
Aviation Security Technology Requirements and Solutions



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Aviation Security Requirements

- Detect weapons and explosives
 - Integrate airport security systems
 - Harden aircraft
 - Improve human performance
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TSA's approach to addressing security technology requirements

- Collaborate with Federal Agencies
 - Collaborate with International Partners
 - Conduct Research and Development
 - Test, Deploy & Integrate Technology
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Explosive Threats

- Military
 - Plastic
 - Sheet
 - Commercial
 - Black and Smokeless Powder
 - Improvised
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Explosive Concealments

- People
 - Baggage
 - Cargo
 - Mail
 - Vehicles
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WHY NUISANCE ALARMS

- Imprecise measurement of properties
 - Range of materials to detect
 - Broad range of diluting materials
 - Low explosive concentration in clutter
 - Constraints of time
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Bulk Explosive Detection

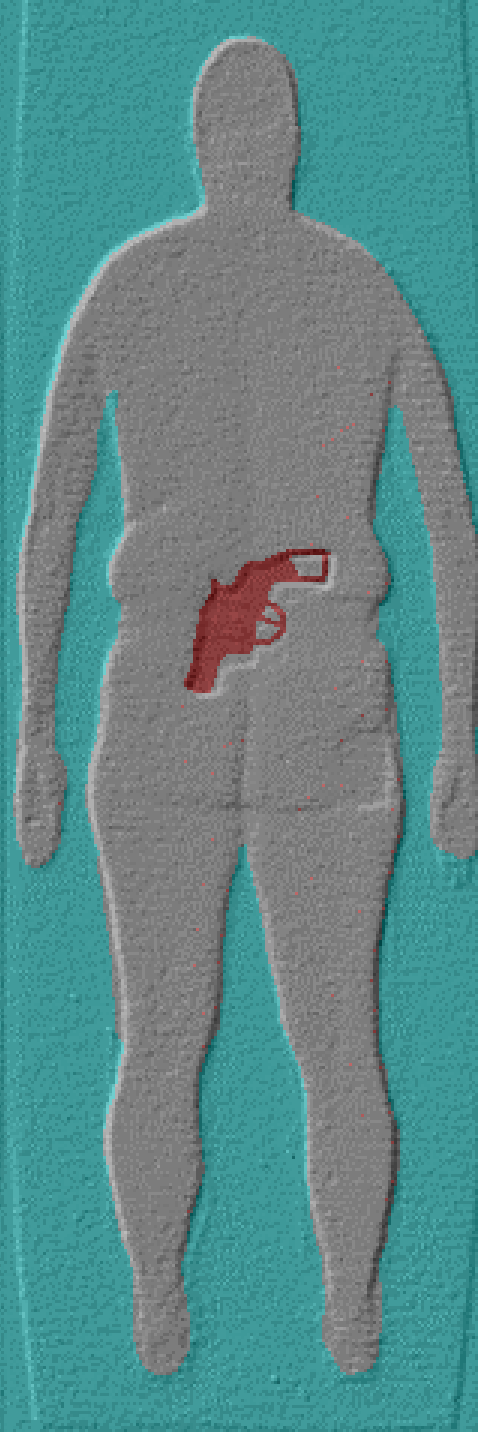
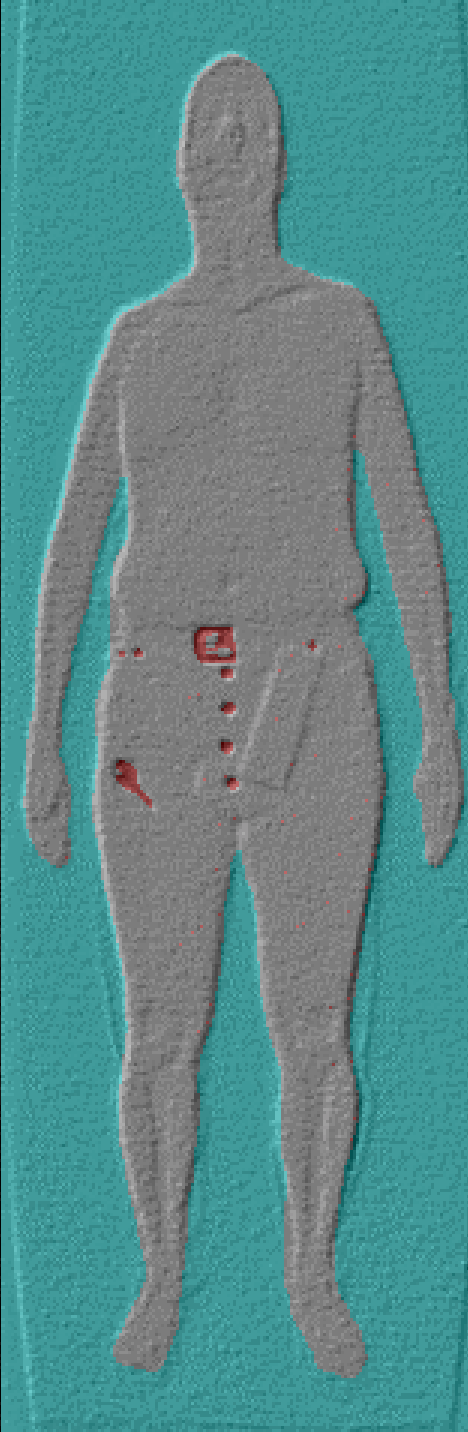
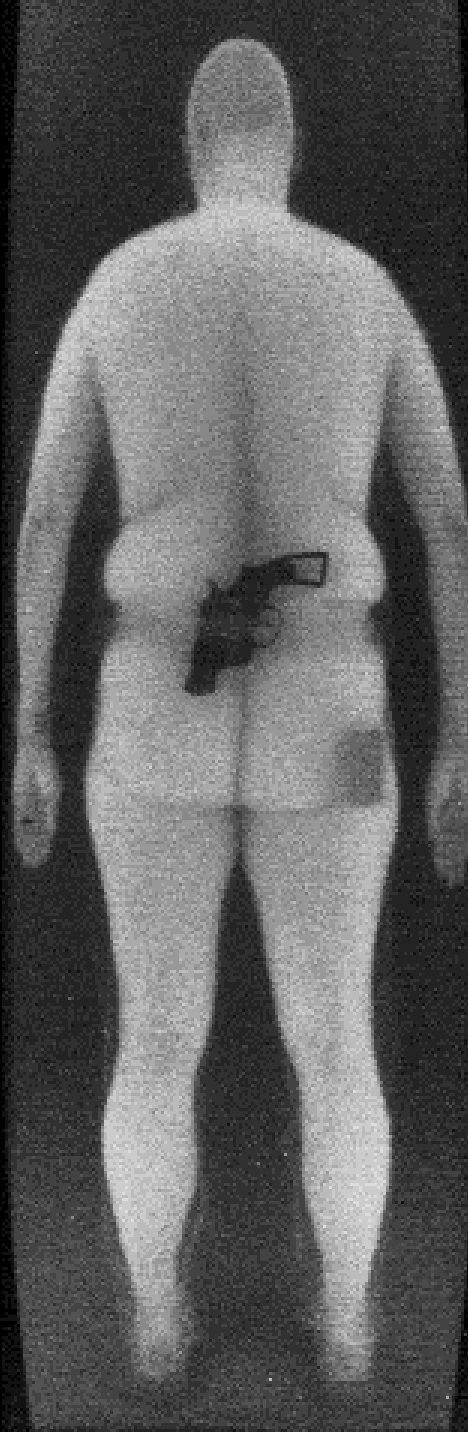
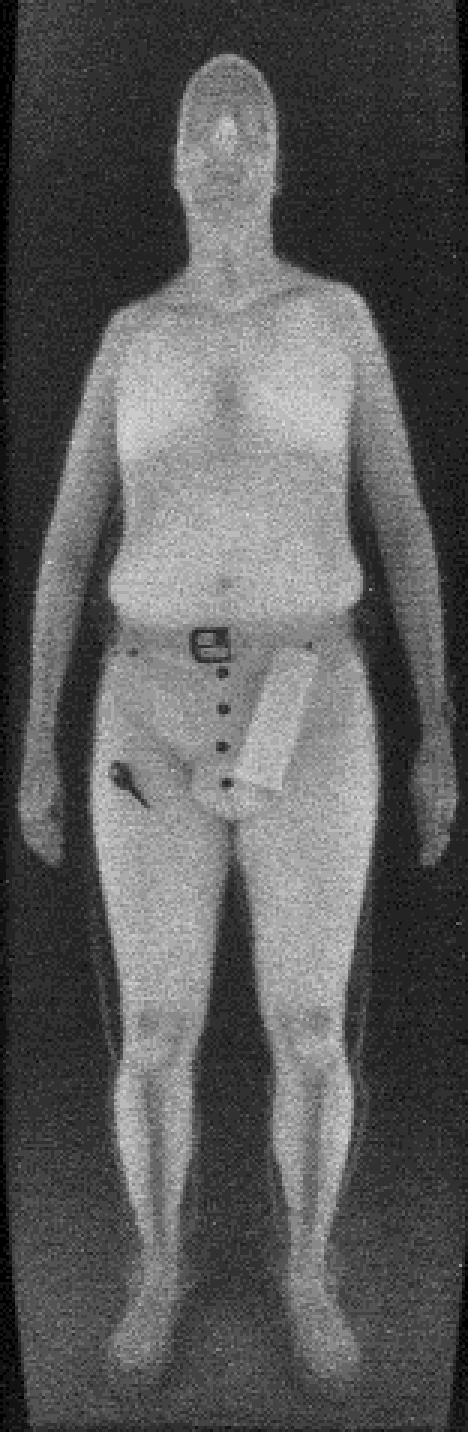
- Probing Radiation is attenuated or changed
 - Neutrons
 - Gamma Rays
 - X-Rays
 - Electromagnetic

