

Vigilant Eagle Airport Protection System

Ground-based Counter-MANPADS Protection for Large Airports and Air Bases



Vigilant Eagle

Securing the flying public with an active protection solution against surface-to-air missiles.

Benefits

- Proven effective against MANPADS threats
- Protects all aircraft in the most critical phases of flight
- Low development, installation and ownership costs
- No adverse impact to airlines, aircraft electronics or airport operations
- No aircraft modifications required
- No impact to civilian population
- Demonstrated extremely low false-alarm rate
- Interoperable with existing airport systems

Raytheon has been involved with the U.S. Department of Defense in the development of microwave-based airfield defense concepts against surface-to-air missiles. This defensive capability has been refined for commercial airports to make it available for further demonstration and application as part of a layered defense to counter the terrorist Man-Portable Air-Defense System (MANPADS) threat at civilian airports.

Active Protection

Vigilant Eagle uses a simple technique of illuminating the missile body with electromagnetic energy tailored to divert the missile. When located at a commercial airport, Vigilant Eagle creates a dome of protection around the airport, protecting all aircraft during the most critical phases of flight—takeoff and landing.

Vigilant Eagle consists of three major components: a distributed missile detect and track subsystem (MDT), a command and control (C2) system and the Active Electronically Scanned Array (AESA), which consists of a billboard-size array of highly efficient antennas linked to solid-state amplifiers.

The MDT is a fixed grid of passive infrared (IR) cameras, with communication lines to the C2 on airport property. These IR cameras can be mounted on existing infrastructures to cover the required detection space. Each missile detection is confirmed by at least two sensors in an overlapping grid. This yields an extremely low false-alarm rate, demonstrated to be on the order of one or two events per year, thus minimizing impact on airport operations. The MDT tracking performance and false alarm rate have been demonstrated in live MANPADS tests and operational deployment.

The C2 provides pointing commands to the AESA and also connects to airport security operations. The C2 capability includes determination of the launch point to notify security forces, enabling capture of the terrorist. The C2 for Vigilant Eagle will be adapted from an existing air-defense system, which is currently deployed in urban environments, demonstrating its interoperability with existing civilian systems and operations.

Upon receiving pointing commands from the C2, the AESA radiates a tailored electromagnetic waveform to interfere with the MANPADS guidance system and deflect it away from the aircraft. The effectiveness of the Vigilant Eagle waveforms has been demonstrated in recent field tests to be highly effective in defeating MANPADS missiles. Transmitted electromagnetic fields are well within Occupational Safety and Health Administration standards



Tower-mounted MDT triangulates target and relays coordinates to Control Center.



Omnidirectional system with distributed MDT covers all commercial aircraft.

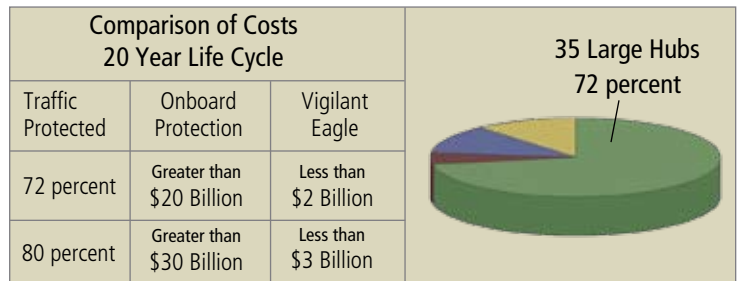
for human exposure limits and Federal Aviation Administration standards (SAE ARP 5583, Guide to Certification of Aircraft in a High-Intensity Radiated Field Environment) for interference with aircraft electronic systems.

Cost Effective

Vigilant Eagle's operational concept ensures an affordable and cost effective addition to a MANPADS layered protection approach when combined with a limited number of commercial and general aviation onboard protection systems. Installation of Vigilant Eagle at the 35 airports specified in the FAA Operational Evaluation Plan provides coverage for 72 percent

of all takeoffs and landings within the United States and over 85 percent of the overseas arrivals and departures. As compared with on-aircraft protection for commercial airlines, Vigilant Eagle is at least six times more cost effective to procure and 30 times more cost effective over a 20 year life cycle, because of the significant logistics tail required for onboard systems. In addition, Vigilant Eagle requires no aircraft modifications.

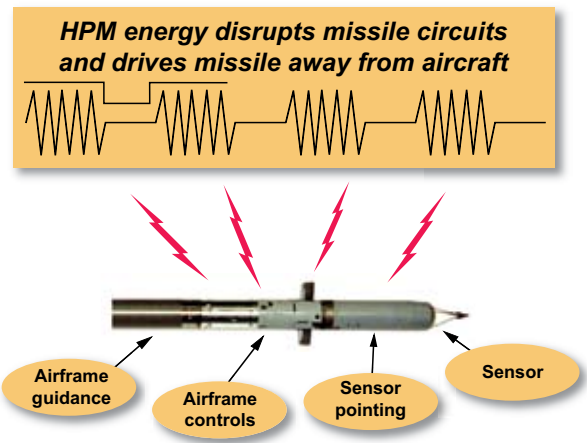
Vigilant Eagle is an effective response that significantly lowers risk of a terrorist MANPADS attack at an affordable cost.



The 35 Operational Evaluation Plan airports manage 72 percent of air traffic.

The Right Solution

- Economically viable solution to the MANPADS threat
- Denies the enemy capability to succeed at terrorist attack
- Provides protection for all aircraft during arrival and departure
- No aircraft modification required
- Low-cost acquisition, certification, installation, operation and maintenance



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