acquisition)

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Mr. Chairman and Members of the Committee:

Thank you for this opportunity to appear before you and discuss the Air Force's contributions to Theater Missile Defense (TMD). Countering the theater missile threat is a complex problem -- there are no point solutions. The Air Force components of TMD, in concert with the BMDO and other service programs, provide critical capabilities which will enable full-dimensional protection for deployed forces against the growing theater missile threat. This threat to our nation and our allies is real, and we appreciate your concern, support, and funding for our efforts.

I appreciate your invitation to discuss the Airborne Laser (ABL) and how it fits into the TMD Family of Systems (FoS) approach. I will begin by describing the TMD kill chain, then discuss Air Force systems which contribute to the kill chain and the TMD FoS.

The TMD Kill Chain

The key functions of the TMD kill chain are to detect, track, target, engage, and assess the effectiveness of our engagements against missile threats. This kill chain starts and ends with an appropriate system of sensors and the requisite Battle Management Command, Control, and Communications (BMC3) to make accurate and timely decisions with regard to potential missile threats. These capabilities provide the eyes, ears, brains, and central nervous system for our TMD programs.

Detect, Track, Target, and Assess

A large share of the system of sensors used to provide critical Intelligence Preparation of the Battlespace and initial launch warning and assessment of Theater Ballistic Missiles (TBMs) resides within the Air Force's Intelligence, Surveillance, and Reconnaissance (ISR) programs.

Air Force airborne ISR assets such as the U-2 and Rivet Joint, in conjunction with national technical means, provide critical data to support pre-planning. Once combat operations are underway, Joint Surveillance Target Attack Radar System (Joint STARS), U-2, Rivet Joint, Unmanned Air Vehicles (UAVs), Defense Support Program (DSP), and, in the near future, Space Based Infrared System (SBIRS), provide near real time information to a Joint Air Operations Center to rapidly initiate attack operations against enemy theater missile systems and to cue active defense systems.

The DSP has been a vital ISR system for many years. As the DSP nears the end of its service, the Air Force will gradually replace it with the more capable SBIRS, adding significant capability to our TMD architecture. SBIRS will provide the nation with new and improved warning and sensing capabilities for the next century, allowing the accomplishment of a greater number of missions from space. As we initiate our SBIRS deployments, the DSP program, which currently has 5 replacement satellites awaiting launch, will be sustained to allow continuous global surveillance during this transition period.

The global coverage of SBIRS-High, with improved sensitivity and revisit rates over DSP, will allow better launch point determination, missile trajectory determination, and impact point prediction. These improvements will also ensure we can continue to detect, track, and assess the increasingly complex theater missile threats being fielded. SBIRS-Low will provide critical mid-course track data to the battle manager to allow accurate targeting and engagement of hostile threats. SBIRS improved early warning and tracking capabilities reduce the military utility and terror value of the weapons of mass destruction by greatly enhancing the response and effectiveness of active and passive defenses. In addition, SBIRS supports the roles of Technical

Intelligence and Battlespace Characterization, which will greatly improve our assessment of enemy capabilities, our situational awareness during conflict, and our engagement results.

The completed SBIRS constellations will consist of of geosynchronous earth orbit (GEO), highly elliptical orbit (HEO), and low earth orbit (LEO) spacecraft as well as a supporting ground infrastructure. SBIRS-High will be composed of 4 GEO spacecraft to provide hemispherical coverage and 2 HEO sensors to provide polar coverage. SBIRS-Low will be composed of approximately 24 LEO satellites, with the actual number to be determined during the program definition phase. The SBIRS ground segment consists of a consolidated ground station, overseas-based Relay Ground Stations, and Mobile Multi-Mission Processors.

The Air Force recently announced a restructuring of the SBIRS program. This restructuring was implemented after careful consideration to mission risk and our overall TMD and National Missile Defense (NMD) efforts. SBIRS-High first GEO launch was delayed by 2 years until FY04. The delay described in the FY00 President's Budget provided critical fiscal resources in FY00 to meet other high priority Air Force needs, make full use of DSP satellites before launching the follow-on capability, and still provide the needed SBIRS High on-orbit assets to support the revised National Missile Defense deployment scheduled for FY 2005. However, the near term savings associated with the delay are offset by increased costs in the outyears. The most recent estimate of these increased costs is significantly higher than previously predicted. Therefore, we have formed a Joint Estimation Team comprised of the contractor, DoD and Air Force personnel to determine the true costs of the restructured program, and we will submit a budget amendment identifying the offsets that are required for a fully funded SBIRS High program. The SBIRS-Low first launch was delayed 2 years to FY06. This decision was driven

by technical and schedule challenges. Updated assessments concluded a FY04 launch was extremely risky and impractical.

