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# S&T Stakeholders Conference

## S&T Thrust Area Bombs

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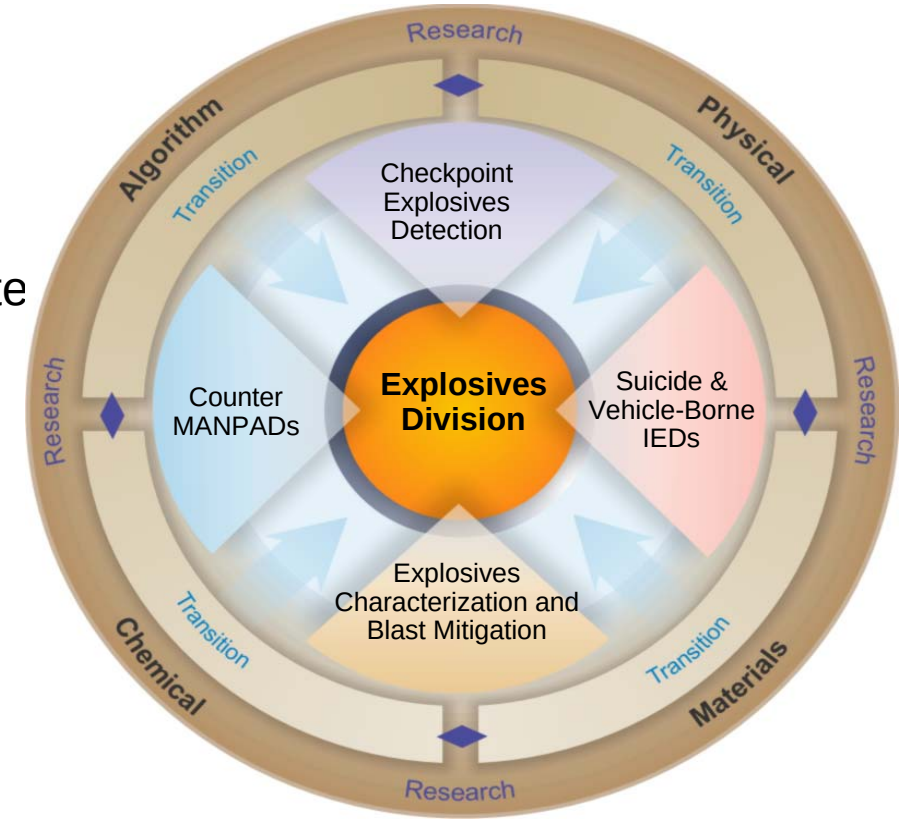
*PARTNERING FOR A SAFER NATION*

# Explosives Division

Mission: To develop technical capabilities to detect, respond, defeat, and mitigate the effects of non-nuclear explosives terrorism and accidents.

Customers:

- Transportation Security Administration
- U.S. Secret Service
- National Protection and Program Directorate
- Customs and Border Protection
- U.S. Coast Guard
- Federal, state and local first responders

