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S&T Stakeholders Conference

Checkpoint Explosives Detection

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PARTNERING FOR A SAFER NATION

Checkpoint Explosives Detection

- Working to develop technologies to screen passengers, carry-on and checked luggage, and cargo
- Increasing detection capability, including for liquid explosives
- Improving screening system throughput, capacity, reliability and effectiveness while minimizing false alarm rates, cost and labor
- Working to decrease passenger retention time while reducing intrusive searches of passengers

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Topics

- Current Checkpoint Approach and Recent Deliveries
- Current Programs
  - Whole Body Imaging
  - Homemade Explosives
  - Automated Baggage Screening
- Checkpoint of the Future

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Current Checkpoint Approach and Recent Deliveries

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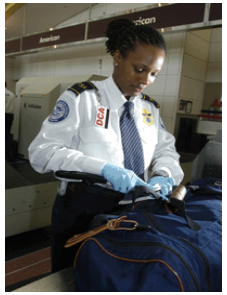
Explosives Detection: Current Approach



Checkpoint: Carry-On Bag Screening

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Checkpoint: Recent Delivery

- CastScope
- SmartCheck
- Secure 1000
- Backscatter Privacy Algorithms
- Checkpoint EDS: Analogic COBRA

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Checkpoint: Recent Delivery

- Smiths Trace Portal
- GE Trace Portal
- Trace Contamination Studies - Turban, Shoes, Hands, Suicide Bomber
- Hardened ETD - Smiths 500DT, Smiths Sabre 4000, GE Itemizer 3, GE Mobile Hand Held Vapor Tracer

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Checkpoint: Recent Delivery

- **New technique to increase X-ray screener performance: X-ray Priming Method (XPM)**
  - **The XPM primes the screeners attention system to expect a higher threat frequency**
  - **The XPM requires 2-3 minutes, on a separate computer, just prior to X-ray screening**
  - **In lab studies, the XPM cuts in half the performance loss created by low threat frequencies, without affecting false alarms rates**
  - **TSA's Office of Operational and Technical Training is starting a pilot test of the XPM**

- **New method of X-ray screener training: Discrimination Training Method (DTM)**
  - **Novel technique based on principles of human perception and memory of threat features**
  - **The DTM increased hit rates with no change in false alarm rates in lab studies**
  - **Delivered DTM and conducted small pilot test at six US airports**

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Current Programs

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Whole Body Imaging

Detecting explosives and weapons at fixed checkpoints

Objectives:

- Detection of threats on personnel before they are admitted into a controlled area
- Checkpoint applications for aviation, mass transit, entertainment/sports venues, or meetings

Projects:

- Non-Ionizing (Radiation Safe) Whole Body Imager for aviation checkpoints
- Passive Terahertz Camera for standoff personnel screening
- Personnel radar detection technologies for mass transit screening

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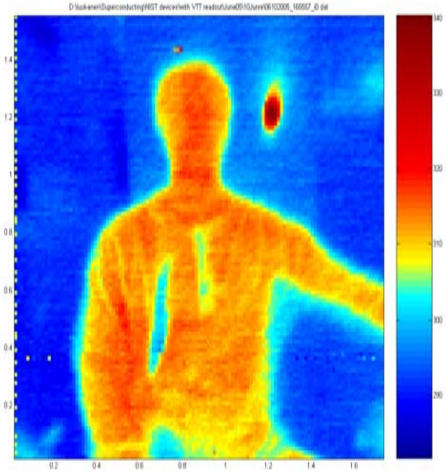
Whole Body Imaging:

Non-Ionizing Whole Body Imaging

Artist's Depiction of Portal



Prototype Human Image Data

Product Description:

New technology to safely (radiation safe) screen aviation passengers for explosives and weapons.

This technology will serve as a primary aviation screening tool, with a throughput of 200 to 250 passengers per hour. This may be a portal or a standoff system with a range of 3 to 15 feet.

Payoff:

High throughput, radiation safe screening of people for small (aviation weight) threats that is automated to assist screeners.

Deliverable: Laboratory proven prototype in 3-5 years.

