



THE BALLISTIC MISSILE DEFENSE SYSTEM

The United States is developing, testing, and deploying missile defenses to counter missiles of all ranges – short-, medium-, intermediate-, and intercontinental-range. The Ballistic Missile Defense System, managed by the Missile Defense Agency, is an integrated, layered architecture that aims to provide multiple shot opportunities in the boost, mid-course, and terminal phases of the flight trajectory to destroy missiles and their warheads before they can reach their targets. The system's architecture includes:

- Ground, sea, and space based sensors providing target detection, tracking, discrimination, and kill assessment;
- Ground and sea based interceptors for destroying a ballistic missile using "hit-to-kill" technology or an explosive blast fragmentation warhead;
- A global command and control, battle management and communications network operated 24/7 by U.S. military personnel providing the needed tools and links between command authorities, sensors, and interceptor missiles.

The United States pursues missile defense cooperation with a number of allies and partners, including Australia, the Czech Republic, Denmark, France, Germany, Israel, Italy, Japan, Kuwait, Netherlands, Norway, Poland, Republic of Korea, Qatar, Romania, Kingdom of Saudi Arabia, Spain, Turkey, United Arab Emirates, and the United Kingdom. The United States also closely cooperates with NATO.

BALLISTIC MISSILES FOLLOW A THREE-PHASED TRAJECTORY: BOOST/ASCENT, MIDCOURSE AND TERMINAL

Boost Phase/Ascent

The boost phase extends from initial launch until booster burnout, and is the ideal time to intercept a threat missile because it has not yet deployed either its warhead or countermeasures. 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 in enemy territory. Early detection in the boost phase allows for a rapid response and intercept early in its flight resulting in destruction of the threat over hostile territory. The United States is exploring several emerging technologies, including directed energy that could destroy missiles in the boost phase.

Midcourse Phase

The midcourse phase begins when the ballistic missile booster burns out and it begins coasting in space towards its target. This phase allows several opportunities to destroy the incoming ballistic missile outside the earth's atmosphere. The Ground-based Midcourse Defense element is deployed to defend the U.S. homeland against long-range ballistic missile threats from countries like North Korea and Iran. The Aegis Ballistic Missile Defense element utilizes existing Aegis cruisers, destroyers, and ashore sites armed with Standard Missile-3 Block IA, IB, and IIA interceptor missiles designed to defend against short-to intermediate-range ballistic missiles.

Terminal Phase

The terminal phase begins once the missile reenters the atmosphere. It is the last opportunity to make an intercept before the warhead reaches its target. Terminal phase interceptor elements include the Terminal High Altitude Area Defense (THAAD) system; the Aegis BMD Sea-Based Terminal Defense capability using SM-2 Block 4 and SM-6 missiles; and the U.S. Army's PATRIOT Advanced Capability-3 (PAC-3).



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FIELDDED CAPABILITIES

The Missile Defense Agency has fielded a Ballistic Missile Defense System consisting of:

- 44 Ground-Based Interceptors for long-range homeland defense.
- 38 Aegis warships capable of long-range surveillance, tracking and ballistic missile defense using SM-2 Block 4, SM-3, and SM-6 missiles.
- One operational Aegis Ashore site which performs BMD only missions with SM-3 missiles.
- An upgraded Cobra Dane radar in the Aleutian Islands, Alaska.
- Upgraded early warning radars strategically located around the world.
- 12 transportable X-band radars for operations and testing (including 7 for THAAD batteries).
- Seven active THAAD batteries, including one deployed to Guam for homeland defense and one deployed to the Republic of Korea for defense of Korea.
- A sea-based X-band radar, now located in the Pacific Ocean.
- An integrated Command & Control, Battle Management, and Communications system that actively coordinates all elements of the Ballistic Missile Defense System.

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 Ballistic Missile Defense System's capabilities.