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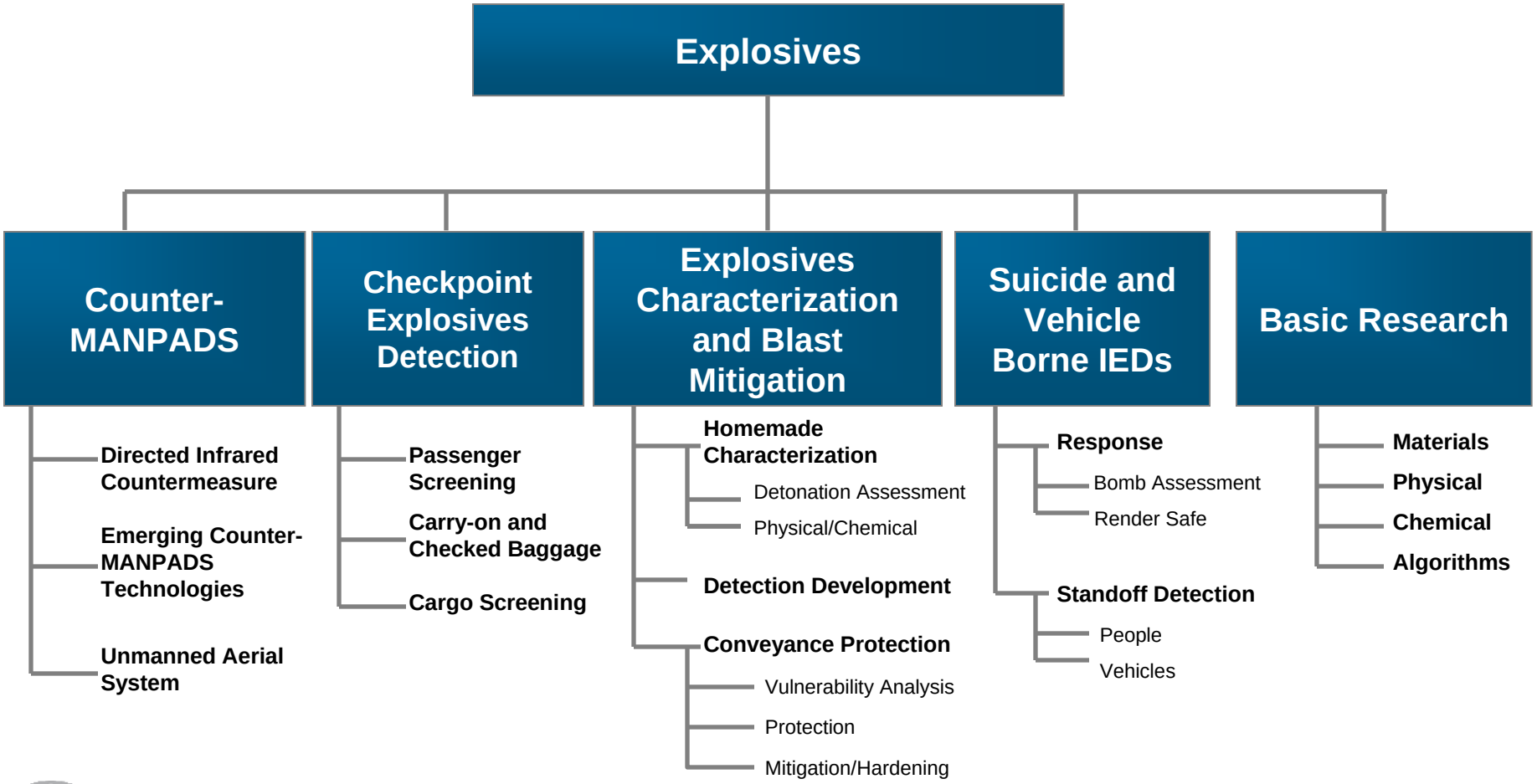
# Division Organization

Managed by the DHS Science and Technology Directorate, the Explosives Division delivers on its mission through five thrust areas.

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# Counter-MANPADS

Man Portable Air Defense Systems (MANPADS)

- Developing and demonstrating Counter-MANPADS mitigation technologies to the commercial airlines industry
- Ensuring that the resulting systems will minimally impact on the air carriers, airport operations, maintenance and support activities
- Currently three programs underway:
  - DIRCM (in Phase III)
  - Evaluating Emerging Counter-MANPADS Technologies (ECMT)
  - High-altitude unmanned aircraft systems