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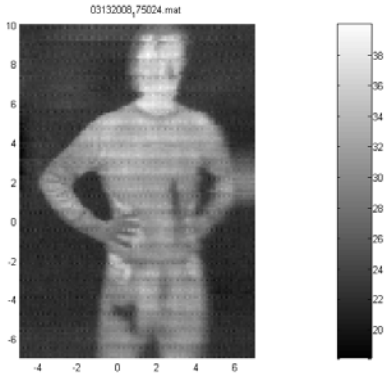
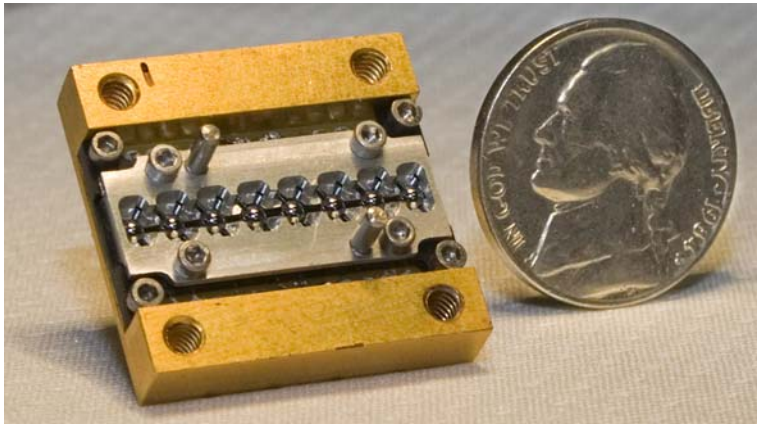
Whole Body Imaging:

Passive Terahertz Camera



First image from camera



Miniaturized Sensor

Product Description:

New technology to safely screen personnel for explosives and weapons.
This technology will serve as a tool for resolving threats from non-threat items in a checkpoint or standoff venue.

Payoff:

High throughput, passive screening of people for explosives and weapons

Deliverable: Laboratory prototype at the end of FY08.

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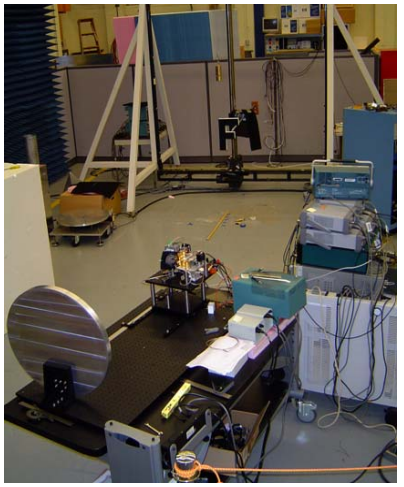
Whole Body Imaging:

Personnel Radar Detection Technology

Stand-off Imaging Concept



Laboratory Proof-of-Concept

Product Description:

New technology to safely screen personnel for explosives and weapons.
This radar technology (active gigahertz) will serve as a tool for detection of suicide bombers in checkpoints, mass transit, or public events.

Payoff:

High throughput, standoff detection with low nuisance alarms.
Technology to accurately detect explosives and weapons at a distance of 25 feet.

Deliverable: Laboratory prototype in FY09.

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Homemade Explosives (HME)

Detection of homemade and liquid explosives at fixed checkpoints

Objectives:

- Detect improvised explosives (homemade and liquid) before they are admitted into a controlled area
- Screen liquids without removal from luggage or parcels
- HME screening technologies for aviation, mass transit, entertainment/sports venues, or meetings

Projects:

- Bottle Screening Devices for aviation checkpoints
- Portable liquid detection technologies
- Non-contact trace (chemistry) detection for automated screening

