Homeland Security
Implementation Strategy and Interagency Management Approach for MPAR

Multi-functionality—Agency Needs, Priorities, and Principles of Operation

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FRUSTRATING

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(This cover sheet is a waste of paper)

FRUSTRATING

NSN 1000-or more-wasted man-hours

STANDARD FORM Trash-Me-Now
Prepared by: MAD WASTED TIME
Caution: These diagrams have not been technically reviewed for official release.

Note: GREEN radar plots are search and beacon reinforced targets; RED plots are Beacon-Only; and BLUE plots are Search-Only.
Customs and Border Protection (CBP)

- Detect airborne and maritime terrorist/smuggling events and their associated illegal alien and contraband cargos
- Covert tracking devices
- Enforce borders at Ports of Entry and between Ports of Entry
Air and Marine Operations Center (AMOC)

• 24-hour multi-agency operations center
• Provide direct support to Homeland Security in protecting the American people and our national borders through the detection and identification of transnational threats and coordination of law enforcement air and marine forces.
### Domestic Air Defense and Security Problem Space

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<th>Point Defense</th>
<th>Border Defense</th>
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<td><strong>Conventional Threats</strong></td>
<td><strong>NCR Defense</strong>&lt;br&gt;- Suicide aircraft</td>
<td><strong>Legacy CONUS Defense</strong>&lt;br&gt;- Foreign aircraft attack&lt;br&gt;- Counter-smuggling&lt;br&gt;- Narcotics / terrorism</td>
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<td><strong>Advanced Threats</strong></td>
<td><strong>NCR Advanced Defense</strong>&lt;br&gt;- Cruise missile</td>
<td><strong>National Cruise Missile Defense</strong></td>
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- Diversity of air defense and security problems; architectures and technologies needs differ
- Assessment objective to guide DHS air security investments
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<th>DHS Need</th>
<th>Roadmap Addressing</th>
<th>Comment</th>
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<tr>
<td>Border Surveillance</td>
<td>Siting, HW testing, M&amp;S, environmental measurements. Signal processing.</td>
<td>View to remote northern borders. Sig. Pro. to reject noise from urban areas.</td>
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<tr>
<td>Inland aircraft tracking</td>
<td>Improving sensitivity, accuracy and height finding</td>
<td>Height finding is significant issue</td>
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<tr>
<td>Maritime domain awareness</td>
<td>Improve ability to track slow targets by improving clutter rejection</td>
<td>Could be lower cost system if focus is here rather than CM</td>
</tr>
<tr>
<td>Cost</td>
<td>System Engineering, M&amp;S, signal processing</td>
<td>How big does it have to be to be effective?</td>
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</table>
Example Cross Border DHS Threats

- Slow, low flying aircraft
- Rapid, Remote Cargo Transfer
- Non-descript Escape vehicle

~ 5 minutes (AMOC)

Architecture required combining air detection, intercept, and ground tracking
The Slash

• The Northern Border Slash provides a unique window for detection of illegal crossings/activity

• Rough terrain and diverse environmental conditions present unique challenges to sensor mix decisions
Air Surveillance Needs

• Wide area, persistent, low altitude surveillance coverage
  – 200 ft over most terrain
  – 50 ft over large flat areas

• Detect small general aviation aircraft
  – 0 dBsm radar cross section

• Surveillance reach across border
  – Sufficient to allow scramble / intercept at border

• Track accuracy sufficient for interceptor handover

• Surveillance coverage sufficient to permit threat conditioning

  • Air surveillance architecture has significant requirements.
    - Low altitude, persistent coverage providing warning and intercept handover.
  • OTHR potentially attractive option for Northern Border surveillance; challenges remain.
Air Surveillance Options

Look-up Sensors
- FAA Radars (ARSR, ASR)
- Military Radars (Sentinel, SPY-3)
- Multiple Use Radars (MPAR, LSTAR)
- Passive (Silent Sentry, Acoustic)

Look-down Sensors
- Aerostats (TARS, JLENS)
- Manned Airborne (AWACS, P-3)
- Unmanned Airborne
- Over-the-horizon Radar (ROTHR)

Not Considered
- Space Based Radar - Cost and coverage issues
- Surface wave radar - Over water applications
DHS Remote Sensing Goals

• Augment other sensors at borders and interior to the US

• Track to the ground at borders
  – Limited target masking by terrain features (high grazing angles)
  – May require site(s) north of Texas to keep grazing angles high