X-Ray Based Detection

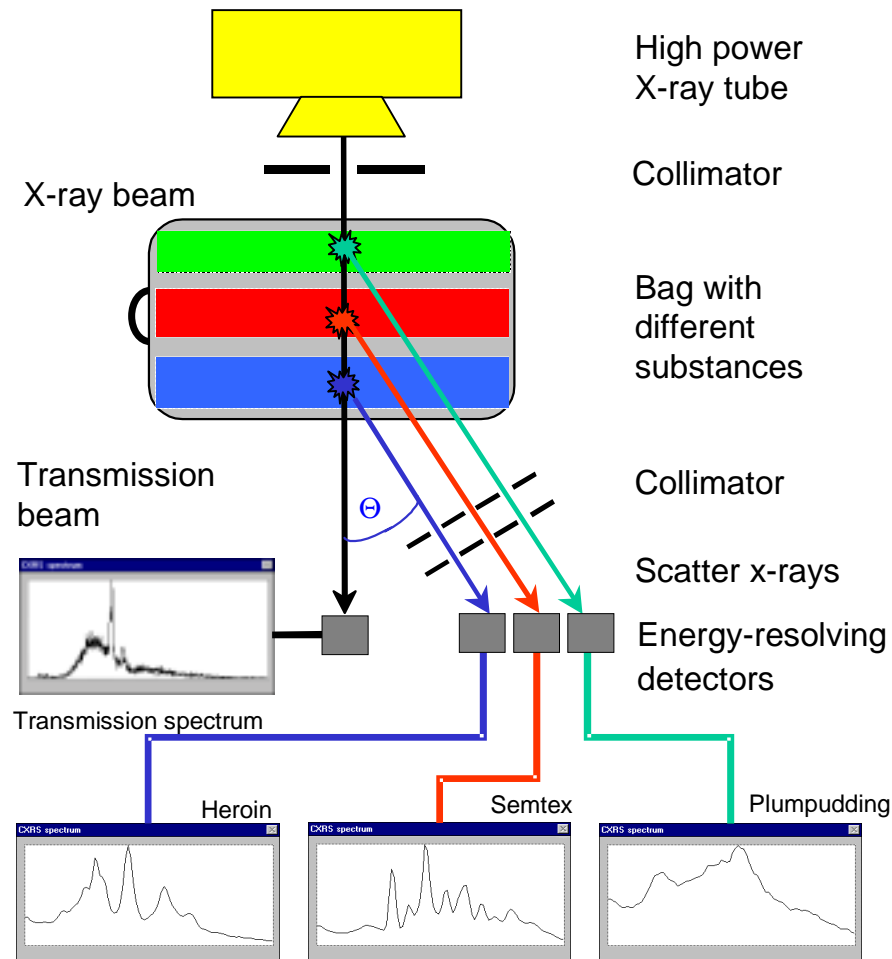
- Computed Tomography
 - Backscatter
 - Resonance Absorption
 - Transmission
 - High Energy
 - Dual Energy
 - Diffraction
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CTX 5500 Explosive Detection System