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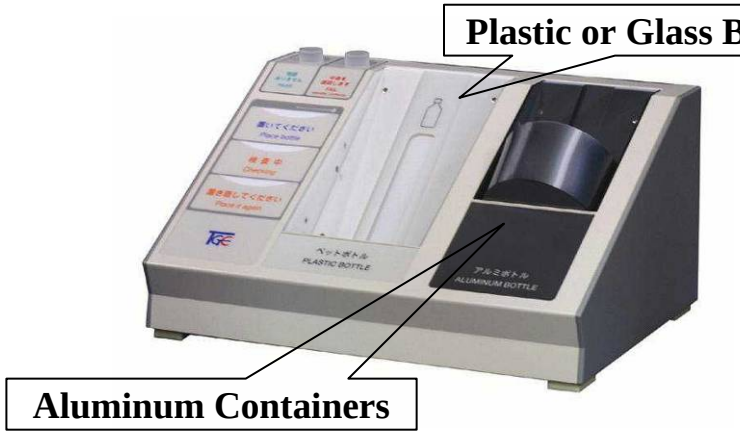
HME:

Bottle Screening Devices



Commercially available bottle screening devices

Product Description:

New technology to screen bottles for liquid explosives without having to open the bottle.
This effort will work with industry to mature commercial equipment to enhance detection and to reduce the number of nuisance alarms.

Payoff:

Highly accurate screening of bottles to ensure they do not contain liquid explosives.

Deliverable: Laboratory proven technology transitioned to TSA in FY09.

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HME:

HME Detection Technologies

Portable equipment for screening bottles

Product Description:

Portable technologies to screen bottles and liquid medical essentials for explosives.
This effort will work with industry to mature commercial equipment to enhance detection and to reduce the number of nuisance alarms.

Payoff:

Portable technology to screen single bottles and medical essentials to ensure they do not contain liquid explosives or flammables.

Deliverable: Laboratory proven technology transitioned to DHS Components in 2 to 4 years.

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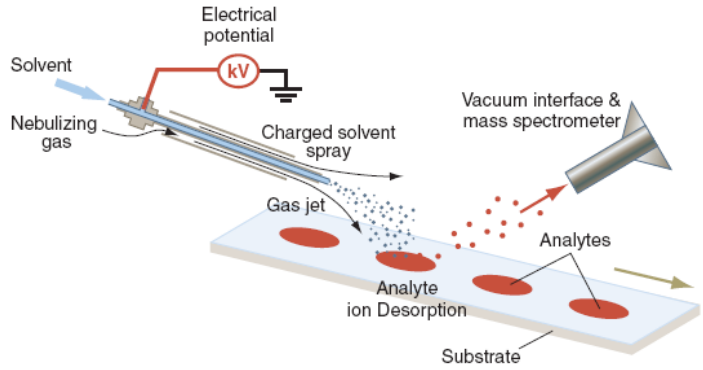
HME:

Non-Contact Explosives Trace Detection



Advanced Chemistry for Detection

Mass Spectroscopy Analysis

Product Description:

Portable and semi-automated technologies to screen people and their articles for homemade explosives, before they are admitted to a controlled area.

This technology will permit screening from a short distance (without contact) using proven chemistry approaches.

Payoff:

Portable technology to perform trace (chemistry) detection without the use of swabs.
Technology with higher throughput, enhanced detection, and reduced costs of consumables and labor.
Advanced technology to detect particles and the vapor from homemade explosives.

Deliverable: Laboratory proven technology transitioned to DHS Components in 2 to 4 years.

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Automated Baggage Screening

Detection at fixed, fully automated checkpoints to assist screeners

Objectives:

- Detect improvised explosives (homemade and liquid) before they are admitted into a controlled area
- Screen liquids without removal from luggage or parcels
- HME screening technologies for aviation, mass transit, entertainment/sports venues, or meetings

Projects:

- Automated Explosive Detection System (EDS) for checkpoints

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Automated Baggage Screening

Prototype Checkpoint EDS by Reveal Imaging

Prototype Checkpoint EDS by Analogic Corporation

Product Description:

New technology using Computed Tomography (CT) to automatically screen baggage and parcels for explosives and homemade/liquid threats.

This effort builds upon two prototypes to add performance and capability in four development spirals.

Payoff:

Highly accurate screening of baggage and parcels to automatically detect explosive and liquid threats without the need for operator assessment.

Advanced technology that can screen both carry-on and checked baggage at low volume airports.

Deliverable: Certified detection technology transitioned to TSA in FY09, FY11, and FY13.

