LLNL-PRES-415026

National Laboratory Support to Ports for Emerging Security Technologies

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Homeland-Defense Operational Planning System Program Leader

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Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory: a Multi-Disciplinary National Security Laboratory

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Dedicated to ensuring national security and applying science and technology to the important problems of our time

- 7000 employees
  - — 1800 PhD
  - — 3800 MS/BS/AA
- Annual budget of $1.6 billion

- 1.2-square-mile main site
- 7000-acre test site between Livermore and Tracy

How can you tap into a National Laboratory for your needs?

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- Our Homeland and National Security Programs provide access to a number of services and subject matter experts:
  - Technology Test and Evaluation
    - WMD Detection - Chem, Bio, Rad, Nuclear, Explosives
    - Communications
    - Physical Security
    - Cyber Security, including SCADA
  - Training and Exercise
  - Critical Infrastructure Assessments and Vulnerability Assessments
  - Innovative science and technology for security
    - Intelligence, Surveillance, and Reconnaissance (ISR)
    - Advanced analytical tools for threat assessments
    - Advanced data fusion tools
    - Ultrawide Band Radar for communications and detection
- National Reachback capabilities:
  - Critical Infrastructure/Key Resources
  - Biotechnology
  - WMD technology
  - Response and Recovery
  - Forensic Science
  - WMD and Counterterrorism Intelligence

e.g., we're a partner in the DNDO West Coast Maritime Preventive Rad/Nuc Detection (PRND) Program

LLNL technologies applied to domestic security are making our nation safer

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- Countering terrorism
  - Radiological and nuclear
  - Chemical and biological
  - High explosives
- Infrastructure protection

Radiation detection

Explosives Detection

Maritime Security

Cargo screening

Transit security

Biological Detection

The Homeland-Defense Operational Planning System (HOPS) is supported by the California National Guard

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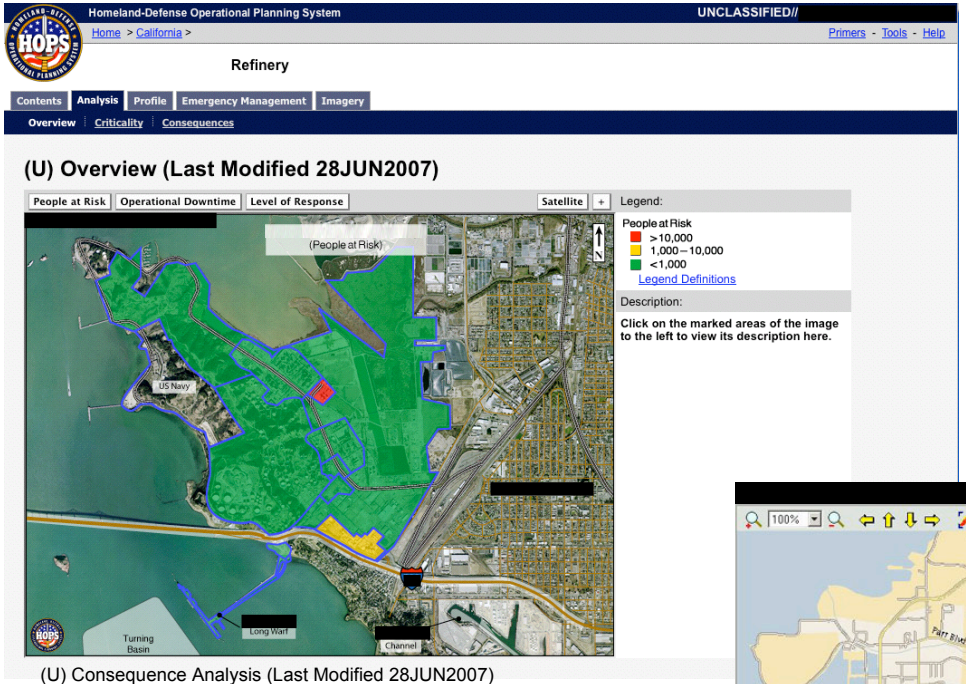
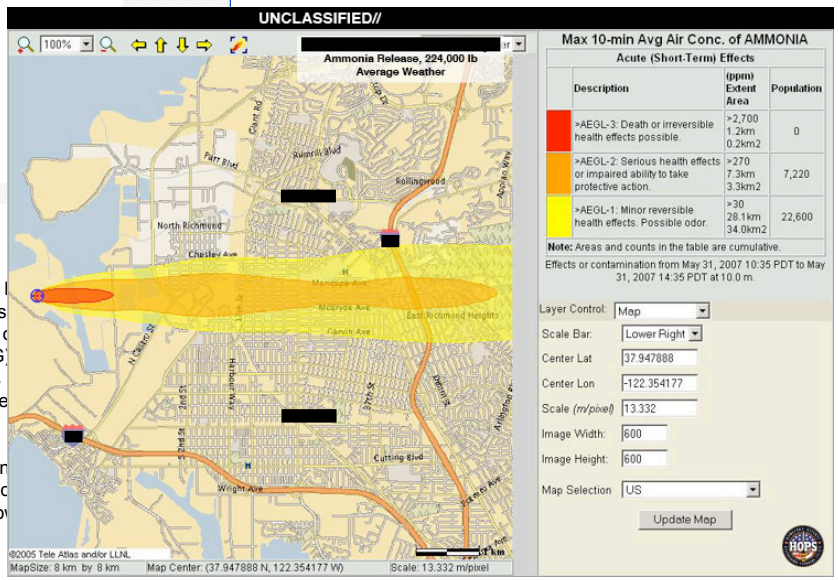


