

Patriot

Combat-Proven Air and Missile Defense



Patriot — the cornerstone of air defense for the new millennium

Benefits

- Patriot, the foundation of the U.S. Army's integrated air and missile defense architecture, is a long-range, all-altitude, all-weather system fielded to defeat advanced threats, including aircraft, tactical ballistic missiles and cruise missiles
- Patriot is capable of simultaneously engaging numerous targets in severe electronic countermeasure conditions
- Patriot is also the foundation of a U.S. two-tiered defense against the escalating tactical ballistic missile threat

Combat-proven during Desert Storm and most recently Operation Iraqi Freedom, Patriot is the most advanced ground-based air defense system fielded in the world today. Patriot has completed well over 2,500 target search and track tests during the entire range of its performance envelope. In addition, over 500 missile firings have demonstrated Patriot's performance against the full range of tactical ballistic and cruise missiles.

Since production began in 1980, over 170 Patriot fire units and over 9,000 missiles have been delivered. Patriot is deployed by the United States, Germany, Saudi Arabia, Kuwait, the Netherlands, Japan, Israel, Taiwan and Greece. An international industry team of over 4,000 suppliers and subcontractors support the Patriot air defense system.

Modern production methods have proven effective in maintaining a production reliability of over 10 times the required specification. Reliability of Patriot systems deployed worldwide (measured in "mean-time-between-failure") remains over twice the required system specification. U.S. Army operational availability has been consistently over 95 percent.

Patriot Facts

Patriot Advanced Capability Phase 2 (PAC-2) was fielded in January 1991. A demonstrated anti-tactical ballistic missile capability was exploited in 1990 following Iraq's invasion of Kuwait when the U.S. Army rapidly directed PAC-2 tactical ballistic missile upgrades into production and deployment to Southwest Asia and Israel. Patriot performance against Iraqi SCUD missile attacks was very impressive, even though these SCUD

missiles exceeded Patriot's design threat. Patriot success was over 70 percent in Saudi Arabia and over 40 percent in Israel.

Improvements Based on Lessons Learned from the Gulf War

"Quick Response" Program 1992: A radar shroud reduced interference and improved radar multifunction performance. A low-noise receiver was added to improve detection range. North-finding and global positioning systems were added to reduce system emplacement times. Remote launch modifications allowed launchers to be placed up to 10 kilometers from the control station, expanding Patriot's defended area.

PAC-3 Configuration 1

1995: New pulse Doppler processor was added that significantly improved radar performance. Engagement Control Station (ECS) and Information Coordination Central (ICC) upgrades improved weapons control, computer throughput, memory and reliability. ECS and ICC upgrades also added an optical disk and embedded data-recording equipment to decrease computer access times, improve reliability and provide a tactical data-recording capability. Patriot Guidance Enhanced Missile (GEM) included a faster warhead fuze to improve kill probability against tactical ballistic missiles and a new low-noise missile seeker section to expand the missile's engagement area.

PAC-3 Configuration 2

1996: Improved the communications processor and added the Joint Tactical Information Distribution System to improve communications and interfaces with joint forces. Fielded Post Deployment build (PDB) 4 software improved multifunction radar performance, detected small radar cross section targets and improved system detection, identification and engagement of anti-radiation missiles and aircraft carrying those missiles.

PAC-3 Configuration 3 Ground Equipment

2000: Added dual travelling wave tube units and a new radio frequency exciter to the radar to further improve radar multifunction performance and detection of small targets in cluttered environments. A

Classification, Discrimination, Identification Phase III program significantly improved radar range performance to discriminate and identify a tactical ballistic missile warhead from other target debris or objects. Post Deployment Build 5 software improved radar multifunction performance, determined tactical ballistic missile impact and launch points, and provided interfaces with the Terminal High Altitude Area Defense System. Remote launch improvements increased the location of launchers from the ECS from a distance of 10 kilometers to 30 kilometers. This dramatically increased Patriot's defended area.

PAC-3 Missile

2001: Lockheed Martin developed and delivered the initial PAC-3 missiles incorporated into the Patriot system. The PAC-3 missile has a lethality enhancer and uses hit-to-kill technology to destroy ballistic missile targets. The U.S. Army plans to equip each U.S. Patriot fire unit with six PAC-2 and two PAC-3 launchers. Raytheon is the overall system integrator for the PAC-3 missile fielding.

GEM+ Missile

2002: Guidance Enhanced Missile Plus (GEM+) added a low-noise oscillator for improved acquisition and tracking performance in clutter against lower cross-section targets. The GEM+ missile provides an upgraded capability to defeat airbreathing, cruise missile and ballistic missile threats in complement to the PAC-3 missile.

Patriot Fire Unit

Up to 16 Launching Stations
(64 PAC-2/GEM Missiles)



Combat-Proven Again in Operation Iraqi Freedom

2003: U.S. and coalition Patriot units were deployed throughout the CENTCOM region to protect forces and populations from the threat of ballistic missiles. The improvements, developed and fielded since 1991, reflected the enhanced capabilities of Patriot to protect against threats to both static assets and forces in the attack. The Configuration 3 Ground Equipment, GEM+, GEM and PAC-3 missiles were all combat-proven.

Future Patriot Improvements

The U.S. Department of Defense has invested over \$3 billion during the last 10 years to further improve and extend Patriot's performance against increasingly challenging threats. Raytheon, as Patriot prime contractor and integrator for the PAC-3 missile, stands ready to continue to support the U.S. Army in block improvements and enhancements of the Patriot system to meet objective force requirements.

Raytheon Company
Integrated Defense Systems
50 Apple Hill Drive
Tewksbury, Massachusetts
01876 USA

www.raytheon.com

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