X-Ray Diffraction



Highly Specific Scatter Spectra

Trace Explosive Detection

- Collect
 - Separate
 - Detect
 - Residues or vapors of explosives
 - Optically view or activate traces
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Trace Explosive Detection

- Chemiluminescence
 - Mass Spectrometry
 - Ion Mobility Spectrometry
 - Canine Olfaction
 - Preferential Absorption & SAW or MM
 - Antibodies
 - Optical Techniques
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IMS Based Trace Explosive Detector



Explosive Detection K-9



Trace Detection Portal

- ❖ Sandia portal

- ❖ Barringer IMS

- ❖ Down flow of air



- ❖ ITI portal

- ❖ ITI IMS

- ❖ Thermal plume



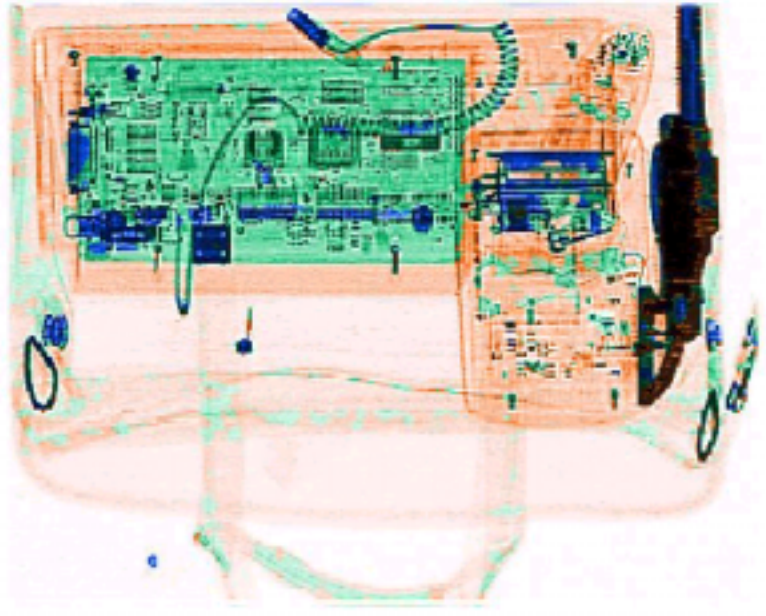
Human Factors Research

Increase Human-System Effectiveness

- Screener selection
 - Screener training
 - Screener testing & National standards
 - Threat Image Projection
 - Check point integration
 - Human machine interface
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Screeener Readiness Test

PictureRead2 - Microsoft Internet Explorer



1 Threat 2 Possible Threat 3 No Threat

Start Novell-delivere... Lotus cc:Mail - ... NSRT - Micros... PictureRea... untitled - Paint 3:08 PM

EDS Certification

- Established Performance Criteria
 - Types and Quantity of Explosives
 - Detection and False Alarm Rates
 - Throughput
- Operational Criteria: SQT & OUE Tests
 - Operator Training and Effectiveness
 - Airport Compatibility
 - Reliability

