



# Picatinny's Armament Research, Development & Engineering Center (ARDEC)

## Homeland Defense Technology Center Overview

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# Picatinny's Homeland Defense Technology Center



- Established to:
  - **Identify** existing and near term technologies for use in Homeland Defense (HLD), Homeland Security (HLS) & Force Protection
  - **Leverage** Picatinny's assets (People, laboratories, test beds, real estate, etc.) to develop those technologies
    - **4,193 Military/Civilian/Contractors**
    - **6,493 Acres (~6.5 miles x 1 mile)**
    - **804 Buildings**
    - **64 Laboratories/Facilities**
    - **35 Miles from New York**
  - **Team** with other agencies (DoD, Other Federal, State, County and Local) to share/transfer technologies
  - **Share** facilities to local First Responders (Non-interference Basis)
- **Morphing to include:**
  - **Integrating & Evaluating** systems comprised from individual technologies to meet HLD/HLS & Force Protection needs.
  - **Showcase & Training** potential users on HLD/HLS/Force Protection technology systems.
  - **Development of Growth Business Areas** by Creating novel partnerships in the HLD/HLS areas

# Authority



## Title XIV, Section 1401 of the Public Law 107-314

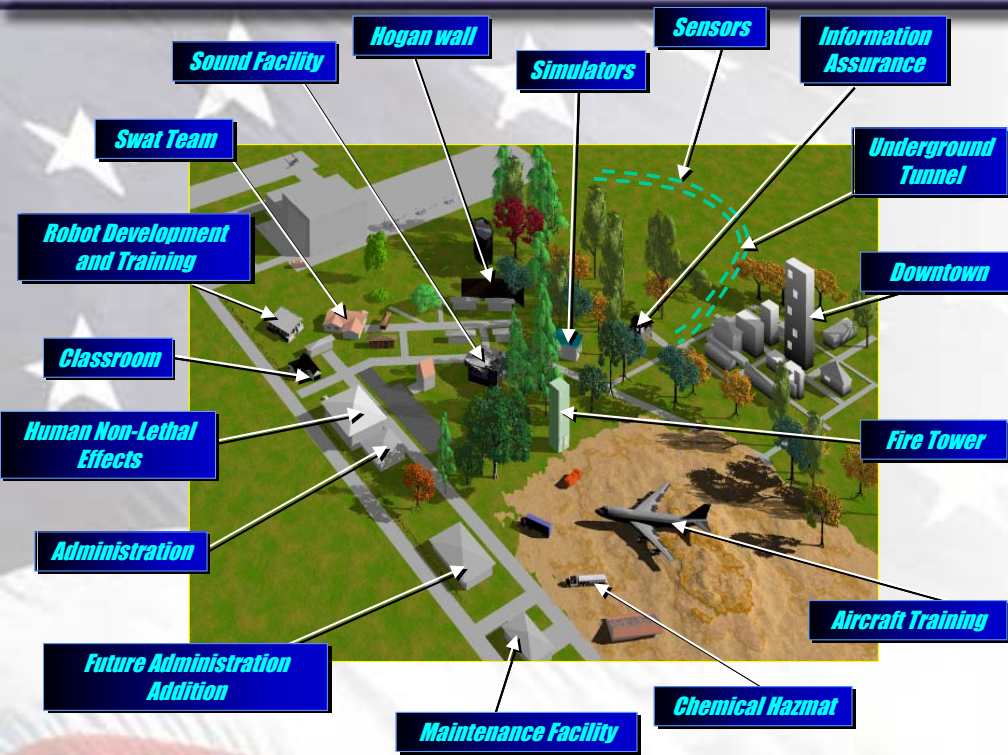
The Department of Defense (DoD) is given the authority to “identify, evaluate, deploy and transfer to Federal, State, and local first responder’s technology items and equipment of homeland security.”

## 2005 Army Strategic Planning Guidance

The Army Released new Strategic Planning Guidance for 2005, It includes three new focus areas of which one is Homeland Defense

# Homeland Defense Movie

# The 3500 Area Testbed



- A multi-acre urban type facility for
  - Armament R&D
    - Target Behavioral Response Lab
  - “Train the Trainer”
  - Readiness Dev for HLD/HLS (including local police, FD, EMS, SWAT, etc)



# ARDEC TARGET BEHAVIORAL RESPONSE LABORATORY (TBRL – Basic investigations into less than lethal)

## SCIENCE

- **ARDEC PRINCIPAL INVESTIGATOR**
- **STRESS AND MOTIVATED BEHAVIORAL INSTITUTE (NJMS & NJUMD)**
- **ACADEMIC AFFILIATIONS (NJIT, SETON HALL, RUTGERS, UCLA, U OF ARIZONA & USMA)**