(U) Consequence Analysis (Last Modified 28JUN2007)

(U) Summary

(U) The XYZ Refinery includes several processes that require the use of extremely l
materials in the processing of crude oil. According to the offsite consequence analys
facility's Risk Management Plan (RMP), anhydrous ammonia is the most significant c
toxic standpoint.[1] Other materials of concern include liquefied petroleum gas (LPG)
flammable mixtures of butane, isobutane, and propane.[1,2] Should these materials
either as a result of an accident, natural threat, or deliberate attack, health conseque
significant.

(U) A release of ammonia from the ammonia storage area results in the greatest con
Under average weather conditions, such a release could result in concentrations exc
minute AEGL-2 concentration (i.e., HOPS level of concern) over 9 km (5.7 miles) do



HOPS has recently completed facility and vulnerability assessments for the key California Ports

Persistent surveillance for maritime domain awareness

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LLNL provides critical reachback capabilities for the nation

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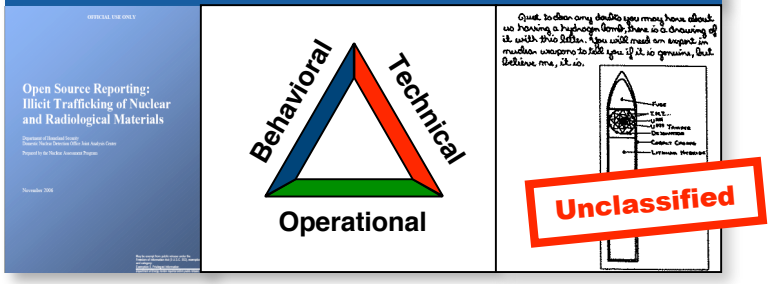
Interagency Modeling and Atmospheric Assessment Center (IMAAC)

Global- to urban-scale dispersion modeling and hazard analysis for emergency response and preparedness

Nuclear Assessment Program (NAP)