A decision to also eliminate two on-orbit demonstrations from the SBIRS-Low program, after formulation of the FY00 budget, was driven by rapidly diminishing returns on investment. Significant risk reductions have been achieved by these efforts to date. However, continued cost growth was consuming program funds at a rate that made the demonstration program unexecutable. The Air Force developed an alternative strategy to ensure SBIRS-Low remained executable and on schedule for an FY06 launch. By terminating the two demonstrations, the Air Force was able to redirect funds toward a more timely risk reduction focused directly on the objective SBIRS-Low design. Meanwhile other on-orbit demonstrations have demonstrated much of the technology critical to SBIRS. These demonstrations were on-orbit experimental packages, not prototype SBIRS satellites. An expanded PDRR focuses more resources on the objective system and should result in a more mature system design when the EMD phase of the program is competed.

BMC3

To provide rapid and decisive action against the serious threat of TBMs, the Air Force provides several key BMC3 components for controlling theater counter missile operations. Assets such as Airborne Warning and Control System (AWACS), Joint STARS, Attack and Launch Early Reporting to Theater (ALERT), and Global Broadcast System (GBS) serve as pipelines to convey information to a Joint Air Operations Center to rapidly initiate and coordinate counter missile operations. To ensure we remain joint in our outlook, the Air Force works closely with the BMDO, Joint Theater Air and Missile Defense Organization (JTAMDO), and other services to ensure interoperability. Further, the Air Force recently created the Aerospace

Command and Control, Intelligence, Surveillance, and Reconnaissance Center to focus our BMC3 and ISR efforts across the board. This Center is already beginning to pay big dividends in integrating our TMD efforts, as evidenced in our recent Joint Expeditionary Force Experiment, JEFX-98.

Engaging Theater Ballistic Missiles - Attack Operations

Aerospace superiority is the cornerstone of offensive operations, which allow us to take the fight to the enemy, seize the initiative, and leverage the full span of joint warfighting capability. Counterair operations to gain and maintain air superiority enable Attack Operations against TBMs. Attack Operations can prevent or disrupt launch of TBMs by targeting the enemy's launch platforms and missiles on the ground. Additionally, Attack Operations include attacks on ISR assets, command and control nodes, and support facilities. Attack operations can be executed by all offensive forces, including air, ground, maritime, and special operations. Successful Attack Operations will reduce the number of TBMs launched and required to be engaged by our active defenses. The effectiveness of Attack Operations depends on our ability to detect TBMs on the ground, recognize them, and attack with precision before they can be launched. Barring that, we will seek to destroy mobile Transportable Erector-Launchers (TELs) just after launch with our Attack Operations assets, and we will engage the TBMs in their boost stage with the next Air Force component of the TMD system, the Airborne Laser (ABL).

Engaging Theater Ballistic Missiles - The Airborne Laser

The ABL is one of our most exciting weapon system development programs and has the potential to revolutionize warfare. While flying in friendly airspace, the Airborne Laser will be able to reach hundreds of kilometers into enemy territory to quickly destroy enemy targets.

Because of this capability, the ABL will play a vital role in our TMD architecture. The ABL's high-energy laser system is DoD's only weapon system designed to destroy TBMs during their initial stage of flight (i.e., boost phase). This intercept capability will give theater commanders the unique ability to destroy TBMs long before they place American or allied troops at risk. Our enemies will also face the potential of having TBM debris fall on their own territory -- this will provide a high level of deterrence, especially if our enemies are contemplating using weapons of mass destruction.

ABL improves the entire TMD architecture performance with its long range sensors and laser tracking capability. These systems will provide advance cues on in-bound enemy missiles to the radars of land- and sea-based missile defense systems, thereby extending their potential coverage. ABL will also significantly enhance attack operations by transmitting highly accurate TBM launch point information.