## CURRENT PROGRAMS

- **GRANT TO STUDY SUPPRESSION TECHNIQUES**
- **DEVELOP MATRIX OF POTENTIAL PERSONNEL EFFECTS FROM VARIOUS ENERGY SOURCE (ie. LIGHT SOUND, PRESSURE, ETC...)**
- **PILOT EXPERIMENTS**
  - BLUNT IMPACT MUNITION EFFECTS
  - STUN EFFECTS
  - AVERSIVE ACOUSTIC EFFECTS
  - MULTI-SENSORY DISRUPTION

## TESTING

- **ARDEC BEHAVIORAL RESPONSE FACILITY**
- **NJHCS-EO (VA) MEDICAL CENTER**
- **UNIVERSITY LABS**
- **COMMERICAL FACILITIES**

## CAPABILITIES FOR FUTURE WORK

- **MULTI-LEVEL FACILITY AND AREA PROTECTION SYSTEMS**
- **ISOLATION & IDENTIFICATION OF TERRORISTS BY THEIR BEHAVIOR USING NOVELTY DETECTION ALGORITHMS**
- **STUDY OF CHRONIC STRESS & FATIGUE IN CRISIS RESPONSE CENTERS**

## APPLICATIONS

- **ADVANCED ENERGY SYSTEMS**
- **SCALEABLE EFFECTS**
  - NON-LETHAL TO NEAR LETHAL
- **FULL RANGE OF SCENARIOS**
  - TACTICAL OPERATIONS
  - HOMELAND SECURITY

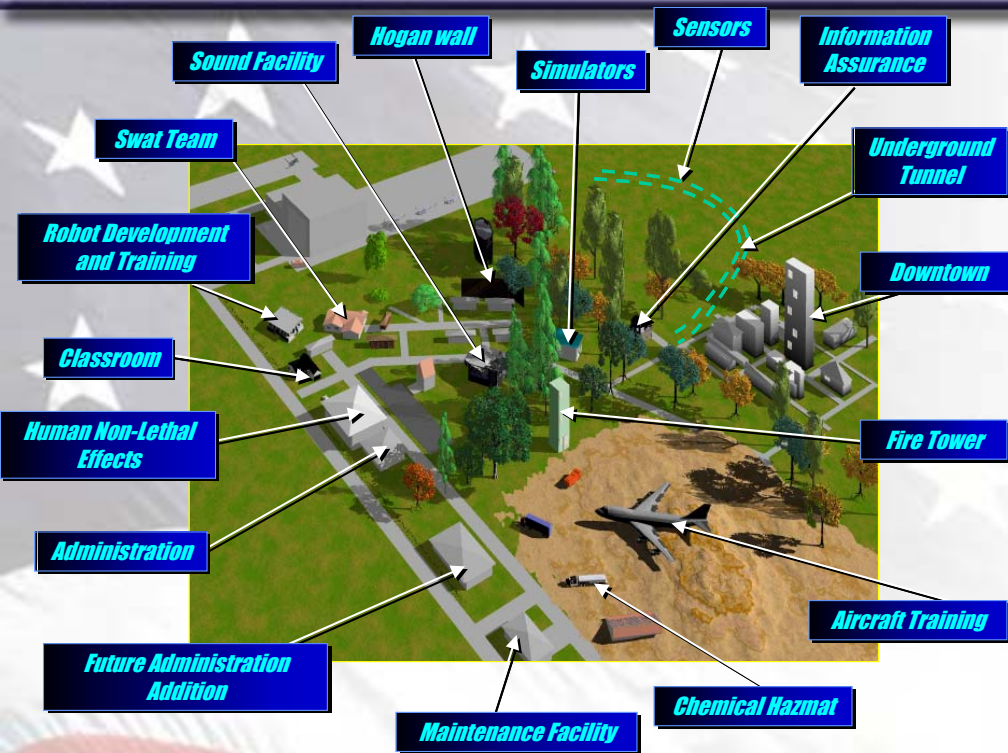


# The TBRL Building





# Unique Training



- Unique Military & Civilian Scenarios
- Combined Training with NG, Active & First Responder
- Multi-Tier Training (Tactical & Emergency Operations)

