MISSILE DEFENSE AGENCY

Fact Sheet

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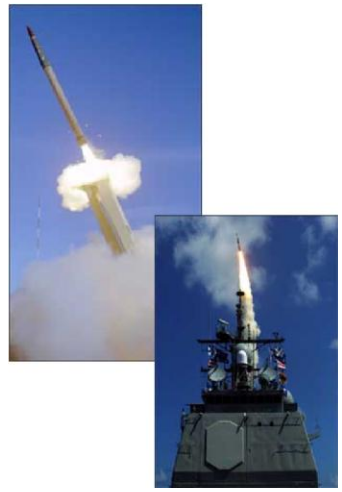
The Ballistic Missile Defense System



One of the greatest threats facing the world today is the increasing proliferation of ballistic missiles and weapons of mass destruction. Non-proliferation activities, to include diplomacy and arms control agreements with Russia, have been successful in reducing this threat. Despite reductions in the number of weapons deployed by the United States and the former Soviet Union, ballistic missile proliferation continues on a wide scale today and could increase as the technology is transferred. Countries make these investments because ballistic missiles provide them with the means to project power both in a regional and strategic context and a capability to launch an attack from a distance. A country with no ballistic missiles today may acquire them in a very short period of time, and these missiles could become available to non-state terrorist groups.

Through its capabilities for defending critical nodes, military assets, and seats of government, missile defense enhances non-proliferation activities. In other words, missile defenses can provide a permanent presence in a region and discourage adversaries from believing they can use ballistic missiles to coerce or intimidate the U.S. or its allies. In times of crisis, we can surge mobile missile defense capabilities into a region to enhance deterrence and, if a missile is launched, improve protection of critical assets and limit damage over a wide area. The ultimate goal of missile defense is to convince countries that ballistic missiles are not militarily useful or a worthy investment and place doubt in the minds of potential aggressors that a ballistic missile attack against the United States or its allies can succeed.

Missile defense technology being developed, tested and deployed by the United States is designed to counter ballistic missiles of all ranges—short, medium, intermediate and long. Since ballistic missiles have different ranges, speeds, size and performance characteristics, the Ballistic Missile Defense System is an integrated, "layered" architecture that provides multiple opportunities to destroy missiles and their warheads before they can reach their targets. The system's architecture includes:

- networked sensors (including space-based) and ground- and sea-based radars for target detection and tracking;
- ground- and sea-based interceptor missiles for destroying a ballistic missile using either the force of a direct collision, called "hit-to-kill" technology, or an explosive blast fragmentation warhead;
- and a command, control, battle management, and communications network providing the operational commanders with the needed links between the sensors and interceptor missiles.

Missile defense elements are operated by United States military personnel from U.S. Strategic Command, U.S. Northern Command, U.S. Pacific Command, U.S. Forces Japan, U.S. European Command and others. The United States has missile defense cooperative programs with a number of allies, including United Kingdom, Japan, Australia, Israel, Denmark, Germany, Netherlands, Czech Republic, Poland, Italy and many others. The Missile Defense Agency also actively participates in NATO activities to maximize opportunities to develop an integrated NATO ballistic missile defense capability.

Ballistic missiles follow a four-phased trajectory path: boost, ascent, midcourse, and terminal.

Boost Phase

The boost phase defenses can defeat ballistic missiles of all ranges including Intercontinental Ballistic Missiles (ICBMs), but it is the most difficult phase in which to engage a missile. The intercept "window" is only from one to five minutes. Although the missile is easiest to detect and track in the boost phase because its exhaust is bright and hot, missile defense interceptors and sensors must be in close proximity to the missile launch. Early detection in the boost phase allows for a rapid response and intercept early in its flight, possibly before any countermeasures can be deployed.

Ascent Phase

The ascent phase begins right after the missile's powered flight and ends just prior to apogee. The MDA is preparing to leverage emerging Ascent Phase Intercept (API) technologies to hedge against threat growth and realize the greatest potential for reducing cost and increasing operational effectiveness of missile defense. This rationale is based in part on a Defense Science Board 2002 Summer Study, which emphasized the benefits of ascent phase intercepts. API would allow us to intercept early in the battle space and optimize our ability to execute a shoot-look-shoot tactic to defeat a threat before countermeasures are deployed, minimize the potential impact of debris, and reduce the number of interceptors required to defeat a raid of threat missiles. Additionally, by destroying missiles early, the remainder of the BMDS architecture is not required to track and kill a threat reentry vehicle (warhead) and associated objects, nor do we have to incur the costs of maintaining a significant number of expensive interceptors to destroy advanced countermeasures in a later phase of a threat missile's flight.

Midcourse Phase

The midcourse phase begins when the enemy missile's booster burns out and it begins coasting in space towards its target. This phase can last as long as 20 minutes, allowing several opportunities to destroy the incoming ballistic missile outside the earth's atmosphere. Any debris remaining after the intercept will burn up as it enters the atmosphere. The Ground-based Midcourse Defense element is now deployed in Alaska and California to defend the U.S. homeland against a limited attack from countries like North Korea and Iran. This system can only defend against intermediate and long-range ballistic missiles. The Aegis sea-based missile defense element utilizes existing Aegis cruisers and destroyers armed with interceptor missiles designed to defend against short- to medium-range ballistic missiles, and has been successfully tested against an intermediate range missile. A network of advanced sensors, radars and command, control, battle management, and communication components provide target detection, tracking and discrimination of countermeasures to assist the interceptor missile in placing itself in the path of the hostile missile, destroying with hit-to-kill technology. These sensors and radars include transportable X-band radars, as well as advanced radars aboard Aegis cruisers and destroyers capable of operating in the world's oceans. We have also built the largest X-band radar in the world, the Sea-Based X-band, which is mounted on a floating platform allowing it to traverse the world's oceans. This radar provides precise tracking of target missiles of all ranges and discriminates between actual missiles and countermeasures that could be deployed with a hostile missile.

Terminal Phase

The terminal phase is very short and begins once the missile reenters the atmosphere. It is the last opportunity to make an intercept before the warhead reaches its target. Intercepting a warhead during this phase is difficult and the least desirable of the phases because there is little margin for error and the intercept will occur close to the intended target. Terminal phase interceptor elements include the Terminal High Altitude Area Defense (THAAD) now being delivered to the U.S. Army, the Aegis BMD near-term Sea-Based Terminal Defense capability using the SM-2 Block IV missile, and the U.S. Army's PATRIOT Advanced Capability-3 (PAC-3) now deployed worldwide. These mobile systems defend against short- to medium-range missiles.

Fielded Capabilities

From its establishment in early 2002 through the end of 2010, the Missile Defense Agency is fielding a Ballistic Missile Defense System consisting of:

- 30 Ground-Based Interceptors for long-range homeland defense;
- Aegis warships capable of long-range surveillance and tracking and missile intercepts;
- Standard Missile-3 interceptors for Aegis Ballistic Missile Defense warships;
- an upgraded Cobra Dane radar in the Aleutian Islands;
- upgraded early warning radars (currently Beale Air Force Base, Calif., Fylingdales, U.K., and Thule, Greenland);
- 11 transportable X-band radars for operations and testing
- a sea-based X-band radar now located in the Pacific Ocean to support flight testing and actual defensive operations;
- and an integrated Command, Control, Battle Management, and Communications element across the BMDS.

Testing

Testing must account for the ever-changing ballistic missile threat and the latest technological developments. Ground and flight tests provide data needed for highly advanced modeling and simulation activities that allow us to measure and predict the performance of all missile defense technologies. Successful flight tests in particular give the warfighter greater confidence in the system's capabilities.