• Step-scan plus wide-area surveillance modes
  – Rapid revisit rate/track while scan
  – Perhaps 2-3 wide area dwells to cover region during good propagation conditions

• Robust detection & track independent of ionospheric propagation
  – Unpredictable daily, annual and solar cycle variations in performance.
  – Revisit rate can be compromised during poor conditions

• Absolute accuracy to support fusion and relative accuracy for interdiction

• Track through maneuvers/poor geometry

• Provide target classification

• Limited number of large sites
Northern Border Coverage

Northern Border Challenges

- Poor low altitude coverage
- Few air stations
- Dense air traffic
- Very long border
- Mountainous terrain

Estimated Coverage

- 200 ft target
- 250 Kt target
- Cessna 550 interceptor
- 9 minute scramble
- 0 dBsm target
- ARSR and estimated Canadian radar coverage

Northern Border Challenges

Target Visibility †

- > 90 Percent
- 50-90 Percent
- < 50 Percent
- No Detection

Required persistent low altitude surveillance compatible with border geography and air traffic
Summary

• Effective border air security requires integrated architecture
  – Improved air surveillance enabling warning and at-border intercept one element

• MPAR has a potential role in meeting DHS surveillance needs

• Improved MPAR models required to more quantitatively assess performance & improvements from proposed advanced sensing technologies
Information Sharing/Collaboration

So you think you’re collaborating…*

Collaboration = Collaborative Information Environments
Two or more humans cooperating in such a way that the result is a mutual creation reflecting notable insight, skill, or intellect
- Requires human interaction (so far)
- A creative process resulting in something that did not exist previously

Coordination
The regulation of diverse elements into an integrated & harmonious operation
- A control process designated to achieve cooperation

Cooperation
Working together on a common goal or task
- Possible to cooperate while maintaining ultimately separate interests

Information Sharing
The basic act of providing information to others
- Independent of how others will use that information
- Requires no cooperation or shared objectives

*…when you’re really just sharing information
Contact Information

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Questions - Discussion
Current CONOPS for DHS Engagement

Current CBP Engagement Chain

1. Detect
   - Skin and beacon
   - Low altitude
   - No beacon
   - Avoid sensors

2. Track
   - Border to landing
   - Long flight
   - Mountain flight

3. Discriminate
   - Targets of interest
   - False flight plan

4. Land
   - Flight plan specific
   - False flight plan
   - Remote airport landing
   - Field ditching
   - Air drop

5. Search
   - Inspect cargo
   - Low inspection rates

Potential Evasion Modes

Current air security architecture is being defeated at multiple steps.
• ARSR coverage  • 200 ft target  • 250 Kt target  • Cessna 550 interceptor
• 9 minute scramble  • Canadian radar estimated coverage

Desired cross-border surveillance extent

Current low altitude coverage is very limited and does not support intercept at border.

† Potential station needed for Northern border air security
## S&T Divisions: Customers & Portfolios

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**Awareness – Prevention – Protection – Response - Recovery**
DHS S&T Directorate: Customers

Federal
• DHS Office of Intelligence and Analysis
• Director of Counternarcotics Enforcement
• Federal Law Enforcement Training Center
• Domestic Nuclear Detection Office
• Transportation Security Administration
• Customs and Border Protection
• Immigration Customs Enforcement
• Citizenship and Immigration Services
• Federal Emergency Management Administration
• U.S. Secret Service
• U.S. Coast Guard

State, Local and Tribal
• First Responders
• Law Enforcement
Air and Marine Operations Center (AMOC)

- 24-hour multi-agency operations center
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Primary Discussion Areas for Consensus

- **Sufficient Feasibility to Establish Risk Reduction Program**
  - Surveillance mission - need compelling operational application demo

- **Implementation Strategy:**

  Initial Priority Risk Reduction Areas:
  - Technology Demonstration & Testing
  - Multi-functionality and Testing
  - System Costs – Business Case
  - Trade Studies

  Demonstration Points & Early Results?
Primary Discussion Areas for Consensus

- Interagency Management Approach
  -- Format:
    --- OMB/OFCM past NEXRAD process (OMB/OFCM-NPC/JSP0)
    --- Multi-Lateral Agency
    --- PD/Congressional Mandated
  -- Address Urgency Issues