BomDetect
Kick-off Meeting

Mike Winer
AS&E Program Manager

August 15, 2006

Team

- Mike Winer – Program Management
- Peter Rothschild – Science (Principal Investigator)
- Rajen Sud – Systems Engineer (EE)
- John Handy – Software Engineer
- TBD – Mechanical Engineer
- Brian Sullivan – Finance
- Rich Wronski – Product Management
Body Search Reveals Both Metallic and Non-Metallic Objects

- 750 gm Cocaine Simulant
- Wrist Watch
- Coin
- 9mm Handgun
- 500 gm Cocaine Simulant
- 9mm Glock with plastic handle
- File
- Plastic Knife

Schematic of the Z Backscatter Van (ZBV)

- Backscatter Detectors
- X-Ray Source
- Generator
- Shore Power
- Electronics Panel (on inside wall)
- A/C
- Single-Sided Inspection
  - Side set at Factory
- Backscatter Only
  - 225 KeV
- Vehicle Offering
  - Mercedes Sprinter (Diesel)
- 1 or 2 Operators
- Multiple Speeds
  - 0.5, 1.5, 5 & 10 kph
  - 0.3, 1, 3, & 7 mph
- RTD Option
Challenges with Long-Distance Imaging

- X-ray beam is diverging so resolution of image decreases rapidly with distance
- Backscatter signal decreases by the square of the distance due to geometry (going from 5 feet to 30 feet reduces the detected signal by $1/36$)
- Air scatter further reduces the detected backscatter signal and creates a background “fog”
- High power x-ray source with a small focal spot (powerful beam with low divergence)
- Collimate primary beam to prevent air scatter into detectors
- Collimate detectors so that they cannot see the air scatter
- Used pulsed x-ray sources to reduce contribution of detector noise to the backscatter signal

**Long Distance Viewing (LDV) - 30 feet**

- Increased range – Requires more X-ray flux
  - Can be achieved with a smaller FoV

<table>
<thead>
<tr>
<th>Long Distance Viewing</th>
<th>Current System</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 ft.</td>
<td>5 ft.</td>
</tr>
<tr>
<td>6 ft.</td>
<td>12 ft.</td>
</tr>
</tbody>
</table>
RADIATION DOSE IS EXTREMELY LOW
- Radiation dose from the LDV is measured in tens of micro-R.
- People who are scanned by the LDV will not be harmed

LDV is not, and will not be, a "certified people scanner"
- Dose is too high to comply with N43.17, which requires dose per scan ≤ 10 micro-R
- ANSI N43.17 is the only standard which addresses the issue of irradiating people for security applications
- This standard was designed for applications such as BodySearch
- This standard is neither a law nor a regulation. Neither ANSI nor CDRH certifies that equipment complies with the standard.
- ANSI N43.17 requires many additional safety features which would be difficult or unfeasible to implement in the LDV system
- ANSI N43.17 requires that people give consent to be scanned. Therefore it is not applicable to covert operations
Center for Subsurface Sensing and Imaging Systems

BomDetec Program
Phase I Kick-Off Meeting
August 16, 2006

HSARPA - Sponsor
Northeastern University (Lead)
Siemens CR&D
Raytheon
AS&E
RPI
PPT

Kick – Off Meeting Agenda

• Opening Remarks & Introduction
• Program Overview
• Operational Overview
• BomDetec Sensors
  • Intelligent Video
  • Millimeter Wave Radar
  • X-ray Backscatter
  • Terahertz
• Integration of Software and Hardware
• Programmatic Discussion
Program Strategy

- Suicide Bomber Detection
  - Person
  - Metal
  - Explosive
- There is No Silver Bullet
- A Flexible Platform or "Mainframe"
  - Capable of Adapting to Future Technological Advances

Program Overview

- A Flexible Mainframe
  - Software
    - Coordinate System (X, Y, Z)
    - Tracking System for People in the FOV
    - GUI
    - Data Analysis, Fusion
    - Database
  - Hardware
    - VAN
      - Power
      - Thermal Regulation
      - Mechanical Support
    - Sensors
      - (Intelligent Video, Radar, X-ray, Terahertz, Other)