Actionable, timely assessments and studies of nuclear threats

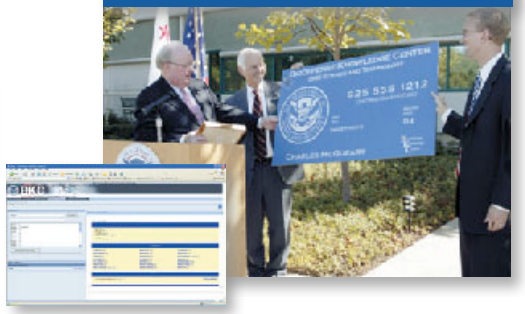
Forensic Science Center (FSC)

Analysis and characterization of samples of interest for proliferation, terrorism, or law-enforcement

Homeland-Defense Operational Planning System (HOPS)

Assessments of U.S. critical infrastructure for planning, response, and recovery

Biodefense Knowledge Center (BKC)



National clearinghouse for rapid-response and in-depth assessments of actionable biodefense information

LLNL provides solutions, analysis, and assessments to protect infrastructure and people

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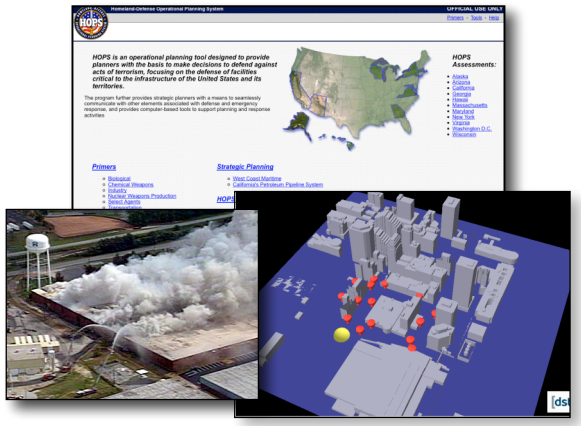
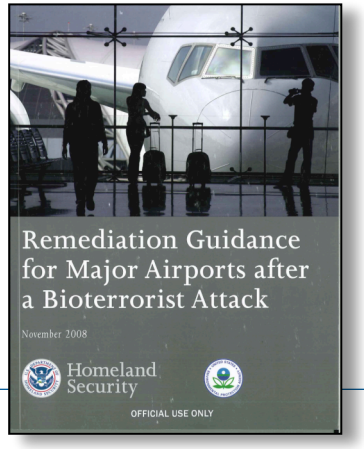
WMD Response Training and Exercise

Site and Facility Assessments

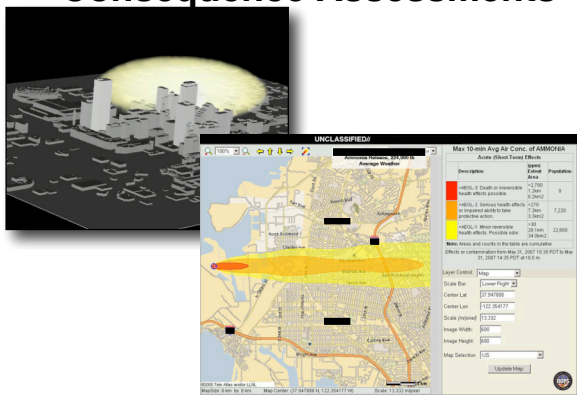


System Architectures and Testbeds

WMD Response and Recovery



Consequence Assessments



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Questions?

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Backups

We are fielding radiation detection technologies for maritime security training and exercise

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Boat passing between two Coast Guard vessels outfitted with LLNL-developed Adaptable Radiation Area Monitor (ARAM) radiation detectors

HazMat team sending spectra files of radioactive sources to the Domestic Nuclear Detection Office

A team of Coast Guard officers, searching for a radioactive source using a hand-held radiation detector