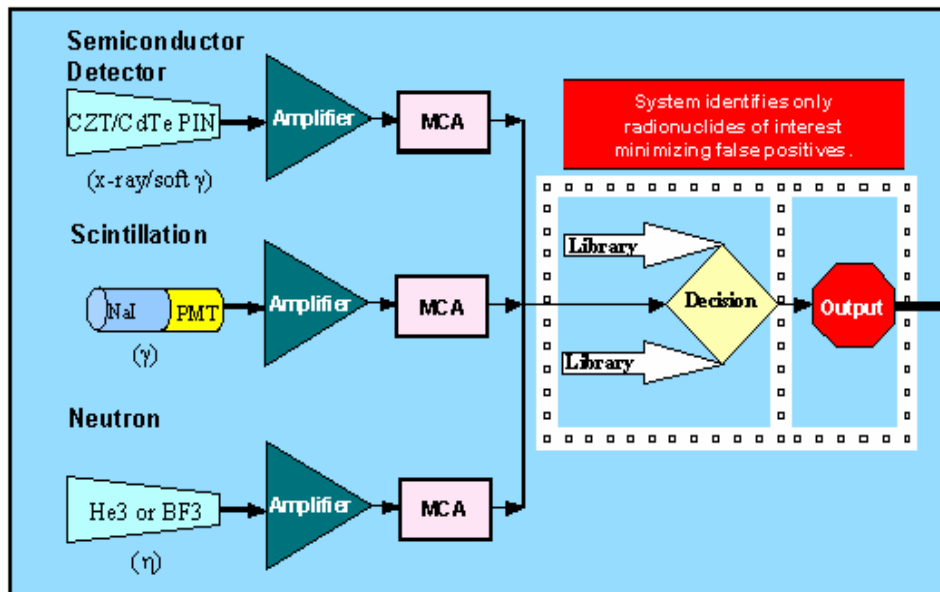
# ARDEC Biometrics Research, Test & Evaluation Laboratory {ABRTEL}



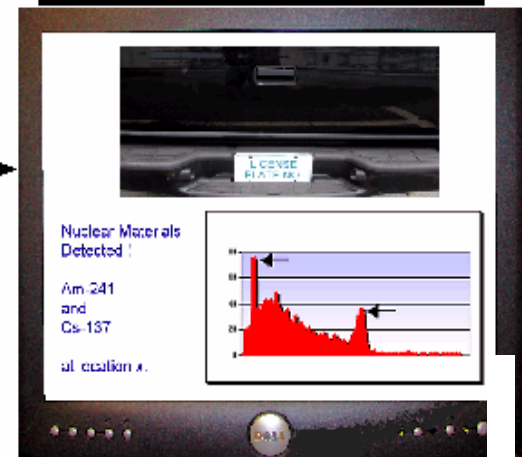
## Miniature Integrated Nuclear Detection System (MINDS)



- MINDS provides rapid identification of specific nuclear signatures.
- Scans autos, trucks, luggage, cargo containers etc.
- Separates medical and normal industrial nuclear signatures from suspect signatures to minimize false alarms.