The ABL has enjoyed great success over the last year. It achieved all of its milestones while maintaining the program schedule and cost. One success included building a laser module with all critical components "flight-weighted." This involved reducing a previous test laser module weighing more than 5500 lbs down to one weighing about 3000 lbs. Most impressively, this same laser module produced 110% of design power, a full 4 years before needed. This and many other program successes provide us confidence that ABL will be able to meet, if not surpass, its requirements.

Despite these successes, concerns exist over the ABL's development and test schedule. The FY99 $25M reduction to the ABL program required the Air Force to restructure the Program Definition and Risk Reduction (PDRR) efforts. As part of the restructure, the Air Force made a conscious decision to address the areas of concern by strengthening our risk reduction

activities. First, we funded near-term testing on the ABL's ability to overcome atmospheric distortion. Second, additional atmospheric data collection and analysis will bolster our growing atmospheric database. Third, lethality and vulnerability testing will provide further confidence in ABL's kill mechanism. Fourth, we expanded the PDRR integration and test schedules to reduce risk. Finally, we activated a Directed Energy Countermeasures Assessment Team in 1998 to examine the ability of ABL to counter potential countermeasures. The new plan will result in the program stretching by 1 year. In FY03, the PDRR ABL will demonstrate lethal capability against SCUD-class missiles. The restructured ABL program will field three aircraft (Initial Operational Capability) by FY07 and seven aircraft (Full Operational Capability) by FY09.

ABL is the Air Force's near-term directed energy solution to address theater-level boost phase intercept. ABL's kill ranges, rechargeable magazine, and relatively low cost per shot focus it towards the TMD mission. ABL should also provide valuable operational and technological insights for the Space Based Laser (SBL). ABL is currently generating data on high-energy laser weapon operability, reliability, target acquisition, pointing, tracking and lethality. In addition, ABL will mature operational procedures for integrating high-energy laser weapons into our Aerospace Expeditionary Forces.

The Air Force is firmly committed to the ABL program. The critical technologies needed to make ABL a reality have been proven. The challenge now is to integrate these technologies on our PDRR aircraft. Recently, an Independent Assessment Team (IAT) of experts from outside the Department of Defense examined the adequacy of the program's test activities, Milestone II exit criteria, and our concept of operations. This team was directed by Congress and we believe the program will benefit by this independent review. Our restructured program is more robust

with significant additions to risk reduction efforts, and the Air Force looks forward to introducing this revolutionary warfighting capability to our joint force commanders.

Advanced Technology - Space-Based Laser

In addition to the current programs discussed above, under BMDO management the Air Force is executing the advanced technology SBL program, a high-payoff, next generation concept for a missile defense system. If deployed, SBL will be a significant capability affording the nation global presence and precision engagement at the speed of light. It will likely be the boost-phase layer in a robust NMD architecture, but may have military utility in other areas as well. It is possible a SBL constellation could engage most TBMs.

An important future step for the development of the SBL system is an Integrated Flight Experiment (IFX) to prove the feasibility and utility of killing ballistic missiles in boost phase from orbit. The IFX will permit the Air Force to integrate laser components into a space platform to perform on-orbit experiments which will reduce risk in the areas of key technologies, system integration, human interaction, and affordability. BMDO recently sponsored the third Independent Review Team (IRT-3) as part of the ongoing assessment of technological readiness, role, and content for an effective IFX. The IRT-3 concluded the range of appropriate time frames for an IFX launch is 2010 to 2012. Currently planned budget levels and priorities lead to a launch planned for 2012.

There was concern an IFX would not be launched soon enough to enable an operational SBL system in time to meet the projected threat. In response, the Air Force and BMDO increased funding for the SBL program by $46M per year through the FYDP ($29M per year from the Air Force, $17M per year from BMDO), raising the total to $139M per year. This additional funding will be used to accelerate risk reduction and technology development prior to

the IFX. The Air Force and BMDO also revised the SBL acquisition strategy to pull the best technical experts together to focus on achieving the IFX sooner.

In conclusion, the Air Force is proud to be developing many of the systems required for effective TMD. Any solution will require a system of systems approach, and changes to any of the programs must be taken in the context of its role within the TMD and NMD architectures. The Air Force is committed to the aggressive development and fielding of these systems, including SBIRS, ABL, and SBL. Fielding an effective defense is essential to our future joint warfighting capability, and the Air Force initiatives in ballistic missile defense will contribute significantly to this goal.