



## **Fact Sheet: Countering Missile Threats to Commercial Aircraft**

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The Department of Homeland Security, in partnership with other federal agencies, is taking an aggressive approach to counter the threat of shoulder-fired missiles to civilian commercial aviation. Homeland Security's Science and Technology division is leading the technology aspects of the effort through its Counter-MAN Portable Air Defense Systems (MANPADS) Special Program Office. This Office will help determine the viability, economic costs and effectiveness of adapting existing technology from military to commercial aviation use. Following an aggressive 18-24 month analysis, prototype demonstration and testing phase, Homeland Security will provide the Administration and Congress with a recommendation for the most viable solution to defend against shoulder-fired missiles.

### ***Working with the Administration and Congress:***

Homeland Security officials throughout the Administration have been working to counter the threat of a shoulder-fired missile attack on civil aviation. In December 2002, the Homeland Security Council and the National Security Council convened an interagency task force representing 21 agencies and offices including the Departments of Defense, Treasury and Homeland Security as well the Federal Aviation Administration and Federal Bureau of Investigation to develop an aggressive plan to assess and counter the MANPADS threat. The task force adopted a systematic, end-to-end countermeasures strategy, which is being aggressively implemented through multiple agency initiatives. The strategy focuses on three areas:

- Proliferation control and threat reduction
- Tactical measures and recovery
- Technical countermeasures

The Administration has made significant progress with the international community on proliferation control and threat reduction. This includes numerous efforts in working with member countries of the G-8 and other international economic and industry organizations to adopt an effective global strategy that will limit proliferation and potential illicit use of MANPADS.

### ***Homeland Security's Science and Technology Counter-MANPADS Office:***

Science and Technology's Counter-MANPADS Special Program Office, which became operational in early October of 2003, does not intend to develop new technology, but rather to adapt existing technology from military to commercial aviation use.

This technology adaptation will also ensure that the resulting countermeasures are consistent with airport operations and commercial air carrier logistics that include such activities as maintenance, support, and training.

The Counter-MANPADS Program has reprogrammed \$2 million in FY 2003, had appropriated \$60 million in FY 2004, and will request an additional \$60 million in FY 2005, for this development effort.

The Counter-MANPADS Program uses a robust and disciplined systems engineering approach to identify, test, evaluate, integrate and support countermeasures for commercial aircraft. The essence of the Program is to collect information from industry, select the best contractor(s) to perform systems analysis and flight tests, and to devise a plan that will permit modifications of commercial aircraft with the least disruption and out-of-service costs to the airline industry.

The Counter-MANPADS Program is working closely with the Departments of Defense, State and Treasury as well as the Federal Aviation Administration to provide Homeland Security with technical and managerial expertise, advice, assistance and detailees to support the Department's efforts to find commercial applications for military technologies.

### ***Awarding Contracts to Counter the Threat:***

In early October 2003, the Department of Homeland Security's Science and Technology division released a solicitation announcing a "call for proposals" to address this potential threat. The solicitation is the first step in the Department's two-

phase systems development and demonstration program for anti-missile devices for commercial aircraft.

- Phase I, which will begin in January 2004, will provide a detailed design and an analysis of the economic, manufacturing and maintenance issues needed to support a system that will be effective in the commercial aviation environment. This phase will last approximately six months and will end in the selection of one to two contractors moving on to the next phase.
- Phase II will include development of prototype demonstrations using existing military or commercial technology which will be subjected to a rigorous test and evaluation process. Phase II will last approximately 12 -18 months followed by a recommendation to the Administration and Congress.

Science and Technology's Counter-MANPADS program held an Industry Day on October 15, 2003 in Washington, D.C. to describe the program's procurement process. The conference, hosted by the Science and Technology division, was attended by over 200 participants from 91 organizations. The Industry Day was an educational opportunity for potential contractors to learn more about the Department's Counter-MANPADS solicitation.

Interested contractors were asked to submit White Papers and Qualifications by late October. Candidates with the most promising White Papers were invited to present oral proposals to Department representatives in December. In January 2004, three candidates were invited to participate in agreement negotiations for the Phase I of the Counter-MANPADS Program.

