12 April 2006

HAF/ICIOD (FOIA)
1000 Air Force Pentagon
Washington, DC 20330-1000

Federation of American Scientists
Matthew Schroeder
1717 K Street NW #209
Washington, DC 20036

Dear Mr. Schroeder

This is in response to your November 8, 2005, Freedom of Information Act request for information regarding “MANPADS: The Worldwide Threat to Aviation Conference”.

The attached documents have been reviewed and determined to be releasable.

Please direct your questions to LaSundra Bridgewater at (703) 696-7263 and refer to case number #06-0122.

Sincerely

[Signature]

JOHN M. ESPINAL
Chief, Documentation Information & Services Section

Attachments:
Responsive documents
This Briefing is Classified SECRET
4 Nov 04
AF/XORE
Major Scott "G-9" Guliherat

Equipment (ASE)
USAF Aircraft Survivability
Purpose

AFRL Efforts
MAJCOM Assessments
Missile Warning Systems
Expendables
Infrared Countermeasures
Exposure
USAF Aircraft Survivability Programs
<table>
<thead>
<tr>
<th>Total Number of Troops Used</th>
<th>Total Number of Troops Used</th>
<th>Total Number of Troops Used</th>
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<tbody>
<tr>
<td>16,667</td>
<td>3,472</td>
<td>508</td>
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<tr>
<td>59,138</td>
<td>49,444</td>
<td>6,879</td>
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<td>57,420</td>
<td>95,991</td>
<td>35,387</td>
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<tr>
<td>60,042</td>
<td>97,030</td>
<td>35,387</td>
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</tbody>
</table>

For Attack

Exposure is a Measure to Determine the Opportunity

Exposure
IR Countermeasure Techniques

- Missile track processing
- Add a modulation to aircraft signature to confuse
- Jammers
- Reactive and pre-emptive approaches possible
- A more intense / degradable source
- Seduce the missile tracker away from the aircraft with
- Decoys
- Not applicable to large transport aircraft
- Make active CM easier
- Generating track denial
- Reduce aircraft IR signature below the IR background
- Suppression
AFSOC - DIRM

DIRECTED INFRARED COUNTTERMEASURES

UNCLASS
Replacement for the QRC 84-024 Pods
Details IR MANPADS (SA-X)
AN/AAG-24(V)6
Directional Infrared Countermeasures (DIRCM)

AN/AAG-24 Overview

UCILAS
AMC - LAIRC

COUNTERMEASURES

LARGE AIRCRAFT INFRARED
The LAIRCM Solution

Common Interred Countermeasure Solution for Multirole Aircraft Platforms
Fleet of aircraft

Costly system – difficult to rapidly outfit large aircraft

(12 C-17s and 4 C-130s outfitted)

Limited number of systems fielded

Warning effectiveness (currently UAV based AAR-54)

System effectiveness limited primarily by missile test

Jammer effectiveness greater than 95% for all threats

Laser energy available in all MANPAD threat bands

Laser based DIRCM systems (LAIRCM) provide highest degree of protection available

LAIRCM
FIRST FIELDED MAY 04, 12 LARCM Lite C-17s Fielded Today

SPreads Laser Turrets Over More Aircraft in Near-Term

LARCM Lite“Lite”
for 8 key threats
> 70% effectiveness

LAIRCM "Lite"

for 8 key threats
> 90% effectiveness

LAIRCM

Coverage & Effectiveness
Acquisition Strategy

SNTLS
- Block 3: Closed Loop IRCM
- Block 2: Nexgen MWS
- Block 1: Miniature Turbines
  - Efficiency improvements for rest of 2-SSC
  - Phase II: Spiral developments to improve affordability &

UCLALS
- CLIRCM Ready
- Fully Backward Compatible
- Full Temp Range Qual (-55C to +71C)
- 25% Increase in TX aperture
- 100% Reliability Improvement
- 2.5/1 Drag Reduction
- 25% Weight Reduction
- 50% Cost Reduction
- Form Fit Replacement

Guardian

CPTA
2 Guard
4 Active Duty
6 C-130 LAIRCM aircraft fielded

LAIRCM (LAIRCM)