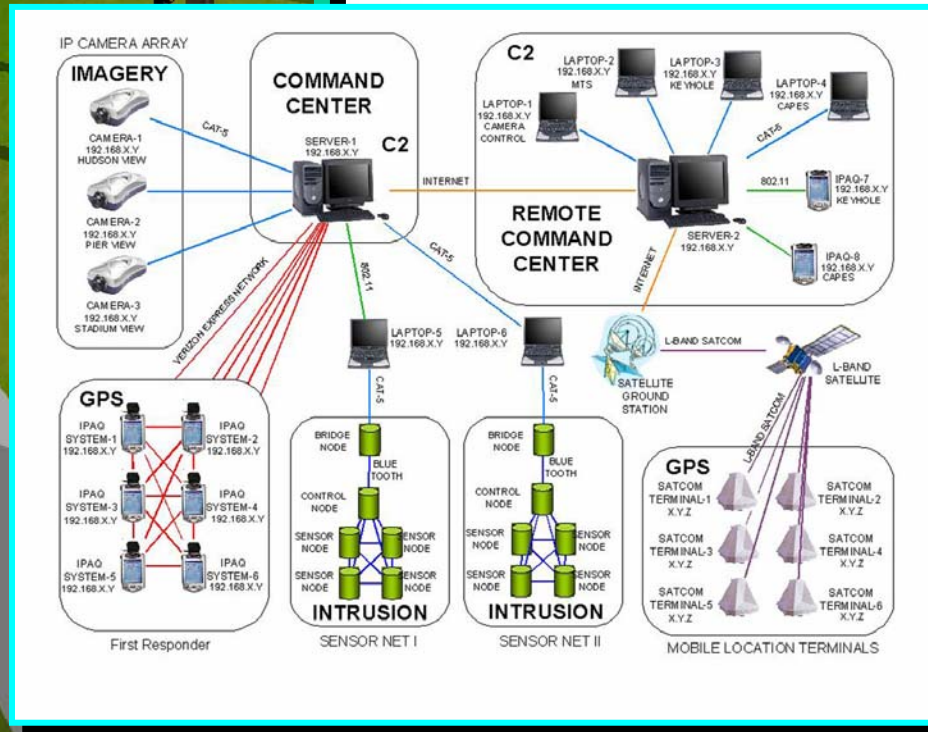
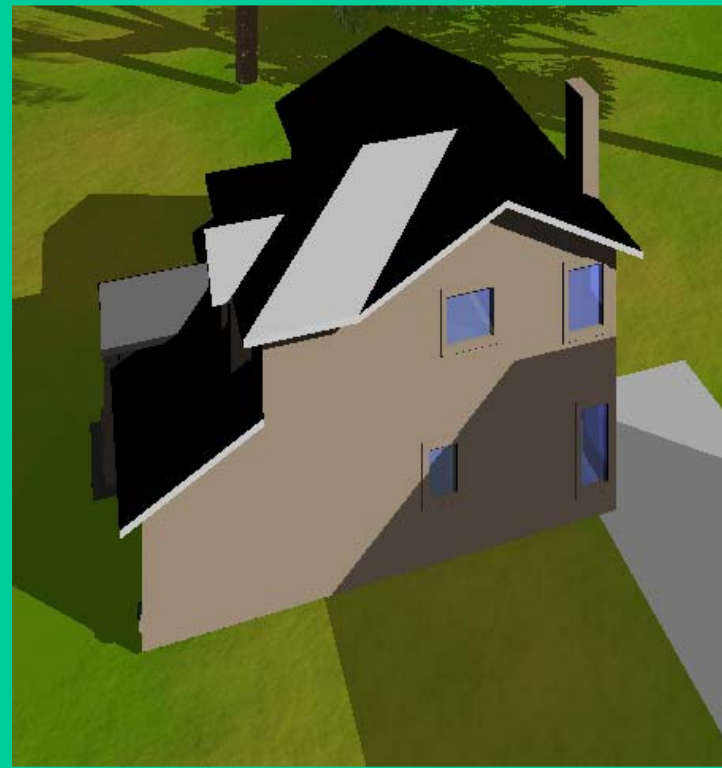


Example of possible output signal to law enforcement / Homeland Security Officials



# Information Assurance

Partnered with Stevens Institute of Technology and CERDEC



- Secure Wireless Testbed Network Definition and Network Connection
- Application of Information Assurance Technologies to Homeland Defense/Homeland Security
- Advanced Research in Information Assurance



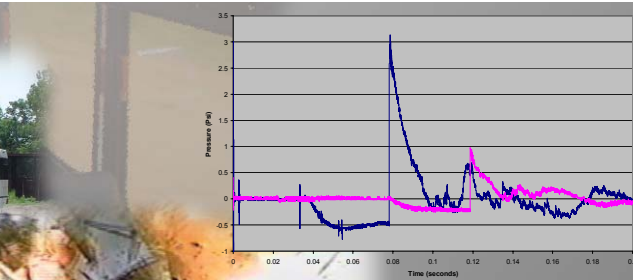
# ***Training the National Guard***

- **Providing Training for the New Jersey Army National Guard**
  - Gate Operations and Vehicle Searches
  - WMD Awareness
  - IED Identification
  - Gate Operations
  - Vehicle Searches
  - Handcuffing
  - GUNFIGHTING 101
    - Movement
    - M16A2/M4 & M9 Overview
    - Equipment Considerations
    - Presentation and Stance
    - Immediate Action Drills
    - Tactical & Speed Reloads
    - Contact Responsibilities
    - Cover Responsibilities
- **Over 1000 Trained**

# 1<sup>st</sup> Surface Transportation Emergency Operations Summit and “Live Fire” Exercise (22 & 23 Jun 2004)



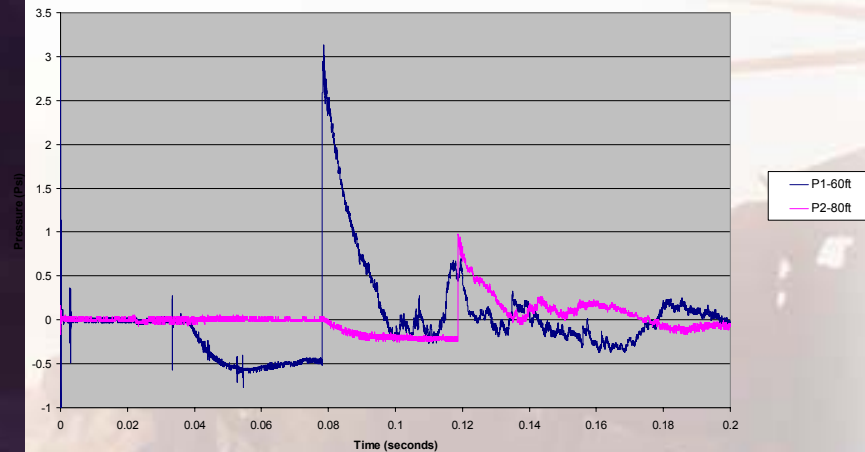
- NJ Transit
- Morris County
  - Prosecutor’s Office
  - Sheriff’s Office
  - SWAT
  - HAZMAT
- Rockaway Police and EMS
- Picatinny Garrison Security
- Picatinny EOD
- FBI
- TotalSecurity.US
- Morris County Canine



