Applied Technologies for Homeland Security
March 6, 2005

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JPL Is Part of NASA and Caltech

- Federally (NASA)-owned “Federally-Funded Research and Development Center” (FFRDC)
- University (Caltech)-operated
- $1.4 billion business base
- 6400 employees and contractors
- 177 acres
- 134 buildings and 531 facilities
- 676,000 net square feet of office space
- 560,000 net square feet of non-office space (e.g., labs)
The Linkage

The NASA Mission
To understand and protect our home planet
To explore the Universe and search for life
To inspire the next generation of explorers
.... as only NASA can

JPL’s Mission Flows from the NASA Mission

We enable the nation to explore space for the benefit of humanity.
Our Mission is:
1. To explore our own and neighboring planetary systems;
2. To search for life outside the Earth’s confine;
3. To further our understanding of the origins and evolution of the Universe and the laws that govern it;
4. To make critical measurements to understand our home planet and help protect its environment;
5. To apply JPL’s unique skills to solve problems of national significance
6. To inspire the next generation of explorers
DHS Themes for FY 06

- Revolutionizing our Borders
- Strengthen Law Enforcement
- Improving National Preparedness and Response
- Leveraging Technology
- Creating a 21st Century Department

Comments from Press Conference with Acting Secretary of Homeland Security Admiral James Loy on the FY 2006 Budget
Synergistic Areas of Interest

- Civil Space Sector (including Homeland Security)
  - Advanced Communications
  - Bio sensors & detectors
  - Space-based global sampling
  - Remote sensing
  - Robotics, in-situ
Information Sharing

Incident Scene 1st Responders

Federal Mobilization

Medical Specialized Resources

State/Local

JPL Related Technologies - All Space Proven and Available Now

Sensors, Robotics, Low Data Rate Wireless Communications, Data Retrieval, Image Processing, Geographical Information Systems, Data Distribution, Knowledge Management, Intelligent Agents
Issues for Applied Homeland Security Technologies

- Cost is a major element
- Ease of operation - user community needs
- Must have multiple applications, no ‘one trick pony’
- No (or low level) “FALSE-POSITIVE/NEGATIVE”
- Think ‘bottom line’ ROI
Concerns Being Addressed:

- Improvised Explosive Devices (IED)
- First Responder Safety Issues
- CBRNE-IA (Chemical, Biological, Radiation, Nuclear, Explosives, Information Assurance)
- Border Control
- Improved Law Enforcement support
Winning Proposals

- Low Cost of Procurement and Ownership
- Research/Development Combined With Industry Partners for Production - Life-cycle Maintenance
- Innovation Is Nice, Technology Has to Demonstrate a Realistic “Concept of Operations”
The Sensor Web is a new class of instrument that creates a
- rapidly deployable
- scaleable
- robust
- long-lived
- self-forming wireless network of interacting
detection sensors over a wide geographic area that can interpret external conditions and react and adapt to the environment.

The Sensor Web is a Dynamic Infrastructure for Sensors Goal is to synthesize knowledge from data.

http://sensorwebs.jpl.nasa.gov
NASA Sensor Web: Sensors Attached to Pods

Multiple Sensors and Types per Pod Allowed

Already Demonstrated:

- Light (visible)
- Temperature (air, soil, water)
- Relative Humidity
- Soil Moisture
- Water Conductivity (total dissolved solids)
- H₂S (hydrogen sulfide) Gas Sensor
- Oxygen Gas Sensor
- Sonic Pinger for Water/Snow depths
- Smoke Detector
- Radiological Detector (radon)
- Tiltmeter for Security Ops
- BTEX (organic contaminants) for Remediation Ops
- ClO₂ (chlorine dioxide) Gas Sensor for Decontamination Ops

... and many others are possible
NASA Sensor Web: A Field-Tested Technology

Kennedy Space Center: Coastal Environment

Simulated Rainforest: Extreme Humidity

New Mexico Desert: Extreme Heat

Antarctica: Extreme Cold

Fairbanks: Snow / Ice
Responder Tracking, Sign In/Out, Communication Infrastructure, Gas Monitoring, etc.
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