Trace Detector Approval

- Identify the residue available
 - Establish system sensitivity
 - Harvesting efficiency
 - Detector efficiency
 - Determine operational suitability
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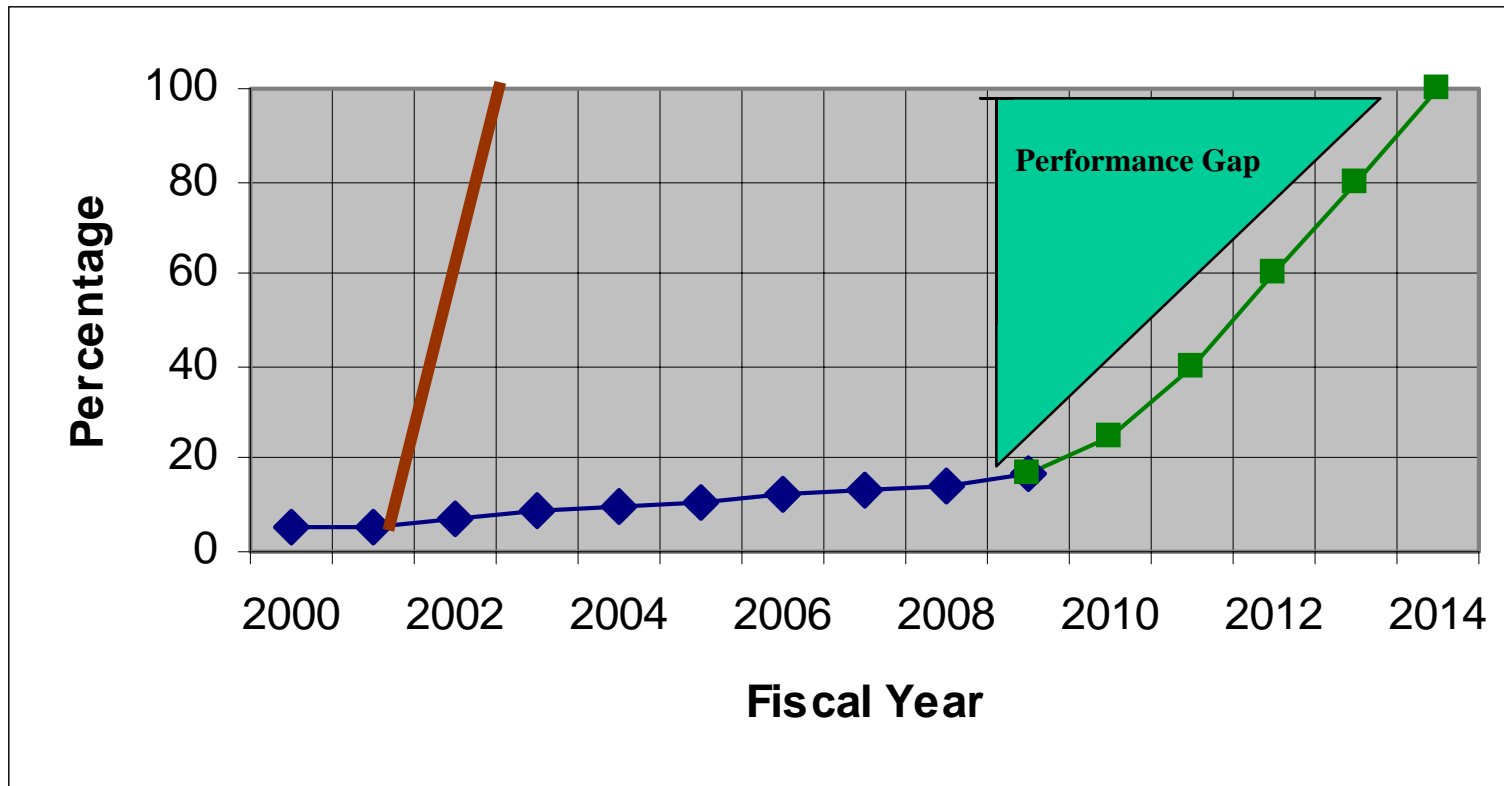
Technology Deployment

170 EDS at 53 Airports

1043 Trace Detectors at 186 Airports

778 TIP Ready X-rays at 79 Airports

The Challenge of EDS Deployment



CAPPS Selectee's Baggage Screening



100% Checked Baggage Screening



New Congressional Requirement