**Realistic Training for Multiple Scenarios**



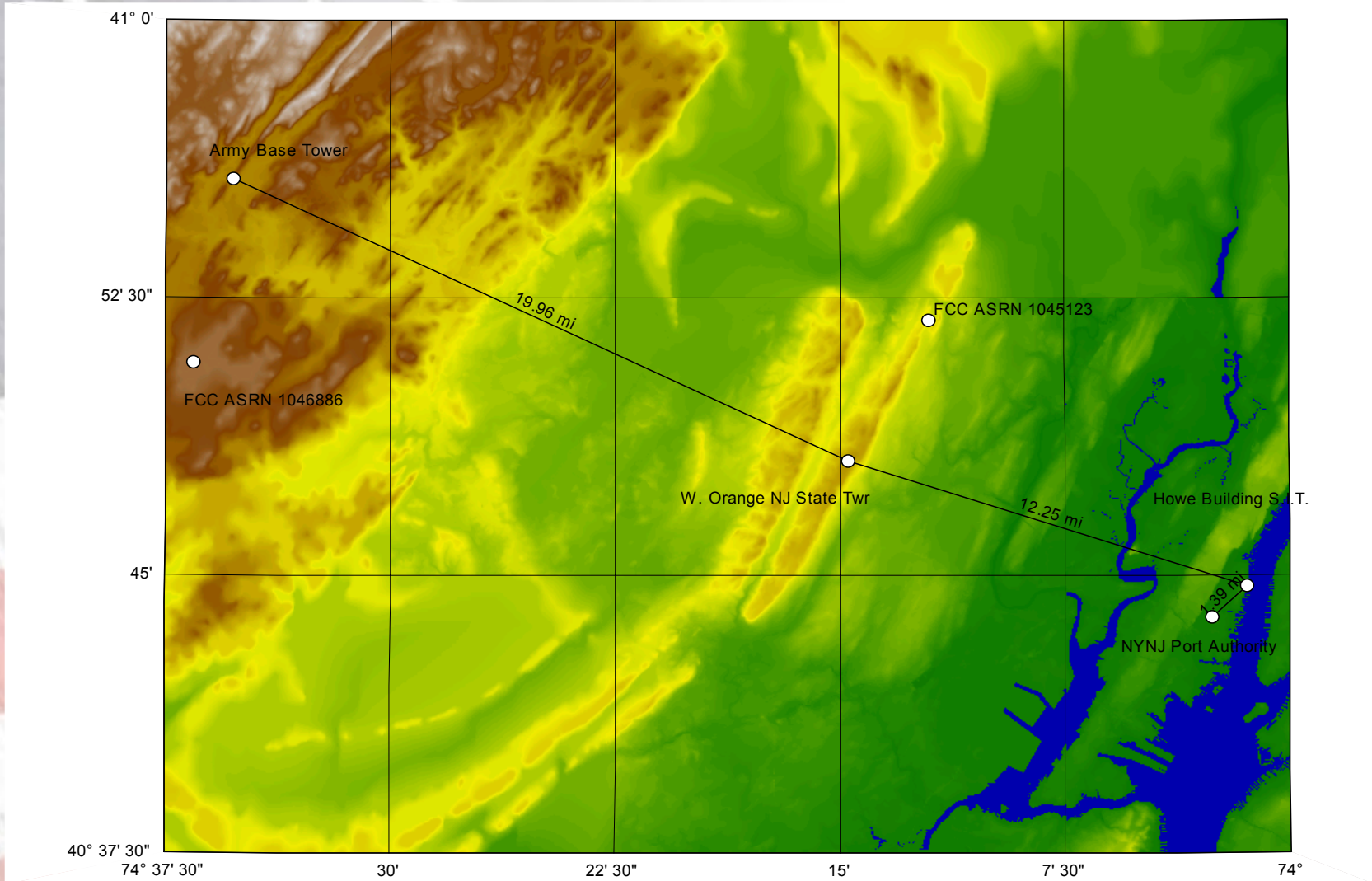
Bus with 12.5 lbs of C4  
Pressure vs Time