**-- Shoulder-launched surface-to-air missiles**

**-- Heat-seeking infra-red guidance**

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# 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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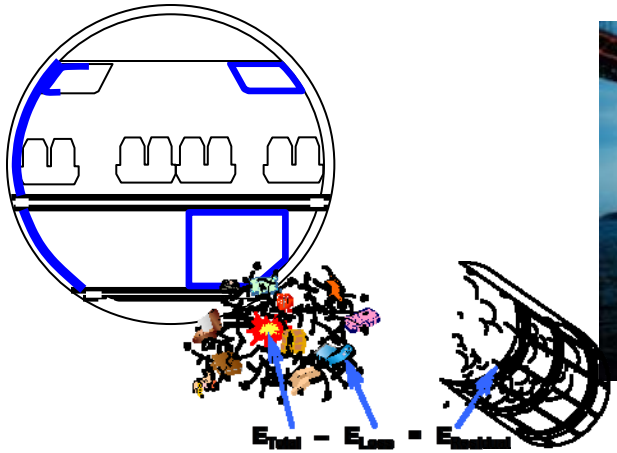
# Explosives Characterization and Blast Mitigation

- Developing and implementing projects that identify conventional and enhanced explosives threats and mitigate their potential damage
- Leveraging the testing from federal law enforcement, the national labs and others. Pairing this information with that from S&T tests
- Providing key DHS stakeholders with data to inform development and updating of procedures and concepts of operation
- Conducting vulnerability analysis to inform those projects examining ways to mitigate damage from explosive threats



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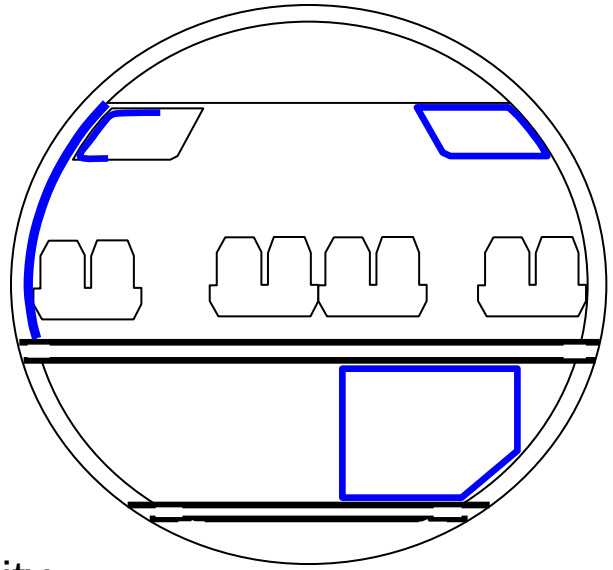
# Aircraft Blast Mitigation Example

- Vulnerability analysis program
- Hardening program
  - Material/Design Selection Process
    - FAA airworthiness requirements
      - Burn/Heat/Smoke
    - Material blast resistance
      - Shock & Fragmentation
  - Blast Testing
  - Airworthiness Approvals
  - Cost benefit analysis
- Evaluate using representative threats
  - Set by EDS performance & aircraft survivability
- Program Focus
  - Hardened luggage containers & cargo hold
  - Hardened passenger overhead bins & cabin liners



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# Suicide and Vehicle Borne IEDs

- Developing new or improving existing technical capabilities to detect, respond, defeat, and mitigate the effects of Suicide Bomber (SB), Leave-Behind, and Vehicle Borne (VB) IEDs for federal, state and local responders

- Technologies should assess, diagnose, and render safe the IED threat
- Developing portable, non-obtrusive detection technologies with no chokepoints and decreased false alarm rates
- Integrated layered system approach and standardized CONOPS