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Checkpoint of the Future

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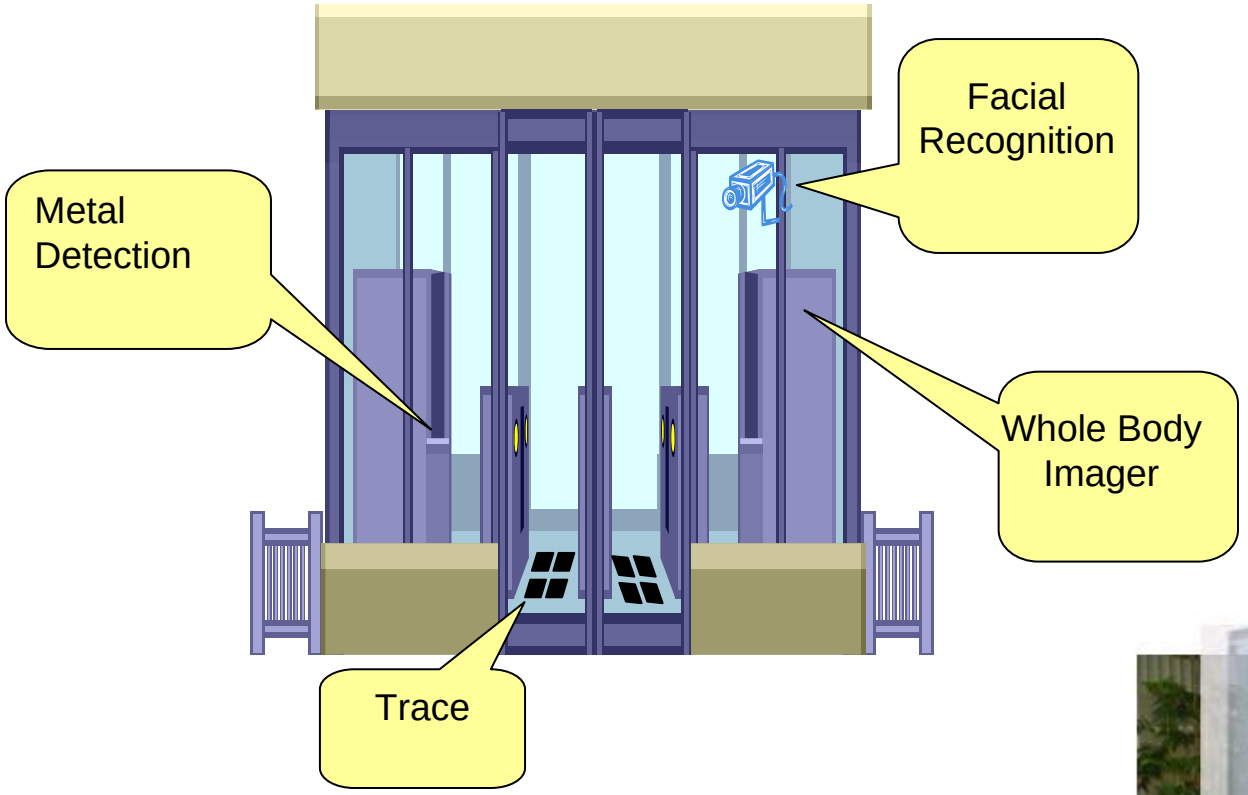
Next Generation Checkpoint Prototypes