# Port Authority – Picatinny Backup Microwave Link



# Airborne Rapid Imaging for Emergency Support (ARIES)

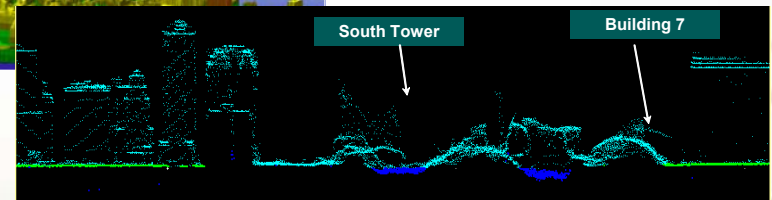
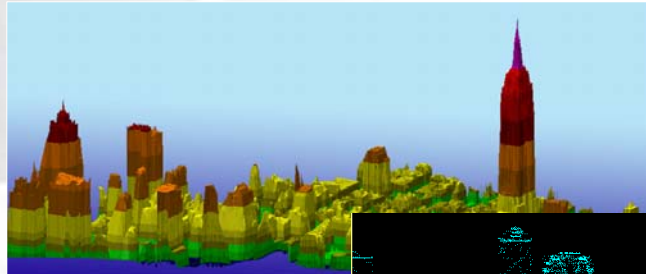
(Phase I Completed Oct 04)



## World Trade Center during 9/11

3 Sensors utilized to provide a comprehensive daily assessment of ground conditions in the search and recovery effort.

- Digital Optical
- LIDAR
- Thermal
- Problem: 9 hour turn around time



- A Homeland Security (ODP) Sponsored Program
- Phase 1 – System Demonstration – A proof of concept employing rapid response technologies for airborne imagery significantly improving over 9/11 results .
- The highly successful demonstration employed an airborne imagery acquisition, direct downlink (high bandwidth), a mobile ground processing station and a EOC that was able to distribute the information in less than 3 hours.

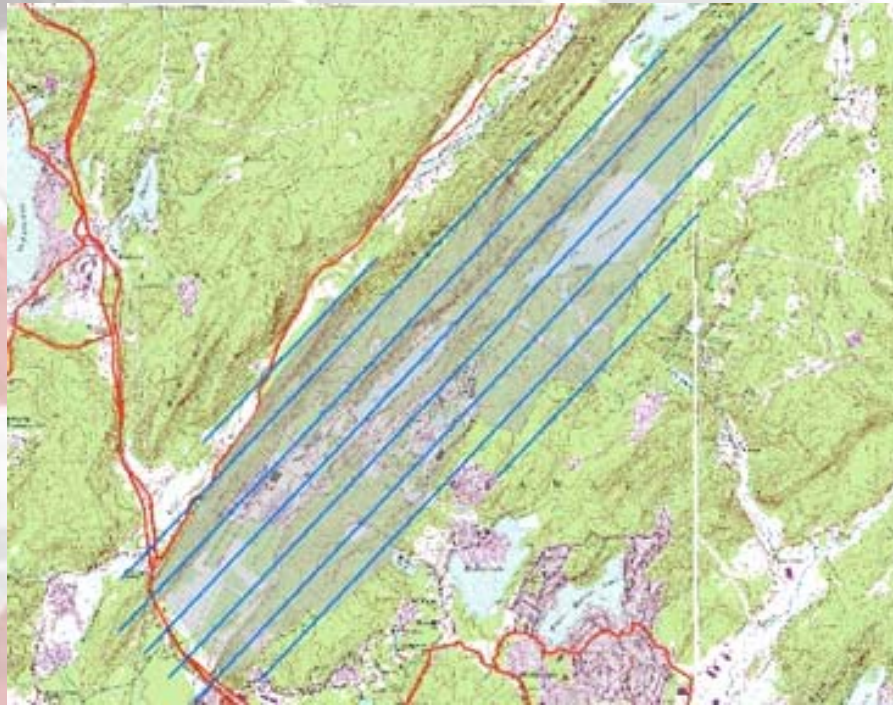
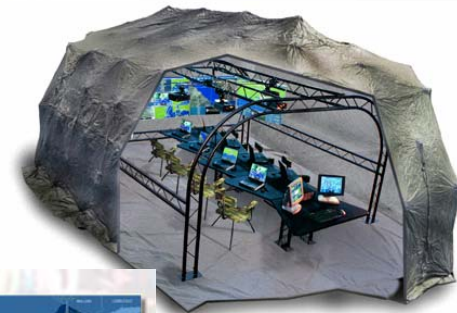
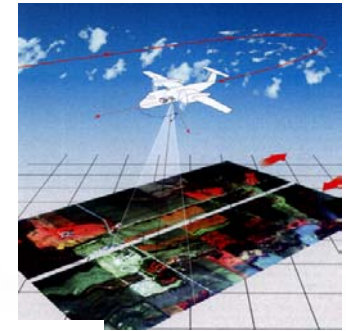
# ARIES Concept