12 C-17 LAIRCM equipped A/C fielded (11 LAIRCM "Lite", 1 Full
end FY06)

Pursuing acceleration of fielding 59 additional C-17s with LAIRCM by

Priority = Airlift Aircraft

Increasing requirement to 444 aircraft

Recent OEF/OIF operational experiences resulted in AMC

Small Scale Contingency Force); FY05 PB funded 116 aircraft

Original requirement for 137 LAIRCM-equipped aircraft (JCS 2

LAIRCM "Bottom Line"

UCLAS
Pyrotechnic Options
Pyrophoric and
FLARES
Preemptive Programs

Hybrid (Evade) - Uses Reactive in Conjunction With

Cost and Logistics Limit Use of Preemptive Options for MAF

Preemptive - Run for a Preentered Amount of Time

Reactive - Require Auto/manual Initiation

Fire Programs

MANPADS

Provides Improved Countermeasure Performance Versus Advanced Pyrotechnic Fire Countermeasures


Pyrophoric - M-211, MJu-50, MJu-51

Fire Families
MISSILE WARNING SYSTEMS
ASSESSMENT
MAJCOM
MAJCOM
<table>
<thead>
<tr>
<th>EC-130</th>
<th>F-16</th>
<th>F-15E</th>
<th>F-15C</th>
<th>B-52</th>
<th>B-1</th>
<th>A-10</th>
<th>MWS</th>
<th>CMDS</th>
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<tr>
<td>Winter 04</td>
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<td></td>
<td></td>
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<tr>
<td>ALE-40/47</td>
<td>ALE-45</td>
<td>ALE-45</td>
<td>ALE-58 FY07-10</td>
<td>ALE-20</td>
<td>ALE-49</td>
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<td>ALE-40</td>
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</table>

- Current
- Future
- Change

CAF IRCM Plan
Navy Program

TA-DCRM

ICRM:

F-16 BOX 15 #87 on ACC UFR
F-15E BOL 15 #85 on ACC UFR
BOL Countermeasures Dispenser

Countermeasures
special material ICRM or a missile warning system with laser-based
provided by either approximately 30 minutes of continuous dispensing of cover
#44 on CAF FY06 Unfunded Requirements (UFR) List
A-10 Extended Duration Cover ICRM

Countermeasure Employment:

First aircraft installs of AAR-54 and ALE-47 in Winter 2004
EC-130 (Compass Call)

Short Term Options:

CAF Way Ahead
<table>
<thead>
<tr>
<th>Notes</th>
<th>CMD</th>
<th>LAIRC</th>
<th>MWS</th>
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<tr>
<td>43 C-17s FY09</td>
<td></td>
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<tr>
<td>24 C-130s FY09</td>
<td>AAR-47</td>
<td>LAIRC</td>
<td>AAR-47</td>
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<tr>
<td>61 C-5s have nothing</td>
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<td>ALE-47</td>
<td>AAR-54 w/LAIRC</td>
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<tr>
<td>12 KC-135s FY09</td>
<td>None</td>
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<tr>
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<td>None</td>
<td>None</td>
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</tr>
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</table>
MAF Way Ahead

Short Term Options:
- Preemptive ALE-47 – Stockpile of covert flare cocktails requires time
  - Aug '02 Test for C-130 Flare Cocktail
  - Accelerate AAR-47 (Navy) Upgrade Install – Improves Reactive ALE-47

System Status:
- LAIRCM
  - Need for 444 aircraft – 18 currently operational
  - Recommend expanding LAIRCM “Lite” for 59 additional C-17s (71 total)
  - Pursue program for LAIRCM on more C-17s, C-130s, C-5Bs in 06 POM

Flare Employment w/ALE-47:
- Coordinating Large Aircraft Defensive System CONOPS (AMC)
- Need to Develop/Procure/Field improved Advanced MWS (2-Color)
<table>
<thead>
<tr>
<th></th>
<th>CV-22</th>
<th>HH-60</th>
<th>HC-130</th>
<th>MH-53</th>
<th>MC-130</th>
<th>MC-130P</th>
<th>AC-130</th>
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<tbody>
<tr>
<td>MWS</td>
<td>AAR-47</td>
<td>AAR-47</td>
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<td>AAR-54 w/DIRC</td>
<td>AAR-44, AAR-47 w/DIRC</td>
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<td>AAR-44, AAR-47 w/DIRC</td>
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<tr>
<td>CMDS</td>
<td>ALE-47</td>
<td>AAR-47</td>
<td>AAR-47</td>
<td>AAR-47 w/DIRC</td>
<td>AAR-40 w/DIRC</td>
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<td>IR Jammer</td>
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<td>None</td>
<td>None</td>
<td>Complete on 15 act</td>
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<td>DIRCM</td>
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- Current
- Future