Training Exercise and Lessons Learned (TELL) Program

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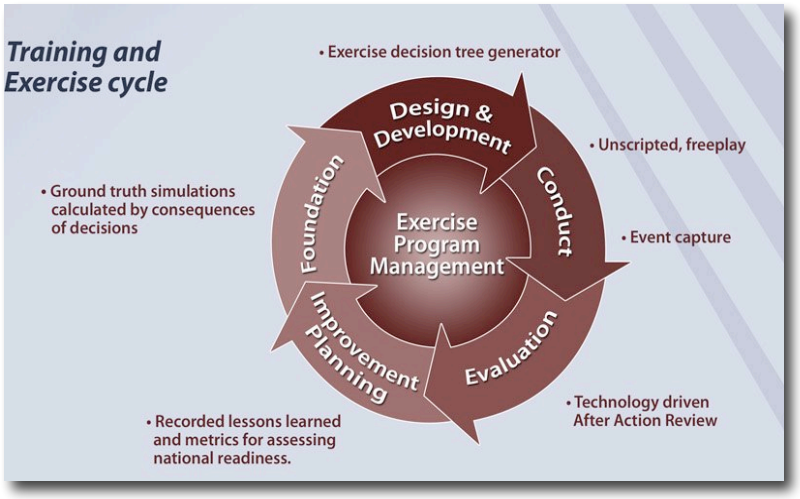
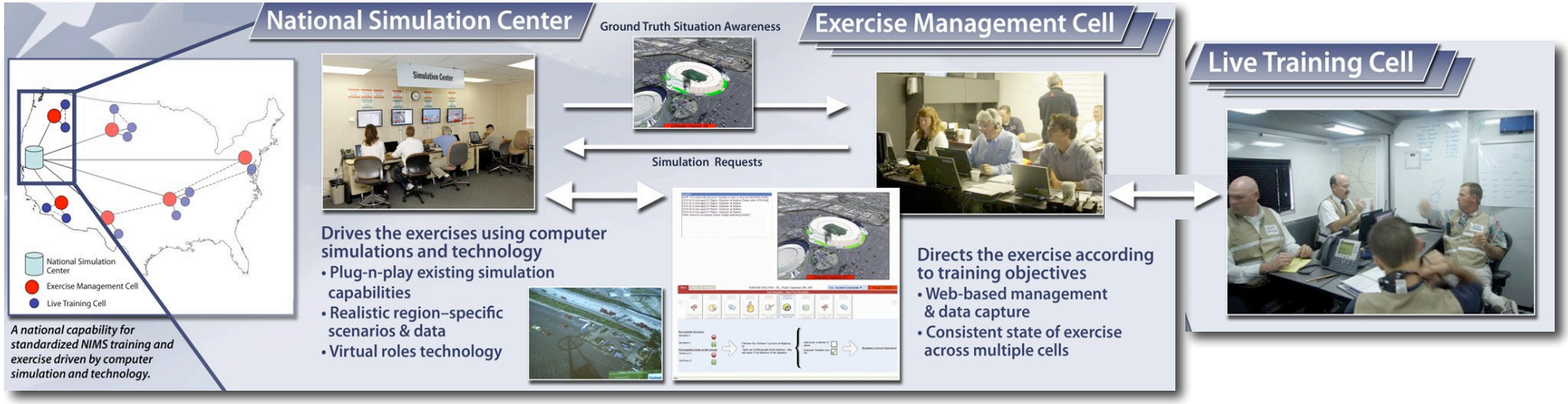
- The TELL Program is exploring how to use simulation and technology to conduct multi-jurisdictional training exercises using different simulation and technology methods to drive training and exercises
  - Distributed exercises
    - Planning
    - Exercise Management
  - Framework
    - Simulation Cell
    - Exercise Management Cell
    - Training Cell





