National Underground Test Bed (UTB)

for
American Association of State Highway Top Officials (AASHTO)
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What If You Could!

- Enhance Safety, Security & Resiliency
- Provide 360 Degree Situational Awareness
- Offer Proven Decontamination – Restoration of Service
- Provide Stand-off Detection of Vehicles Carrying Chemicals
- Advance Fire Suppression Capability
- Provide Tailored Ventilation Protocols – Application specific
- Update Tunnel Design Standards & Codes
- Validate Dispersion, Simulation and Blast Models
- For All Hazards – Provide Testing, Training, and Exercise capability
Why Do This?

• PPD-8 & PPD-21 – *it’s the law! Presidential Directive*
• Tunnels are critical infrastructure - “vital” with “debilitating impacts” - 42 USC 519 C (e)
• Systematic preparation – hazards & threats
  ✓ All Hazards – Fire, Terrorist, Flood, Collapse, Seismic, etc.
  ✓ Threats – Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE), Arson & Sabotage
• **Full-Scale** Underground T & E capability does **not** exist
  ✓ Opportunity to Collaborate T& E’s – Memorial Tunnel, COE, TEEX, FRA-Pueblo, WMATA & BMTA
UTB – Good Idea?

Pulsed the Merits with Owner/Operators/Enablers

✓ AMTRAK & CA HSR
✓ NY MTA – Tunnels & Bridges
✓ PENNDOT & WADOT
✓ NYC- Transit
✓ PANYNJ
✓ NYPD & FDNY
✓ BART; LA-METRO; TriMet
✓ USDOT – FHWA, FTA, FRA
✓ USDHS – S&T, TSA, NPPD
✓ APTA & AASHTO

Immediate National Need

• Ventilation
• Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) threats/attacks
• Fire & Smoke Dispersion and Mitigation
• Validation of Dispersion/Blast Models
• Communication and Evacuation
• Response Protocols
• Situational Awareness
• Decontamination & COOP
• Development of National Tunnel Standards
• Training & Exercising
ORNL Standoff Spectroscopy

Wider wavelength range achievable with multiple Lasers

Data processing and Display

Multiple Quantum Cascade Lasers

Photodetector

Collecting Mirror

Hyperspectral Image Array

Follow a single pixel through the image array and extract the spectral signature for that image point

TNT on door handle