SOF IRCM Plan
Short Term Options:

- Reactive ALE-47 - Stockpile covert flare cocktails within 1 year
- DIRCM: On all AC-130H/U, MC-130E/H and MH-53J/M by Dec 2004

System Status

- Flare Employment w/ALE-47
- Preemptive ALE-47 Flares not an option due to ALE-40
- ALE-47 on all aircraft by CY05 (2-Color)
- Need to field improved flare cocktail
- Need to Develop/Procure/Field improved Advanced MWS
Air Force Research Lab (AFRL) Efforts
### Operational Issues
- Allow aircraft to accomplish its assigned mission
- Missile defeat
- Deny launch by disrupting/disabling sensors
- Avoid initial engagement
- Fulfill more bombs on target
- Fly places we will not fly now
- Detect threat before enemy can engage

### Benefits to the Warfighter
- System Development 1.3 6.4 16.2 15.8 14.3
- Component Tech Dev 3.5 6.8 0.6 0.5
- In-H Measurement 4.7 2.9 1.7 1.6
- DARPA Funding (SM) – 6.3 (PE 63762)

### Description
- Life and ELMS
- Countermeasure
- Threat Id
- Missile Warning & Situational Awareness
- Active & Passive EO Capability

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**Aircraft (MEDUSA)**

**Multi-Function Electro-Optics for Defense of US**

**UCLAS**
**Operational Issues**

- Initial funds needed to complete demonstration
- Use USAF DUSAT vehicle requiring 50% cost share with industry
- Dives to lower cost of Laser ICM systems below $1m in production of 100 units or more
- Integration over many platforms

**Technology**

- Visible band missile warning sensors
- Semi-conductor and fiber ICM lasers
- Pulse synchronized agile track camera
- Micro-turrets with single optical path

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### Benefits to the Warfighter

<table>
<thead>
<tr>
<th>Description</th>
<th>DOE Funding</th>
<th>IRBM Funding</th>
<th>DARPA Funding</th>
<th>AFRL/SEI Funding</th>
<th>AFRL/SEI Test</th>
<th>WARRAP</th>
<th>Track Cameras</th>
<th>ICM Lasers</th>
<th>Micro-Lasers</th>
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</tbody>
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**Technology Investment Schedule (FY)**

**System (ALISS)**

Affordable Laser ICM Survivability

UNCLASSIFIED
included in FY05 AF Unavoided Priority List

- Evaluate Investment Strategy (Status: LAIRCM-Lite acceleration)
- Follow direction of MAJCOM EW Roadmaps, continue to share settings
- Standardized approach and departure tactics, created "Evade"
- Develop TTPS to mitigate MANPADS (Status: AMC MANPADS (Status: CONOPS drafted))
- Develop CONOPS for protective zone around bases to mitigate
- Recommendations:
  - CSAF signed-off on briefing read-ahead
  - Freedom
  - Briefing to CSAF was pre-empted by start of Operation Irak!

- A working group to provide CSAF a "Quick Look" at

Project Romulus
UNCLAS

Counter-MANPADS Interagency Task Force

- Resulted from 27 Nov 02 Mombasa, Kenya incident
  - Directed by the Homeland Security and National Security Advisors

- Organized into four working groups:
  - MANPADS Proliferation Control and Threat Reduction
  - Tactical Measures and Recovery
  - Technical Countermeasures
  - Information/Public Affairs Strategy

- ASD/HD is the primary DoD representative to the Task Force
  - A key DoD contribution to the Task Force was the DoD MANPADS Study
Summary

AFRL Efforts
MACOM Assessments
Missile Warning Systems
Expendables
Infrared Countermeasures
Threat

USAF Aircraft Survivability Programs