### ***Technological Challenges and Costs:***

Technologies developed for military or other specialized purposes are currently incompatible with commercial air fleet operations. Although underlying military technologies will be leveraged, the systems must be adapted to meet commercial operational concepts.

One likely technology that has been identified for potential commercial use is the so-called Directed InfraRed CounterMeasure (DIRCM), an infrared device that jams missile guidance systems.

Current DIRCMs cannot be easily adapted to the U.S. commercial air fleet, and must be re-engineered. The current available DIRCMs have roughly 300 hours of life before they must be repaired or refurbished. While suitable for the military or special purpose aircraft, given their maintenance and logistical infrastructure, this is not suitable for U.S. commercial air fleet use. The cost of the training, ground support equipment, supplies and spares, and logistics trail that would need to be in place at every U.S. airport would be prohibitive. Estimates put this cost at as much as \$5 billion to \$10 billion per year, a burden that the U.S. commercial air carrier industry cannot bear.

Military missile countermeasures, such as the Large Aircraft InfraRed CounterMeasure (LAIRCM) unit, which uses Directed InfraRed CounterMeasure (DIRCM) techniques, exist in various stages of development and initial fielding. The LAIRCM system defeats the threat missile guidance system by directing a high-intensity modulated laser beam into the missile seeker. However, these technologies are generally utilized by military and Heads-of-State aircraft that have the operations and maintenance infrastructure to support the systems.

The defense industry has performed limited evaluation of tower-mounted InfraRed CounterMeasure (IRCM) subsystems for ground-based applications as an alternative to airborne installation. IRCM commercialization requires tightly integrated systems engineering and development, as well as testing and evaluation of existing and emerging military equipment. Efforts to transition IRCM systems to civilian use face several limitations. The primary challenges are:

- Achieving an affordable total cost of ownership;
- Improving reliability over their military counterparts;
- Performing less labor and time-intensive maintenance interventions;
- Decreasing false alarm rates; and
- Ensuring that these devices can be safely applied in operating environments of civilian aircraft.

When evaluating the deployment of IRCMs aboard civilian aircraft, it is also important to consider the effects of using these countermeasures in civilian airspace, specifically, in populated areas. In the event of a MANPADS launch, traditional military pyrotechnic countermeasures (flares) represent a major safety hazard to property and personnel. Directed countermeasures, such as an on-board laser to disrupt the MANPADS sensor and steer the missile away from the aircraft, appear to be the most promising candidates for application to civilian aircraft. However, new pyrotechnic and pyrophoric technologies may be adaptable to commercial operations, which will be analyzed in Phase I.

While it is conceivable that existing military IRCM units could be re-engineered for civilian aircraft use, many technical and

operational tradeoffs have not been performed to address risks of such approach. For example, there is an established military logistics infrastructure that serves airborne countermeasure equipment, spanning functions from pilot training and routine maintenance to spare parts and depot repair. A similar infrastructure would be costly and time-consuming to replicate in the commercial airline industry.

It would be premature to integrate currently available military IRCM equipment aboard civilian aircraft due to numerous issues concerning aircraft modification and certification, maintenance and supportability, and operational employment. Even if IRCM equipment were retrofitted on only the Civil Reserve Air Fleet, safety of flight and IRCM operational issues abound because rigorous analytical processes have not been performed.

***Partnerships:***

Department leadership is committed to working with the key stakeholders involved in the potential deployment of a Counter-MANPADS system.

- Transportation Security Administration - conduct vulnerability assessments and work with law enforcement officials to reduce risks at major airports
- Department of State - counter proliferation of shoulder-fired missiles
- Federal Aviation Administration - certification of technology for commercial use
- Department of Defense - provide expert advise on military technology

Science and Technology staff members have a working relationship with representatives of the safety, operations, and maintenance areas of the Federal Aviation Administration, who are key to the success of this development and demonstration program.

The Department's effort also includes significant contributions from pilots, airport operators, airlines, and ground maintenance professionals. This industry input will ensure that lifecycle costs, including acquisition, integration, operation and support will be analyzed, giving all stakeholders an understanding of the total costs associated with any potential system.