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Innovative Research Call 2023 for Explosives and Weapons Detection

Goods



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Goods Scenarios

- Screening for a threat item within:
 - Scenario 1: Large vehicle loaded with variable sized consignments
 - Scenario 2: Pallet sized bulk goods
 - Scenario 3: Fast throughput, small volume consignments



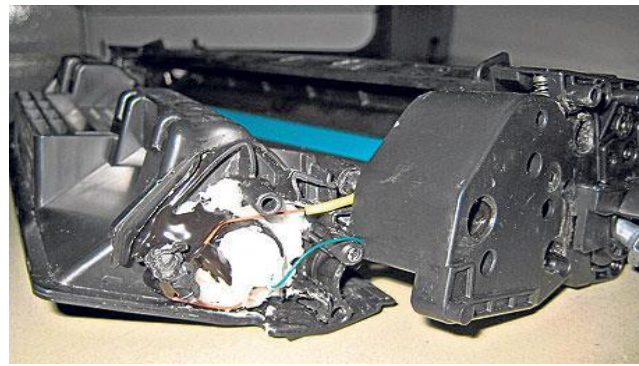
Goods Scenarios

- Screening for a threat item when:
 - Crossing a border
 - Entering a restricted area
 - Being delivered or sorted
- Border includes:
 - Airports
 - Eurotunnel/Rail Freight
 - Maritime (containers/Ferries)
 - Postal



Threat Items

- Improvised Explosive Devices
- Explosives Precursors
- Weapons
- Undeclared Dangerous Goods (secondary)



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General Considerations

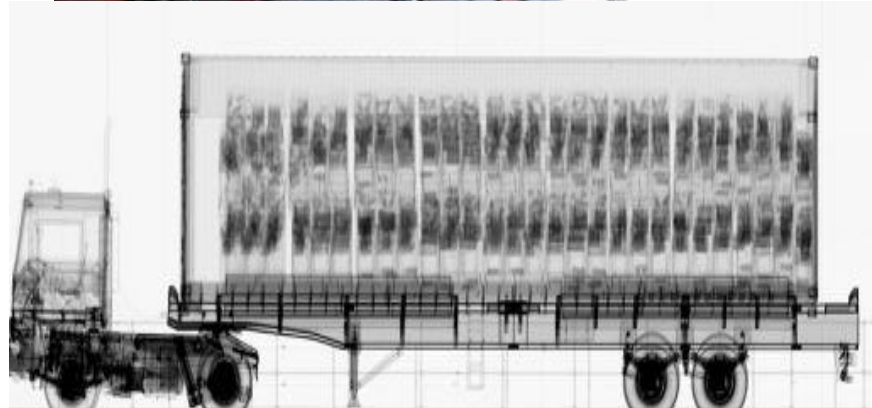
- Complex consignments
 - Complex metal and organic clutter
 - Dense contents
- Respond to new threat materials/concealments
 - Concealment in (or as) a legitimate object
- Maintain communications
 - Provide all information on detection (what, where) for resolution search



Scenario 1 – Large Goods Vehicle



Scenario 1 – Current Capability



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Scenario 1 – Capability required

- Screening a whole consignment without removal from delivery vehicle (if quicker than unloading)
- Faster screening of vehicle load areas
- Screening of densely-loaded vehicles or pallets without breaking them down into smaller parts
- Less reliance on human interpretation or intervention
- Maintaining any vehicle security seals



Scenario 1 – Large Goods Vehicle

- Vehicle type
 - Shipping Containers, Flat bed Lorry, Curtain-sided trailer
- Goods type
 - Unlimited variation
- Screening time
 - Entry checkpoint - less than 2 minutes
 - Delivery of stores - up to 10 minutes per vehicle



Scenario 1 – Large Goods Vehicle

- High probability of detection required
 - High assurance
 - Location and what.
 - A solution requiring multiple search techniques could be proposed
- Acceptable false alarm rate
 - As low as possible
 - A higher rate may be acceptable if alternative resolution techniques are available



Scenario 2 – Palletised goods



Scenario 2 – Current capability



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Scenario 2 – Capability required

- Faster screening of consignments
- Ability to screen dense and/or thick goods
- Ability to screen small areas of high-density in a larger consignment
- Less reliance on human interpretation
- Reduce false-positives and the need to open boxes
- Screen consignments without further breaking down
- Health and safety and insurance considerations (desire to avoid opening)



Scenario 2 – Pallet goods

- Container
 - Typical maximum 1m x 1m x 1.5 m
 - Cardboard boxes, wooden boxes, plastic flight cases, metal barrels, plastic wrapping etc.
- Goods type
 - Highly variable
 - Liquid barrels, combined household goods, machine parts, food deliveries, chilled containers etc.



Scenario 2 – Pallet goods

- Screening time
 - 5 minutes per consignment including any load, unload and positioning.
 - Faster is better
- Probability of Detection
 - High assurance needed before accepting the consignment as cleared
 - Additional resolution techniques could be employed as part of a system



Scenario 2 – Pallet goods

- Acceptable false alarm rate
 - The proposed solution should result in less than 10% of non threat consignments as suspect.
- Resolution of suspect consignments
 - A low percentage (maximum 10%) could be held for a longer period of time to conduct more in depth investigations.
 - A resolution technique could be proposed as part of the solution but is not necessary



Scenario 3 – Fast Parcels and Post



Scenario 3 - Current capability



Scenario 3 - Capability required

- Very fast screening of consignments required
- Screening can be slower if you can pre-screen and select for longer interrogation
- Less reliance on human interpretation
- Less reliance on imaging techniques
- Low false positive rate
- Not opening consignments is desirable



Scenario 3 – Fast Parcels and Post

- Packaging
 - From a letter to 1m x 1m
 - Cardboard boxes, plastic wrappings, jiffy bags, etc.
- Goods type
 - Large variety of contents
 - Typically less dense contents than other scenarios, but not always



Scenario 3 – Fast Parcels and Post

- Screening time
 - 5s maximum, less than 1s preferred
 - Non-cleared packages to be identified and resolved by a parallel procedure to allow continuous screening
- Probability of Detection
 - High assurance needed before entering a secure building or mode of transport
 - Additional resolution techniques could be employed as part of a system



Scenario 3 – Fast Parcels and Post

- Acceptable false alarm rate
 - The proposed solution should result in less than 1% of non threat consignments as suspect.
- Resolution of suspect consignments
 - A low percentage (maximum 1%) could be held for a longer period of time to conduct more in depth investigations.
 - A resolution technique could be proposed as part of the solution but is not necessary



General Constraints

- Footprint of screening equipment
 - Often defined by existing layout and processes
 - Throughput linked to space constraints and the operating environment
 - If integrating into a process, speed must not be a detriment.
- Cost and staffing
 - Technology should not increase staff requirement
 - Energy and maintenance costs will be considered
 - Equipment should be useable by “non-experts”



Final Considerations

- Goods are very diverse
- A solution that applies to only a small proportion of the problem may be acceptable
- Very high up-front cost is difficult to justify unless the process will deliver a major increase in throughput or capability



Questions for panel



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