(phase 1)

Enacting a plan to improve rapid response



1. Airborne Sensor Component
2. Downlink Technology
3. Mobile Ground Processing Station (MGPS)
4. Transfer Data to Picatinny's Simulation & Emergency Operations Center
5. Sent throughout NJ VIA HLS's ASOCCS system



# LOCAL

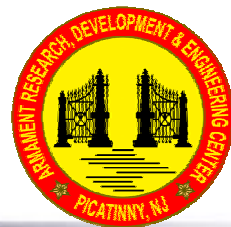
**HILL RACE**  
to research bal-

**HIGHLANDS BILL ON WAY TO BUSH**  
House unanimously adopts legislation despite worries about technical changes. **A23**

**CHARITY LOW ON DONATIONS**  
Interfaith Food Pantry relies on holiday giving but is seeing a decline in food contributions. **A23**

ER 18, 2004 [www.dailyrecord.com](http://www.dailyrecord.com)

## High tech response in times of disaster



## Picatinnny shows imaging of maps

**BY ABBOTT KOLOFF**  
DAILY RECORD

ROCKAWAY TWP — They arrived shortly after terrorists attacked the World Trade Center, taking aerial images of Ground Zero and then processing them at a makeshift command center in Albany to make maps to be used by emergency officials.

The high-tech maps were then sent to Manhattan using a transportation system that was low-tech.

"We gave it to a state trooper," said Bryan Logan, chairman of the board of EarthData, a Maryland-based mapping company.

Logan has a name for that system, which relied more on shoe leather than electronics: "The Sneekernet."

Logan said his company resorted to those tactics because the Internet was in chaos in the first days after the 9/11 terrorist attacks. EarthData's system for mapping Ground Zero — using thermal imaging to identify underground fires, and laser imaging and photographs to produce a detailed map — was cobbled together after a state agency asked company officials to see what they could do to help rescue workers avoid dangerous areas and find survivors buried under debris.



David Lilly of EarthData speaks with Lt. Col. Mike Hendricks, a teacher of geographic information systems at West Point about the radio dish antenna that will receive images from an airplane.

EarthData demonstrated a more polished version — called ARIES, or Airborne Rapid Imaging for Emergency Support — for military and emergency management officials gathered at the Picatinny Arsenal on Wednesday. The maps are now available, company officials said,

uses off-the-shelf technology, would allow first responders to have quicker access to detailed maps of disaster sites. It took 12 hours to get maps to emergency officials on 9/11.