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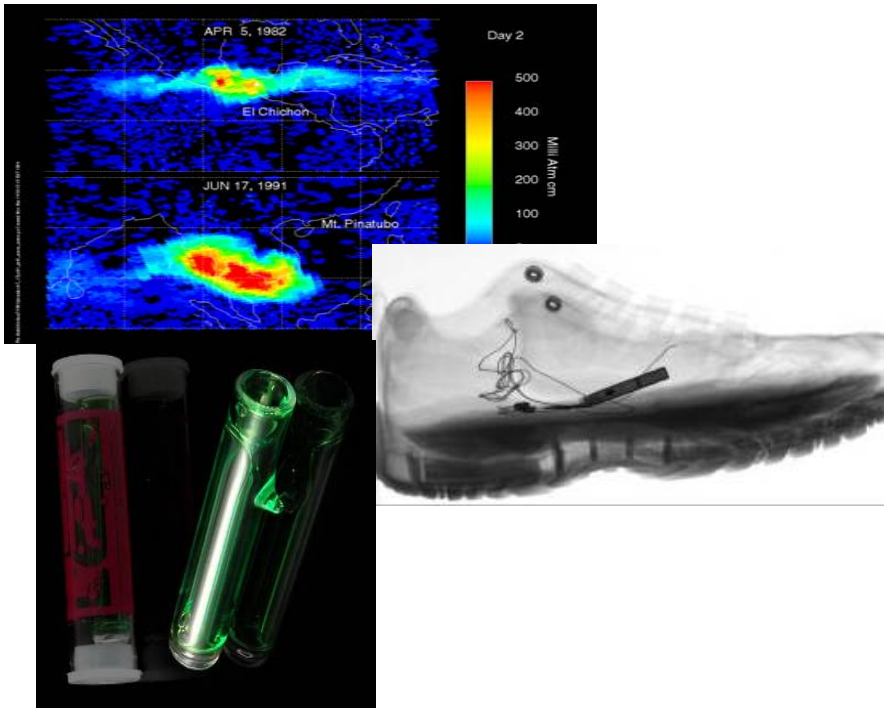
# Basic Research

- Working to ensure that Explosives Division programs are balanced between:
  - Producing technologies that can be transitioned to meet customer needs, and
  - Advancing state of the art science related to explosives countermeasure and prevention




Research Programs Include:

- Road Mapping & Assessment
- Fundamental Particle Physics
- National Science Foundation Supplemental
- SENSIT/Ultra-Low Field Magnetic Resonance Imaging
- **Liquid & HME Characterization**
- Analysis of Raw Images and Algorithms
- Manhattan II
- Detection Technology/Materials

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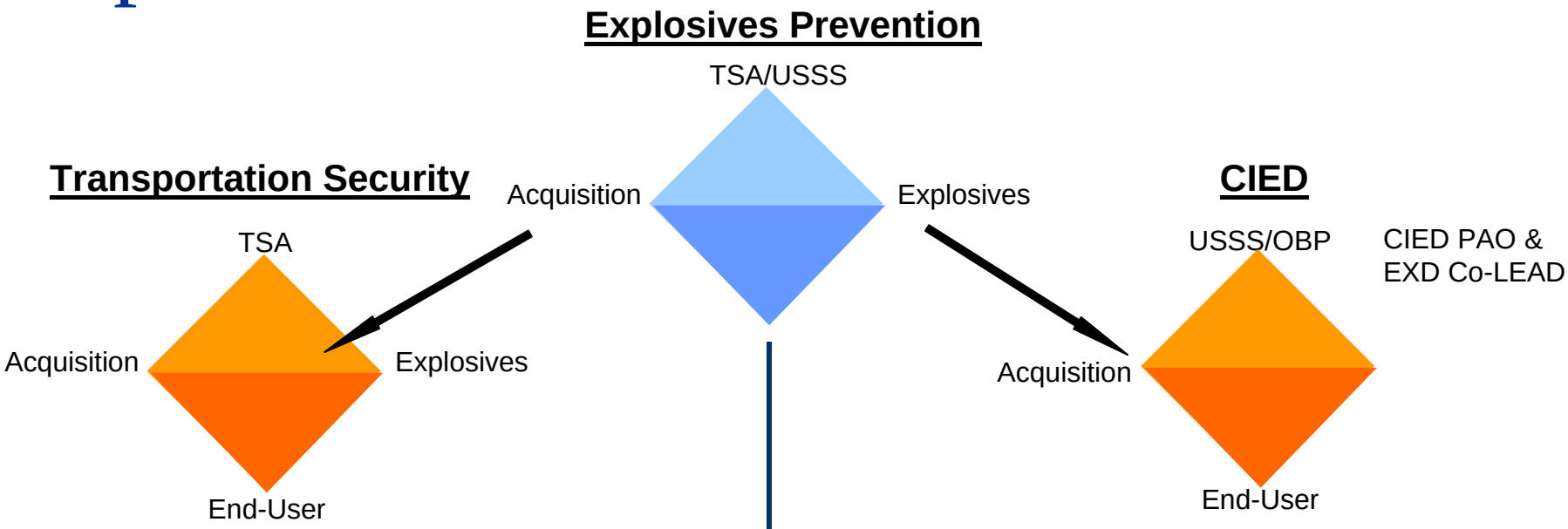
# Explosives IPTs




