Title: Risk Assessment Profiling Procedure (RAPP) for Air Cargo Security

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1. Objective of research

- Introducing a new security process for air cargo originating from both Low and High Risk countries – Risk Assessment Profiling Procedure (RAPP) for air cargo security.

Less technological screening of cargo shipments
2. Overview on air cargo security after 9/11

- Post 9/11: Special focus on air passenger security, less focus on air cargo security.
- Cargo is loaded on both all-cargo airplanes and passenger airplanes

Terrorists try to bypass the strict air passenger security and **target the cargo instead**
2. Overview on air cargo security after 9/11

2.1 Air cargo supply chain:

Source: Bart (2010), ICAO (2013)
2. Overview on air cargo security after 9/11

2.1 Air Cargo Supply chain:

**Known Consignor:**

- Originates the shipment for its own account
- Follows security rules and standards

**ACC3:**

- Security requirements set by the European Union for air cargo carrier or mail carrier for transporting goods from a third non-EU state.

Sources: Department of transport, tourism and sport (2010), Macario et al. (2012).
2. Overview on air cargo security after 9/11

2.2 Different approaches:

**Unites States:**
- 100% technological screening for cargo on board passenger planes

**European Union:**
- No technological screening if the cargo originates from a known consignor with a secured supply chain
- ACC3 is mandatory

2. Overview on air cargo security after 9/11

2.3 Technology resources:

X-RAY machines:  

Limitations:

1. X-ray does not detect explosives.
2. Non-effective for high density and nonidentical shipments
3. Dependency on the qualities and the experience of the machine operator

Source: Crowely and Butterworth (2007)
2. Overview on air cargo security after 9/11

2.3 Technology resources:

X-RAY machines:

4. Objects are difficult to recognize when depicted from an unusual viewpoint.

Source: Schwaninger (2009)
2. Overview on air cargo security after 9/11

2.3 Technology resources:

**Explosive Trace Detector (ETD):**

<table>
<thead>
<tr>
<th>Limitations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Non-effective if shipment surface is not contaminated with explosives</td>
</tr>
<tr>
<td>2. Non-effective if a sample is taken poorly</td>
</tr>
</tbody>
</table>

Source: Crowely and Butterworth (2007)
3. Passenger profiling

3.1 The Israeli method of passenger profiling:

Risk assessment tool for detecting terrorist method of operation

Principles:

- Increasing the role of the Human factor.
- Analyzing the threat by determining the level of risk.
- Adjusting the right technological tools in accordance to the risk level.
- Focusing on suspicious passengers.

3. Passenger profiling

3.2 Passenger profiling - suspicious signs

<table>
<thead>
<tr>
<th>Behavioural signs</th>
<th>Passport signs</th>
<th>Nationality signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nervousness</td>
<td>5. Passengers who do not speak the language of the country issuing the passport</td>
<td>8. Country of citizenship</td>
</tr>
<tr>
<td>2. Lack of cooperation with the airport security officer</td>
<td>6. Passengers who do not match the passport photo or physical description entered</td>
<td>9. Country of residence</td>
</tr>
<tr>
<td>3. Contradictory statements</td>
<td>7. Passengers who have different names in the passport and the flying ticket</td>
<td>10. Ethnicity</td>
</tr>
<tr>
<td>4. Avoidance of answering</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Air cargo profiling

4.1 Risk Assessment Profiling Procedure (RAPP) for air cargo security

- Assessing the risk
- Determining the terrorist method of operation
- Adjusting the right technological screening

- Differentiation between cargo originating from low and high risk countries
- Full use of the known consignor and ACC3 programs
- Unique air cargo suspicious signs detected from the freight’s documents and the external look of the shipment
4. Air cargo profiling

4.2 Air cargo - suspicious signs

<table>
<thead>
<tr>
<th>Physical characteristics of the package</th>
<th>Dispatching mistakes</th>
<th>Anomalous patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unusual odors</td>
<td>5. Poorly or illegibly typed or written addresses</td>
<td>10. Unexpected packages mailed from outside the United States</td>
</tr>
<tr>
<td>2. Sealed with excessive tape</td>
<td>6. Use of incorrect titles</td>
<td>11. Restrictive markings destined for a specific, high-profile person</td>
</tr>
<tr>
<td>3. Lopsided or uneven shape</td>
<td>7. Mailed with excessive postage</td>
<td></td>
</tr>
<tr>
<td>4. Indications of liquid/powder leaking from the package</td>
<td>8. Addresses misspelled or containing only titles of recipient</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. No return address</td>
<td></td>
</tr>
</tbody>
</table>

Source: Department of Homeland Security (2010a),
RAPP for cargo originating from Low Risk countries

Has the shipment originated from a Known consignor or ACC3?

After Profiling, has the agent concluded that neither suspicious signs nor anomalous patterns were found?

Risk Assessment center: sorting the shipment according to three risk-level categories:

1. Low Risk: Has technological screening denied the existence of explosives?

2. Medium Risk: Has technological screening denied the existence of explosives?

3. High Risk: shipment reasonable? Has technological screening denied the existence of explosives?

Is the supply chain secured and shipment has not been tampered?

Cargo can be loaded

Cargo cannot be loaded
Has the shipment originated from a Known consignor or ACC3?

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Cargo can be loaded

Cargo cannot be loaded
5. Case study - 2010 printer plot from Yemen

Has the shipment originated from a Known consignor or ACC3?

After Profiling, has the agent concluded that neither suspicious signs nor anomalous patterns were found?

Risk Assessment center: sorting the shipment according to three risk-level categories:

1. Neither ACC3 nor Known-Consignment
2. Fictitious Adressee
3. Content and type of goods shipped.

RAPP would have detected the suspicious printers

3. High Risk: shipment reasonable? Has technological screening denied the existence of explosives?

Cargo cannot be loaded
6. IT profiling

The Goal: Creating an IT-Profiling system for air cargo security.

1. Run air cargo suspicious signs Algorithms on the freight’s documents
2. Combine real-time intelligence reports Algorithms
3. Check for already known-information Algorithms

Generate Risk- Percentage: 0-100% Risk
Known consignor / ACC3

1. Low Risk (0-15%)
   - Is the supply chain secured and shipment has not been tampered?
   - Cargo can be loaded

2. Medium Risk (14-40%)
   - Cargo can be loaded

3. High Risk (41-100%)
   - Cargo cannot be loaded
7. Conclusion

- **RAPP enhances** the level of **air cargo security**

- **Pro-active** approach

- RAPP enables to find ‘*the needle in a haystack*’

- **Integrate IT solutions:**
  What role would IT have on optimizing the profiling process?
Declaration

• The information and interpretations shown in this presentation as well as written in the paper are based on non-classified sources, which were gathered from open sources.

• The paper has been selected for publishing in the *Journal of Air Transport Studies*
References


References


References


Morrel, P.S. (2011), Moving Boxes By Air: The economics of international air cargo, Ashgate, Farnham Surrey.