WebExer is an exercise management tool

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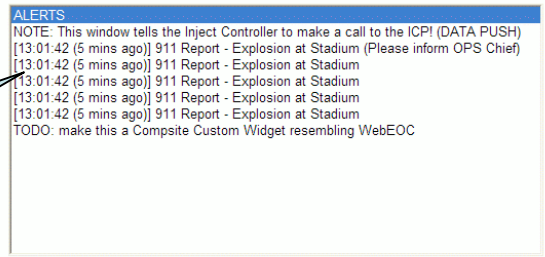
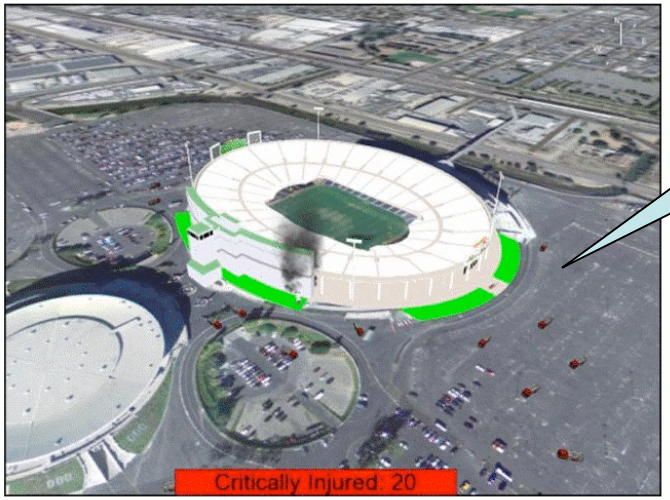
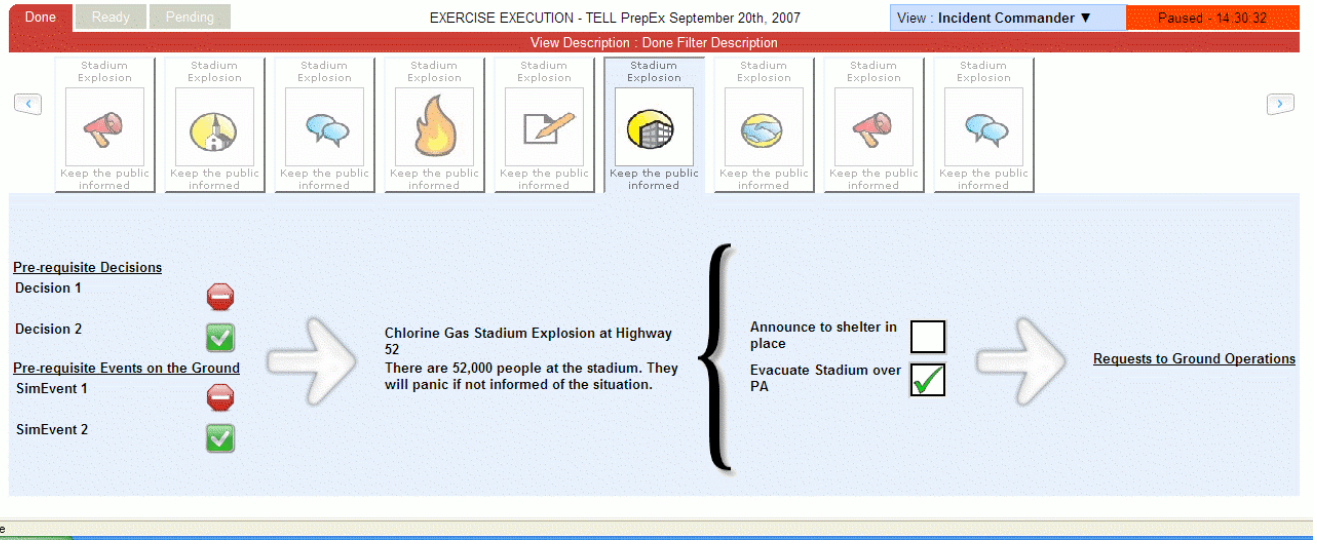
Alerts are generated by the simulation to instruct the inject controllers what to do.