The maps are now available, company officials said,

SEE ARIES / A22



# System of Systems SECurity (SoSSEC) Integration

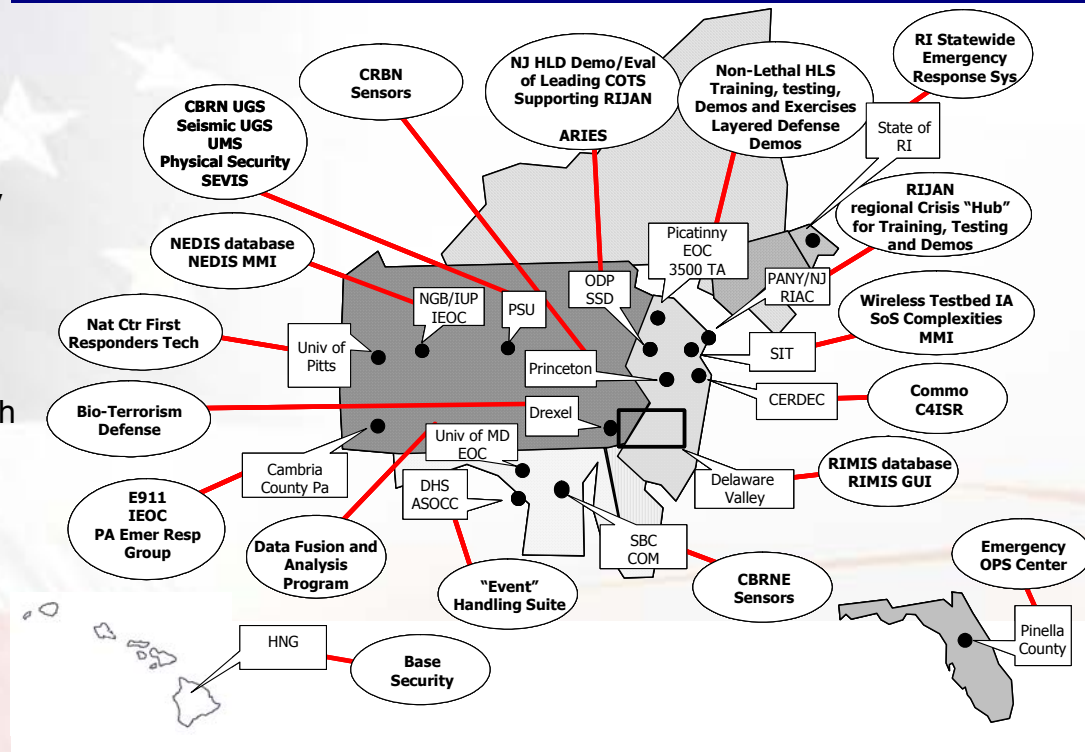


- ☑ Support preparation against asymmetric threats in Homeland Defense/ Security, Military Force Protection and Stability/Security missions
- ☑ Promote interoperability across organizational and geographic boundaries
- ☑ Maximize the combined, full spectrum of capabilities and solutions
- ☑ Operate across the full cycle of awareness, prevention protection, response, and recovery

## SoSSEC Program Goals

- ☑ Deliver an integrated “System of Systems” solution
- ☑ Promote an “Enterprise Architecture” approach
- ☑ Enable a spiraling set of demos
- ☑ Evaluate component system for utility and interoperability across the development spectrum
  - ☑ Commercial Off-The-Shelf (COTS)
  - ☑ Government Off-The-Shelf (GOTS)
  - ☑ Research and Development Initiatives (Universities, DoD/Federal & Commercial)

## Current Situation: Many Isolated “Islands” of Capability



# Office of Homeland Defense Technologies

## Hosting Demonstrations, Exercises & Conferences



- **Emergency Preparedness Incident Command Simulation (EPiCS)**
  - 10 MAR 04
- **NJ Transit 1<sup>st</sup> Surface Transportation Emergency Operations Summit**
  - 22-23 JUN 04
- **Airborne Rapid Imaging for Emergency Support (ARIES) Survey Demonstration**
  - 10 OCT 04
- **Northern New Jersey Urban Area Security Initiative (UASI) Meeting**
  - 20 OCT 04
- **NJ Regional Homeland Security Technology Committee Meeting**
  - 20 OCT 04
- **Layered Defense Demonstration (LDD) #1**
  - 20-21OCT 04
- **Airborne Rapid Imaging for Emergency Support (ARIES) Exercise**
  - 17 NOV 04
- **Northern New Jersey UASI Region Rapid Deployment Force Training Barrier Protection Penetration – Practitioner & Commander Course**
  - 15 DEC 04
- **Public Health Response to Terrorism: A Regional Approach Conference**
  - 16-17 FEB 05
- **Miniature Integrated Nuclear Detections System (MINDS)**
  - Deployed at Picatinny for demonstration and acquisition of baseline data
  - May 05
- **Layered Defense Demonstration (LDD) #2**
  - Jun 05

# Collaborating with



- CECOM
- ECBC
- TRAC WSMR
- Ft. Dix
- ODP, DOJ, Office of Homeland Security
- US Army Medical Research Institute of Infectious Diseases (USAMRIID) Fort Detrick, MD
- The Naval Undersea Warfare Center Division, Newport (NUWCDIVNPT)
- United States Military Academy – Providing Testbed design and SERIS support
- FEMA (integrating HAZUS into SERIS)
- Veterans Administration
- US Postal Inspectors (Training at Picatinny)
- Secret Service (Potential training at Picatinny)
- Picatinny Fire Department & Security Force
- State Police
- The NJ Regional Homeland Security Technology Committee (reports to NJ Domestic Security Preparedness Task Force)
- State of NJ Department of Military and Veterans' Affairs (NJDMVA)
- Office of Morris County Prosecutor
- Morris County Office of Emergency Management
  - ARDEC is a member of the Emergency Planning Council
- Summerset County
- Port Authority of New York and New Jersey
- New Jersey Transit
- SOSSEC Members
- NJ College of Medicine and Dentistry
- Stevens Institute of Technology
- Princeton
- Rutgers
- NJIT

# *Remarks and Conclusions*



- **Picatinny has extensive expertise in force protection, situational awareness, systems integration, modeling and simulation, and numerous other technologies that may be applied to HLD/HLS needs.**
- **Picatinny's Assets support optimized training technique development.**
- **Picatinny looks forward to participate with its partners.**