Current and Future Security Screening Technologies for the Air Express Cargo Industry
Express requirements – the EEA study

Rationale for our study

• Existing and potential technologies to ensure compliance with air cargo security requirements

• Predominant focus on passenger screening technologies, need for air cargo-specific technologies

• Express cargo business model has specific needs
The Express Cargo model
Setting the scene

- **Time Definite Delivery** in specific timeframes (12 h to 72 h)
- **Very large volumes**: 100 K - 1 M shipments per night (expected increase 6.2% p.a.)
- **Very fast handling**: Hubs operate in a 4 h to 5 h window
<table>
<thead>
<tr>
<th>Screening Methodologies</th>
<th>Hand Search</th>
<th>Visual Check</th>
<th>X-Ray</th>
<th>EDS</th>
<th>EDD</th>
<th>ETD</th>
<th>Metal Detector</th>
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</thead>
<tbody>
<tr>
<td>Need to open shipment</td>
<td>X</td>
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<td>Inefficient as a sole method</td>
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<td>Footprint</td>
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<tr>
<td>Additional licenses required</td>
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<td>X</td>
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<tr>
<td>Shipment size limit</td>
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<td>X</td>
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<td>Availability &amp; recognized in all countries</td>
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<td>X</td>
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<td>Long processing time</td>
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<td>Not fit for core Express customers/commodities</td>
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</table>
Stakeholder position

Express Industry

- Access to new technologies – high throughput, cost-efficient, space-efficiency and low false alarm rate
- International approval of screening equipment
- (Global) harmonization of screening requirements
- The ability to screen different types of cargo
- More R&D innovations
Stakeholder position

Screening equipment manufacturers

Hesitant to invest in R&D activities for cargo

- Small fragmented markets
- Regulatory uncertainty
- Slow approval process (health & safety)
- High costs of technological innovation

Regulator

- Want secure and efficient air (express) cargo supply chain
- “If something needs to be done in a specific way, that`s the way to go”
- Regulatory framework enables trials of promising new technologies
- When there is a sufficient evidence about the performance of a new method, the regulator takes a look on the regulations and decide which change is necessary
Solutions approaches

1. **Adding Screening Machines**
   
   Impact = increase in capacity, increase in cost, equal performance and increase in required space

2. **Improving existing equipment detection capability**

   Reduce false alarms
   - Improved screeners for x-ray systems
   - Improved algorithms (EDS systems are optimized in screening hold-luggage)
   - Improved hardware (segregation of materials and shape - multi energy detectors)

   Reduce dark alarms
   - Improved hardware (variable, adjustable energy levels)
   - More views (reducing shielding, ideal = CT machines)

   Impact = increase in performance, in capacity and decrease in labour cost
3. Increasing machine capacity

Increase “belt speed” of screening equipment

Consolidation screening (drawback = alarms resolution)
• Before (truck level) or after sorting process (ULD level)

Options
• Remote screening (several screeners on same equipment)
• Improve electronic components, improved algorithms,
  CT - mechanical improvements linked to rotational speed of gantry
• Radiations: X-ray, gamma-ray, fast neutron radiography combined with automated threat recognition
• Hyphenated techniques for ETD
• Vapor detection at transport unit level.

Impact = increase in capacity, impact on cost, smaller footprint
4. Reducing number of consignments to be screened

- Risk based approach (exemptions)
- Low cost first level filters
  - Electronic component detection
  - Auto clear capacity

Impact = increase in capacity, decrease in cost
Enabling regulatory pre-conditions

• For some of the solution approaches, the EU regulation will have to be adapted or new regulation has to be developed

**Regulatory - Harmonization**

Countries should agree on:

• threat appreciation (perception of threat)
• mitigating measures (detection by technology is part of a layered approach)
• detection technologies (which technology, for which threat and when)
• detection performance standards (acceptable risk level?)
• harmonized test methods (mutual recognition would not be required anymore)
• harmonized certification of testing methodology/scheme (international test centers?)

(There have been and are initiatives addressing one or more of the conditions mentioned above)

Have an international list of approved equipment
Conclusions

• X-ray imaging equipment, EDS, EDD and ETD particles are mainly deployed in express cargo business today but combination of methods are required in a number of cases. However, not all of these methods are allowed in all Member States.
• The identified developments in screening equipment are not specifically focused on express cargo applications.
• The design of the associated test method determines for which application the equipment will be optimized, and currently most test methods are passenger and baggage oriented.
• Consequently, equipment manufacturers are mainly focused on passenger and baggage screening applications. As a result, the available screening equipment is not dedicated to application in express cargo.
• Technology manufacturers feel restrained to invest in R&D activities for air express cargo sector.
**SHORT TERM**

- Ensure express cargo community is involved in the analysis, development and testing of new technologies, including for passenger security screening technology that are likely to be applied to cargo screening.
- Improve existing technology ensuring that specific algorithms are developed for cargo.
- In order to develop and implement these technologies, some enabling regulatory preconditions must be met.
- Consider EU/National funding instruments for research in cargo-specific screening technologies.
EEA Recommendations

MEDIUM/LONGER TERM

• (Global) harmonization of regulation and certification processes will lead to a defragmentation of the market from which both the express cargo industry and the equipment manufacturers will benefit.
• Consolidated screening is considered to be a promising solution for air express cargo with an expected increase in capacity and a reduction in need of space and costs. This can be achieved by several near mature technologies:
  • High energy x-ray or gamma-ray in combination with automatic threat recognition
  • Fast Neutron Radiography
  • High Volume Sampling in combination with high sensitive explosive vapour detection equipment
THANK YOU