S&T Stakeholders Conference

Counter-MANPADS Programs

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DHS MANPADS* Threat Summary

- MANPADS are readily available worldwide and capable of destroying aircraft.
- Civilian aircraft are easy targets: slow and predictable, with large signatures.
- Aircraft are most susceptible near airfields and when traveling below 15,000 – 20,000 feet.
- Danger zone of MANPADS attack is large:
  - Largely outside airport boundaries (greater than 60 nm).
  - Attack corridor may be up to 8 nm wide.

*Man-Portable Air Defense Systems
National Strategy: A Multi-Layered Approach

• Department of State – Non-Proliferation
  – Global weapons stockpile
  – Global export controls
  – MANPADS destruction program

• DHS/Transportation Security Administration – Tactical Operations
  – Airport vulnerability assessments and mitigation plans
  – Guidelines for identifying and reporting threats
  – Elevated alert guidelines

• DHS/Science and Technology (S&T) – Technical Countermeasures
  – Commercial transport survivability of MANPADS attack
  – Directed Infrared Countermeasure (DIRCM) systems for commercial transport protection
  – Emerging countermeasure technology (ECMT)
  – Innovative concepts – CHLOE (Kerry Wilson briefing)
Counter-MANPADS DIRCM Program

- **Phase I - Jan - July 2004 - 6 months**
  - Feasibility and preliminary design - three contracts
    - BAE Systems Team - distributed DIRCM
    - Northrop Grumman Corp Team - DIRCM pod
    - United Airlines Team - decoy flares

- **Phase II - Aug 2004 - Mar 2006 - 18 months**
  - Adapted DoD technology for commercial transport protection
  - Evaluated performance through simulations and flight tests
  - Obtained FAA Supplemental Type Certification (STC)
    - B-767 with BAE system
    - B-747 and MD-11 with NGC system
  - Developed operations, maintenance and supply procedures
  - Performed initial manufacturing/installation rate assessment
  - Completed preliminary ownership and life-cycle cost analysis

- **Phase III - Mar 2006 - Mar 2009 - 3 years**
  - Conducting in-service evaluations with FedEx MD-10 cargo aircraft
  - Plan to start passenger in-service evaluations early 2008
  - Assessing system performance and reliability
  - Completed live fire tests at White Sands Missile Range Fall 2007
  - Goal to certify performance of both systems
<table>
<thead>
<tr>
<th>BAE and NGC Counter-MANPADS</th>
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<tr>
<td>• Evolved from U.S. Army Advanced Threat Infrared Countermeasures (ATIRCM) Program</td>
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<tr>
<td>• Utilizes distributed component approach</td>
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<td>• Commercialized version consists of 12 Line Replacement Units (LRU)</td>
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<th>Homeland Security</th>
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<tr>
<td>• Evolved from U.S. Air Force Large Aircraft Infrared Countermeasures (LAIRCM) Program</td>
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<tr>
<td>• External pod contains most components</td>
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<td>• Commercialized version consists of 4 LRUs</td>
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CONOPS: Detect and Counter-MANPADS

Provides a Countermeasure for Commercial Aircraft to Defeat MANPADS During Low Altitude Flight

- MWS Detects Missile and Cues Directed Infrared (IR) Jamming Techniques
- Counters Multiple, Simultaneous Threats
- Performs Emergency Ground Notification (EGN) and Cockpit Alert
- Operates Autonomously (no action required by aircrew)
Rigorous Evaluation and Verification Process

- Digital simulations - more than one million MANPADS launches
- Hardware-in-the-loop simulations – over 4,100 tests for each system with actual missile seekers and DIRCM jammers
- Flight test – over 50 hrs of flight tests with simulated missile shots
  - B-767 for BAE system
  - MD-11 for NGC system
- Comprehensive functional configuration audit to verify compliance with system functional requirements
- Live fire tests Fall 2007
  - Over 7,100 additional hardware-in-the-loop simulations to prepare for live fire tests
Missile/Countermeasure Simulation

Motion Table With Seeker

Actual Threat Seekers

Full Motion Flight Simulator

Detailed Aircraft Models

- Flight Motion Simulator
- Laser Countermeasure
- Target Projector
- Simulation/Control
- Data Acquisition
- Data Display
- Analysis Station

Hardware-in-the-loop simulations at
Guided Weapons Evaluation Facility – Eglin AFB, FL
Aircraft on Flight Range

- Simulated missiles “fired” at aircraft
  - MWS detects “missile”
  - DIRCM defeats “missile”
  - Range provides data for performance evaluation
Live Fire Tests of BAE & NGC Systems
White Sands Missile Range – Aerial Cable Range

- 29 missiles fired at DIRCM systems on gondola-emulated B-747 IR signature
- Demonstrate ability to defeat MANPADS
- Provides data on effectiveness and performance
- Identify potential anomalies
- Objectives were met
Counter-MANPADS Live Fire Tests
Phase III In-Service Operational Evaluations

- Cargo revenue service evaluation by FedEx
  - Initiated January 2007
  - Up to 10 MD-10s operating with NGC C-MANPADS
  - About 6,000 system operating flight hours through January 2008 flying domestic routes only

- Passenger Airline revenue evaluation by American Airlines
  - Congressional direction
  - Up to three B-767s with BAE C-MANPADS
  - Up to 7,000 hours flying JFK to LAX and SFO by March 2009

- Suitability Working Group following operational evaluations
  - FAA, airlines, Boeing, Airbus, Airline Professional Associations, Passenger-Cargo Security Group, NGC, BAE, and others invited
  - Understand and contribute to evaluation approach
  - Understand and improve cost estimation approaches

- Results to be briefed to Congress and aviation community late 2009
DIRCM Counter-MANPADS

Summary

• Preliminary results:
  – Both systems capability of protecting commercial transports with some limitations that require further analysis and testing
  – System reliability still well below that required for a cost-effective solution
  – Four different FAA-certified prototype installations

• Phase III to improve performance, reduce risks, & estimate ownership costs
• Performance certification process established
• No decision to deploy
Questions?