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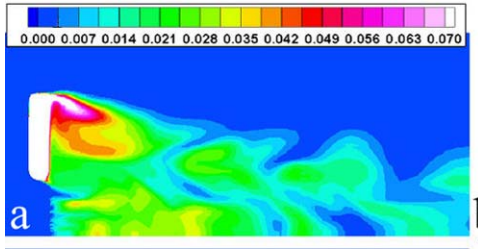
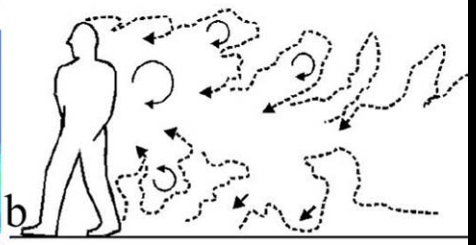
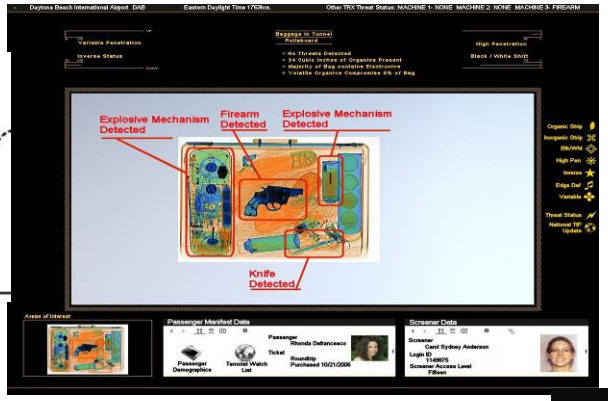
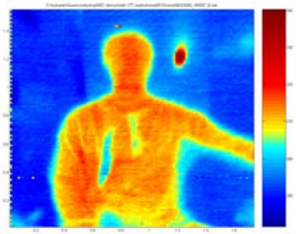
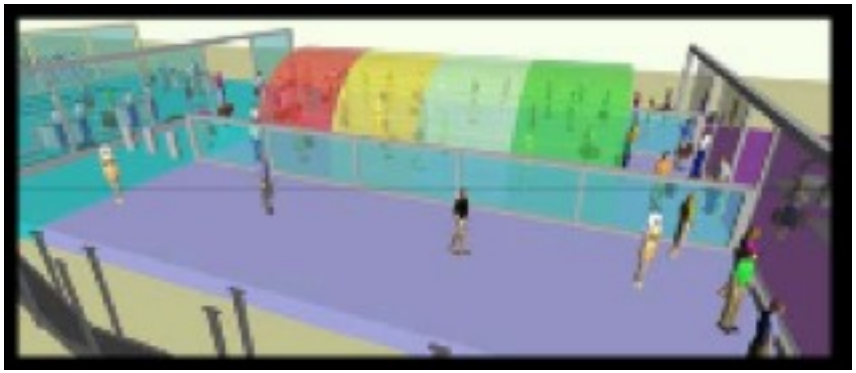
Integrated Checkpoint System

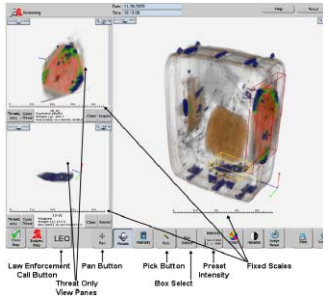


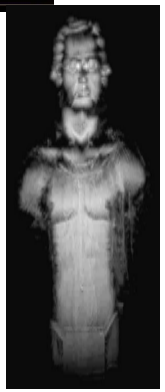


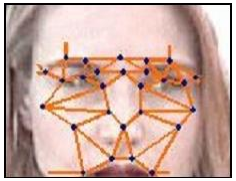


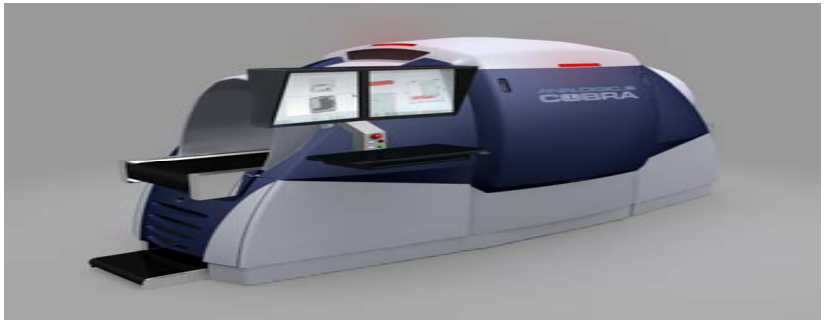












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Future Steps

- Continuing to develop a subsystem for non-contact inspection of people that will have increase the detection rate, reduce of false alarms and increase throughput
- Improve carry-on baggage inspection
- Integrate subsystems into a fused sensor checkpoint – FY11
- Develop an integrated checkpoint that meets all customer requirements – FY13

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