Situation awareness about the event is gained from the 3D picture of the disaster



DHS Interagency Modeling and Atmospheric Assessment Center (IMAAC)

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Reach-back support for national-level hazardous airborne events

- Provides advanced operational plume modeling services and tools as codified in the National Response Plan:
  - Provides real-time predictions for major airborne hazardous release incidents
  - Supports national-level exercises (e.g., TOPOFF4)
  - Provides outreach, training and Web tools to federal and state agencies
  - Maintains and upgrades atmospheric model and computer systems

IMAAC and RTOP provided 24/7 support of the TOPOFF4 exercise

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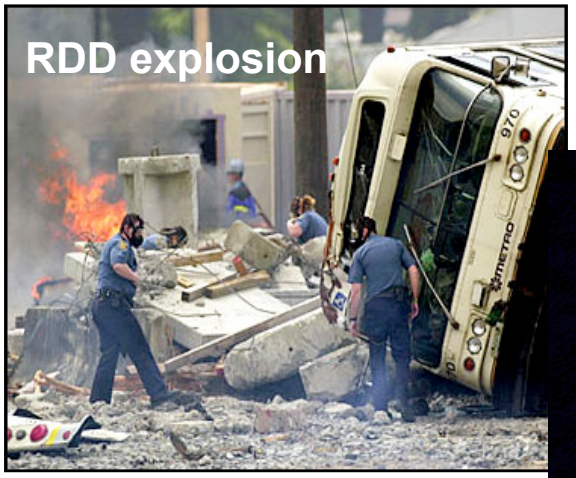
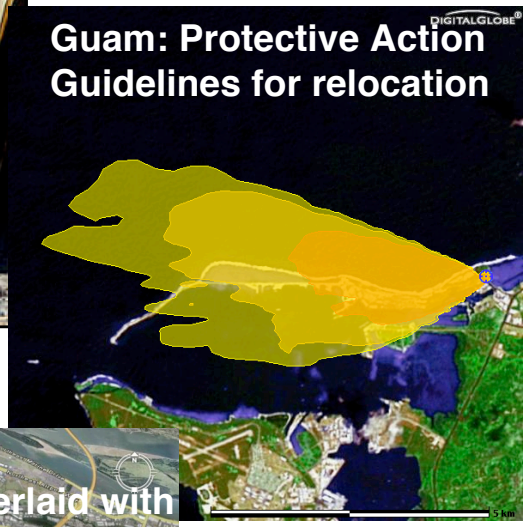
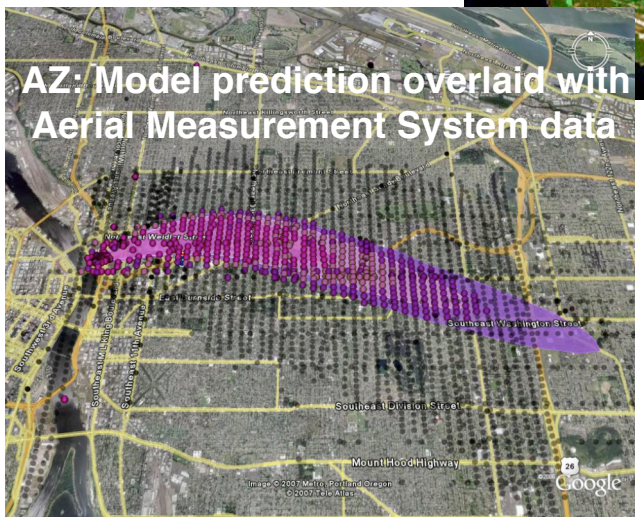
- Congressionally-mandated biennial counter-terrorism exercise
- Largest and most comprehensive exercise carried out to date
  - 15,000+ participants
  - Three venues (Guam, Oregon, Arizona)
  - Federal, state, and local agencies
  - International partners (Australia, Canada, U.K.)
  - Private sector
- Tested full-scale response to radiological dispersal device attacks







LLNL leverages its conflict simulation tools for modeling and simulation from the building to the regional level