**Mission Space**

- Checkpoint including Carried Baggage (People / Materials)
- Checked Baggage
- Air Cargo
- HME Characterization
- Conveyance Protection (Airports, Mass Transit/ Maritime)
- Access Control & Perimeter Security

**Mission Space**

- Deter – Motivation and intent based
- Predict – Risk Analysis and predictive screening
- **Detect – Person Borne and Vehicle Borne**
- **Respond / Defeat – Post Detection Resolution**
- Mitigate – Blast Protection of people and infrastructure

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# Transportation Security Capstone IPT High Priority Technology Needs

- Technologies to screen people for explosives and weapons at fixed aviation and mass-transit checkpoints—In particular, to allow high detection rates with minimal disruption to passenger flow

- Systems solution for explosives detection in checked and carried bags—In particular, automated systems to screen for conventional explosives, liquids, weapons, and homemade explosives

- Capability to detect homemade or novel explosives—In particular, characterizing potential homemade explosives for use in developing detection systems for screening at checkpoints

- Optimized canine explosives detection capability—In particular, techniques, training tools and methods to improve performance for all transportation venues

- Technologies for screening air cargo for explosives and explosive devices—In particular, technologies for screening break-bulk, palletized, and containerized air

# Counter-IED Capstone IPT
# High Priority Technology Needs (EXD)

- Capability to detect domestic use vehicle-borne improvised explosive devices (VBIEDs)—In particular, technologies to provide a non-intrusive means of screening vehicles for VBIED detection
- Capability to assess, render safe, and neutralize explosive threats—In particular technologies to protect against person- and vehicle-borne explosive threats
- Capability to detect person-borne IEDs from a standoff distance—In particular, technology to enable the detection of person-borne concealed explosive threats in various high-throughput venues, at standoff distances
- Capability of inerting common explosives or making them less sensitive to initiation
- Techniques to track the origin of explosives and bomb components used in domestic IEDs—In particular, to improve forensic evidence investigations with better tools such as biometric technology, taggants, and radio-frequency identification devices (RFIDs)
- Capability to mark explosives material to improve the detection of IEDs

# Counter-IED Capstone IPT
# High Priority Technology Needs (Other)

- Low-cost and practical approaches to protect urban structures and occupants from VBIED attacks
- Protective measures to reduce damage and prevent catastrophic failure of high-consequence infrastructure assets subjected to IED attacks
- Models for predicting of blast effects that take into account the diversity and variability of construction in urban settings
- Affordable blast-, fragment-, and fire-resistant materials
- Rapidly deployable blast-mitigation concepts for rapid threat response or temporary protection
- Tools to rapidly assess damaged structures
- Techniques and tools to stabilize damaged structures and prevent their collapse
- Capability to predict the threat of an IED attack
- Increased capability at vehicle or pedestrian ports of entry and border crossings to identify person born IED threats
- Enhanced capability for local officials to communicate understandable and credible IED warnings and instructions to the public


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