University Network Summit

DHS Science & Technology R&D to Counter IEDs

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March 18, 2009
Domestic IED Incidents

May 1927 – Suicide bombing of school kills 45, injures 58, Bath, MI

Feb. 1993 – VBIED attack on World Trade Center garage, kills 6 and injures 1,042

March 2003 – Farmer drives tractor into pond near Washington Monument, threatens IED attack

March 1970 – IED detonates prematurely, killing 3 Weatherman “urban guerillas”, NYC

April 1995 – VBIED attack on Murrah Federal Building kills 168, injures 388, OK City

July 1996 – 2 killed, 111 injured in Centennial Park bombing, Atlanta Olympics

March 2008 – IED explodes at military recruiting center in Times Square
TERRORIST ROADMAP

- Bombs
- Borders
- Bugs
- Business
- Bodies
- Buildings

CONSEQUENCE OF OCCURRENCE

LIKELIHOOD OF OCCURRENCE

HIGHER

- IEDs
- Trans Nat’l Migration
- Cyber
- Gov’t, economy, societal instability
- Physical, Critical Infrastructure Attack

LOWER

- Biological
- Chemical
- Radiological
- Nuclear

MULTI-DIMENSIONAL

BOMBS, BORDERS, BUGS, BUSINESS, BODIES, & BUILDINGS
Homeland Security Presidential Directive 19

“Combating Terrorist Use of Explosives in the United States”

Signed February 12, 2007

Establishes a national policy on the prevention and detection of, protection against, and response to terrorist use of explosives and Improvised Explosive Devices (IEDs) in the United States

Calls for the development of a National Strategy for IEDs including recommendations

Paragraph (4):
“...It is the policy of the United States to counter the threat of explosive attacks aggressively by coordinating Federal, State, local, territorial, and tribal government efforts and collaborating with the owners and operators of critical infrastructure and key resources to deter, prevent, detect, protect against, and respond to explosive attacks, ....”

DHS S&T provides the science and technologies needed to combat terrorist use of IEDs within the US
Countering the IED Threat

Breaking the links in the IED Delivery Chain

- Obtain Funds
- Deter & Predict
- Develop Organization
- Gather Materiel
- Detect
- Plan the Attack
- Conduct the Attack
- Defeat
- BOOM
- Mitigate
- Observe Consequences
- Attribute Responsibility
Prioritization of Needs

Critical Needs

- C-ED Network Attack and Analysis
- Detection of Homemade Explosives
- Standoff Rapid Detection of Person Borne IEDs
- Vehicle-borne IED Detection
- IED Access and Defeat
- Radio-controlled IED Countermeasures
- IED Assessment and Diagnostics
- Waterborne IED Detect and Defeat Systems
- IED Warnings
- IED Threat Characterization and Signatures

Research Challenges in Combating Terrorist Use of Explosives in the United States

Subcommittee on Domestic Improvised Explosive Devices

December 2008
DHS S&T Counter-IED Program

DHS S&T has established a counter-IED program to leverage existing multi-agency research and investments to deter, predict, detect, defeat and mitigate the impact of IED attacks.

Terrorist IED Attack Timeline

**INTENT**
- Initial Planning
- Obtain Operational Resources
- Conduct Operations

**ATTACK**
- Immediate Effects
- Long-Term Effects

**Deterring**
- Human Factors
  - Actionable Indicators
    - Group Characteristics
    - Pre-incident Rhetoric
    - Pre-incident Behaviors
    - Community Characteristics
    - Integration
  - Countermeasures
    - Comparative Counter
    - Red/IED Strategies
    - Strategy Impact

**Predicting**
- Human Factors
  - Predictive Screening
    - Behavior Analysis
    - Video Tracking
    - Video Identification & Alert
    - Risk Prediction
    - Target Prediction
    - Staging Area Prediction

**Detecting**
- Explosives
  - Person Borne IED Detection
  - Vehicle Borne IED Detection
  - Canine/Biological Marking

**Defeating**
- Explosives
  - Bomb Assessment/Diagnostics
    - Type of Explosive
    - Device Triggers
  - Render Safe
    - Electronic Countermeasures (IR/RF Jamming)
    - Directed Energy
  - Robotics
  - Bomb Components

**Mitigating**
- Infrastructure
  - Blast Mitigation
    - Affordable blast resistant materials
    - Rapidly stabilize damaged structure
  - Explosives
    - Body Armor
    - Inerting
    - Tagging (Forensics)
    - Post Blast (Forensics)

**Cross Cutting:**
- *Standards; Outreach; Technology Demonstration/System Integration*
- *Intel Data Sharing (FBI, CIA, DIA): Technology resource & Test sharing (DOJ, DOD, DOE)*
Counter-IED Investment Areas

• Social and behavioral science to identify potential IED threats
  – Real-time, automated video-based identification of suspicious behaviors
  – Integrated social and behavioral science indicators of radicalization

• Strategies to deter potential IED attacks before they occur
  – Intent-focused deterrence measures that could be used in the United States

A human factors portfolio focused on identifying and deterring potential IED threats
Counter-IED Investment Areas

- Improved detection capabilities for known and emerging IED threats
  - Imaging technologies
  - Spectroscopic and trace detection technologies

- Improved probability of detection by screening for IEDs more efficiently to while minimizing effect on flow of people and commerce
  - Non-contact interrogation
  - Enhanced algorithms for automation

- Improved first responders’ ability to react to and defeat discovered IED threats
  - IED identification and defeat tools
  - Radio frequency jamming equipment

Diversified investment portfolio to maximize potential for success
Counter-IED Investment Areas

• Enhanced blast resistance
  – Advanced blast-resistant materials
  – Models for assessing damage from blast

• Mitigation of effects
  – Rapidly deployable means to stabilize damaged structures

• Community resilience
  – Communication of clear, understandable, credible warnings in the event of an IED threat
  – Recovery in the aftermath of an attack

Preventive measures to reduce effects of an event, help for recovery afterwards
Future Requirements

Immediate Goals & Objectives (0-1 year)
- Utilize current tools and equipment

Near Term Goals & Objectives (1-3 years)
- Currently under development

Far term Goals & Objectives (3-10 years)
- Concepts and Innovative solutions
- Basic Research vs. Applied Research
DHS S&T CIED Challenge: From Securing Special Events to Transportation Security and Beyond