AOC Position Statement  
“Missile Defense Systems for the American Commercial Airline Fleet”

Position Statement.  AOC, the Electronic Warfare & Information Operations Association, advocates and urges that the federal government rapidly research, develop, purchase and install a surface-to-air missile detection and deterrent system for the American commercial airline fleet. This action would provide a viable means of protecting the public and the airline industry from this very real terrorist threat. (Adopted February 2003)

Overview. As past and on-going events show, man-portable air defense systems (ManPADS) are an increasing threat to commercial aircraft. As a leader in the electronic warfare and information operations (EW/IO) community, AOC desires to make a contribution and assist with protecting the American public and enhancing homeland security. With that goal in mind, we reviewed known threats from terrorists to commercial aircraft to determine if this fleet could use EW/IO technologies already developed to protect military aircraft. One immediate conclusion is that existing or near-term military technologies are candidates to protect the civilian airline fleet and its’ passengers.

The Threat. In the last 25 years, there have been 35 attacks on civilian aircraft using ManPADS, 24 of which resulted in crashes with over 500 casualties. It is estimated that there are over 500,000 of these infrared-tracking ManPADS in circulation throughout the world today. ManPADS are easy to conceal, relatively inexpensive ($25-80K on the black market), widely available, and difficult to protect against because of their range and altitude capabilities. The footprint of possible launch sites around an airport may encompass over a 300 square mile area. The engagement zone—three miles on either side of the flight path and twenty-five miles along both the departure and arrival path—would be very difficult to patrol or reasonably restrict access. For example, to restrict access around Washington Reagan National Airport would include a zone stretching from the Patuxent River to north of Baltimore, Md. Obviously, such an option is not feasible given the number of airports that would need to be protected across the nation.

Countermeasures. The countermeasures that provide the ability to deceive and deflect missile threats include jammers, IR chaff, flares and decoy heat sources. Jammers—the latest employing laser technology—disrupt the ability of the missile to detect and lock on to the target. IR Chaff uses metallic foil confetti that oxidizes so quickly it gives off heat and acts as a decoy target. Flares burn at a higher temperature and intensity than the heat sources on the aircraft, thus diverting the missile. While highly undesirable, decoy heat sources could be placed at less vulnerable points on the aircraft body to draw a missile away from critical components.

The Technology. Currently, the military uses a number of systems to protect aircraft against ManPADS attacks that offer options for application in a commercial setting. These systems generally employ a missile warning system that detects the missile, determine if it’s a threat, and then alert the aircraft crew of the threat. All of these systems then use either manual or automated countermeasures to defeat the missile. The more popular options include:

- Pyrotechnics/Pyrophoric Devices. Virtually all military fighters and helicopters are equipped with and use some sort of incendiary devices, like flares, to decoy ManPADS away from their intended targets. While proven effective against older IR missiles, many of these incendiaries suffer deficiencies relative to the commercial transportation world. Namely, they are less effective against newer generation ManPADS equipped with automatic flare-rejection capabilities. And, flares can be

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dangerous—inadvertent releases have killed military personnel and continue to endanger surface structures. Newer technological offerings in this category, intended to overcome the above mentioned shortcomings, include thin foil metal discs that oxide and leave residue clouds that can distract and confuse the IR seekers on ManPADS.

ATIRCM. Advanced Threat Infrared Countermeasures uses a high powered lamp to disrupt ManPADS IR seekers, with plans to upgrade the lamps to lasers. Currently, ATIRCM is programmed for smaller Army aircraft (i.e., helicopters), but part of the upgrade plan includes reconfiguring the design for application on larger aircraft.

DIRECM. Directed Infrared Countermeasure uses laser technology to disrupt the missiles tracking capability to defeat the missile. The Air Force’s Large Aircraft Infrared Countermeasures (LAIRCM) system is often cited as the most likely technology that would readily convert to civilian application. Installation in pod configuration, they point out, would make retrofit, installation, maintenance and removal or replacement much more feasible. Already employed on a number of the larger aircraft now in use by the military, like the C-130 and C-17, many experts believe that the capabilities would readily transfer to airliners and should be tested as quickly as possible.

EDDIRCM. Escort Directed Infrared Countermeasures eliminates the need for installation of an individual missile protection system on each aircraft by using an airborne platform to create an electromagnetic protection umbrella for aircraft on take-off and landing. This technology is not available today, but this approach is being explored for application at specific airports on a case-by-case basis to protect non-equipped aircraft when ‘warnings’ indicate a possible threat.

PLATO. Protected Landing and Take-Off uses a grid of arrayed sensors on the ground in the flight path of an airport to detect missiles, send a signal to the control tower for evasive action, and alert the aircraft in the flight path of the detection and to deploy countermeasures. This system is also only in the concept stage and has a number of drawbacks that must be overcome. They include the inflexibility of flight paths once sensors are installed, the vast area that must be included in the sensor grid, overcoming responses in false detections and the requirement that aircraft would still have to be equipped with an on board countermeasure device.

**Recommended Solution:** Any missile deterrent system would be required to detect threats, identify the source of a threat (to reduce the possibility of false alarm) and then deflect or decoy the missile away from the aircraft. While estimates to equip the entire commercial jet fleet (approximately 6,800 aircraft) run from $5-15B, depending on the technology, the cost of doing nothing would most likely be even greater. When compared to the cost of a single new aircraft at $200+M, the $1-3M needed for a detection and deterrent system is cost effective insurance for the safety of the passengers and the protection of the aircraft. A final important point: any strategy for addressing this threat should synchronize with the Department of Defense to advance both military and civilian protective capabilities, protect both civilians and military personnel (arguably the most exposed to a ManPADS threat) and further reduce costs in the future.

**In Summary.** The threat is real and can happen any time at any aircraft facility in the world. It would only take one successful ManPADS incident to have a devastating effect upon the commercial airline industry. Such an incident would quickly evaporate any gains made since 9/11 by the airlines to restore the vitality of their industry. The financial impact of such an incident would make the costs of this system pale in comparison. **The AOC believes that this terrorist threat must be addressed sooner rather than later and that efforts by the Department of Homeland Security to identify an acceptable technology should receive the highest priority from the Congress and the Administration. Because AOC is in a unique position regarding electronic warfare, we stand ready to assist the Department of Homeland Security and the U.S. Congress to make air travel safer from recognized terrorist threats.**

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