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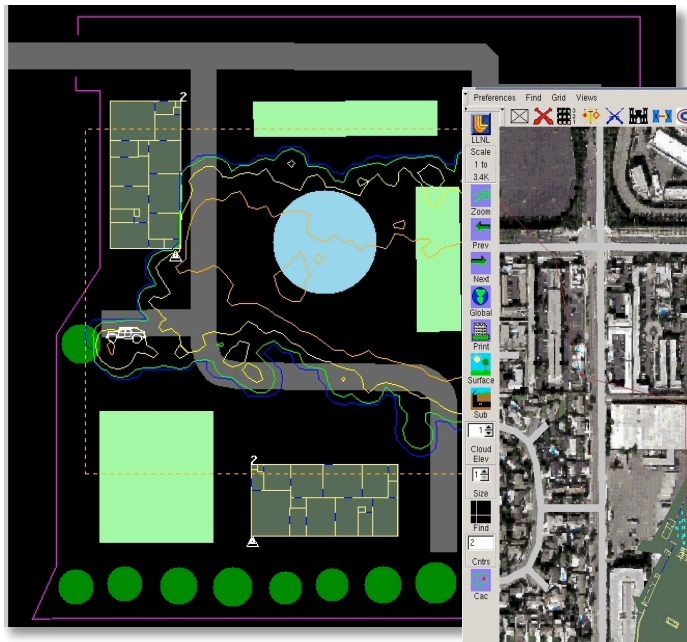
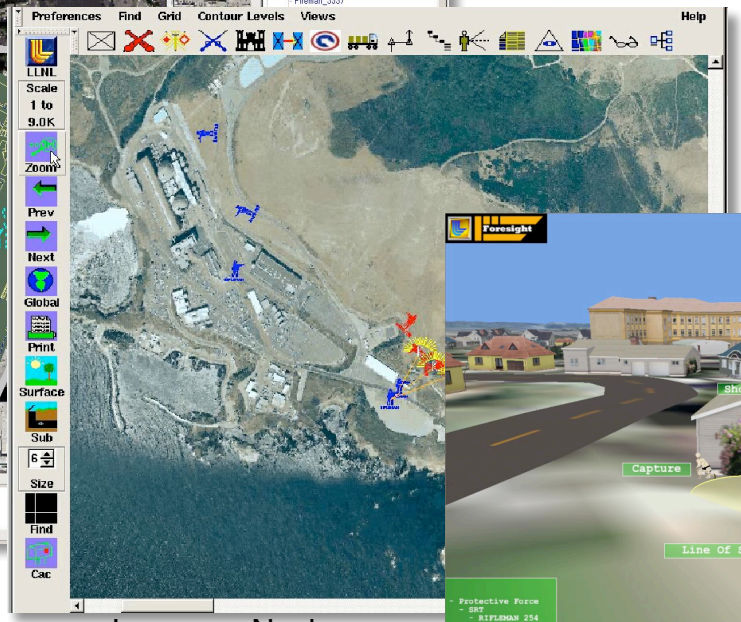


ACATS Immune Building Program

Regional Technology Integration Initiative



Japanese Nuclear Power Program Development

Foresight 3D Interface

Persistent surveillance has potential applications to maritime domain awareness

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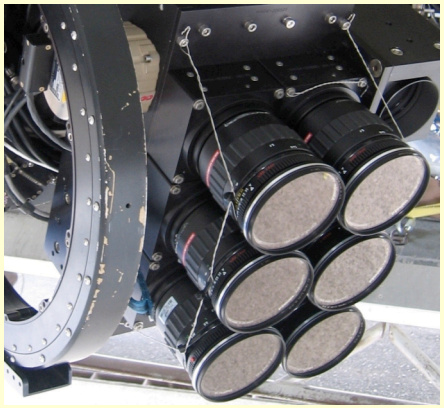
LLNL scientists and engineers have addressed the challenges involved with system integration and safety in an airborne environment

Shorts SC-7

66 Mpx camera
2 Hz, 8 km x8 km field of view



Camera system mounted to a stabilized three axis gimbal cantilevered out of the aircraft aft door