Border and Maritime Security Division

University Network Research and Education Summit 2007

CDR David Newton: *Moderator / Maritime Security*
Gerald Kirwin: *Program Manager, Border Security*
Bob Knetl: *Program Manager, Cargo Security*

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Borders and Maritime Security Division

Mission Statement

Develop and Transition Capabilities that Improve the Security of our Nation's Borders without Impeding the Flow of Commerce and Travelers

- **Stop Bad Things and Bad People from Entering the Country**

AND

- **In the Maritime- Protect the Public, the Environment, and U.S. Economic and Security Interests**

Borders are all land and maritime borders including U.S. ports-of-entry, vast stretches of remote terrain and inland waterways

Customers:

Customs and Border Protection (CBP), United States Coast Guard (USCG), Immigration and Customs Enforcement (ICE), Transportation Security Administration (TSA), and Citizenship and Immigration Services (CIS)

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Border Security

Gerald Kirwin

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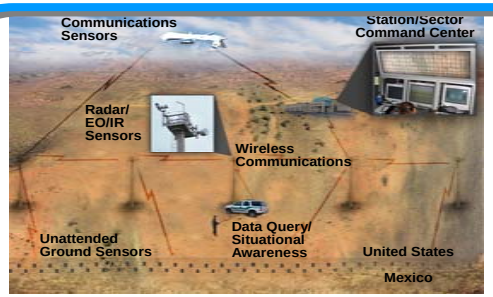
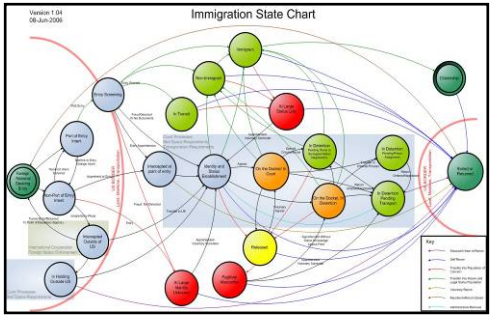


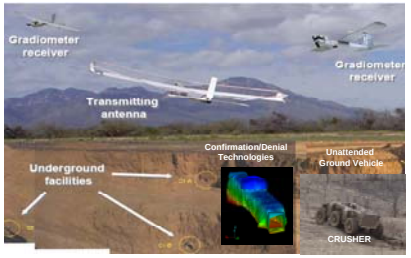
BorderNet - Connects law enforcement officers in the field to real-time information from law enforcement databases and geographic information systems using a wireless communication network

Border Detection Grid – Detects and classifies cross-border movement with a grid of advanced sensors and DCL technologies

Sensor/Data Fusion and Decision Aids - Fuses tactical information from multiple data sources such as sensors and monitors, and provide different layers of detail



Secure Border Initiative (SBI) Systems Engineering and Modeling & Simulation - Helps border enforcement agencies to make informed improvements in immigration and border security policy and operations, as well as investments in technology, complex systems and infrastructure



Tunnel Detection – Uses an integrated-systems approach to combine different sensing technologies to confirm illegal and clandestine underground border structures and activities

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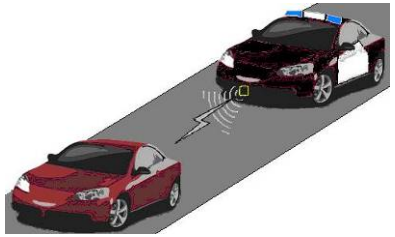
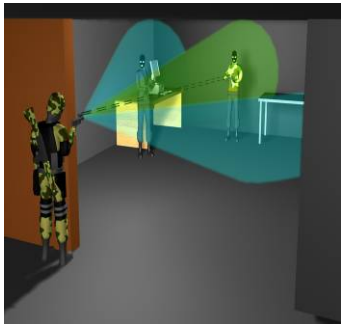
Border Officer Tools and Safety

Officer Safety Load Carriage System - Combines personal protection, floatation, and load carriage capability into a wearable system



Microwave Vehicle Stopper – Stops vehicles with highly effective, easily deployable, and inexpensive less-lethal technology for law enforcement



Light Emitting Diode Incapacitator - Produces disorientation and strong flashblindness with afterimages

Integration of mobile biometrics - Provide in-the-field capabilities to improve agent mission effectiveness and safety – mobile enrollment

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Border Technology Challenge

Northern Border Surveillance

- The Challenge: Develop an integrated network of sensors and sensor platforms that can provide effective surveillance, detection, tracking and classification of persons and contraband illegally crossing the U.S.-Canadian border

- Operational Environment Considerations:
  - *Harsh winter weather: snow, ice, wind and cold*
  - *Dense foliage*
  - *Forests and mountainous terrain*
  - *Land use restrictions*
  - *Long stretches of remote border area*

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Border Technology Challenge

Passive Coherent Localization (PCL)

- The challenge: develop a passive radar system that exploits ambient RF signals for target detection and tracking
  - *Position multiple receiver in a multi-static configuration*
  - *Sources include radio, TV signals, cell phone, existing radars and microwave signals*
  - *low FAR and high Pd*
- Technology has been sucessfully demonstrated to detect and track fixed wing and rotary aircraft
- Avoids need for transmit towers and provides potential cost saving compared to conventional radar systems

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Cargo Security

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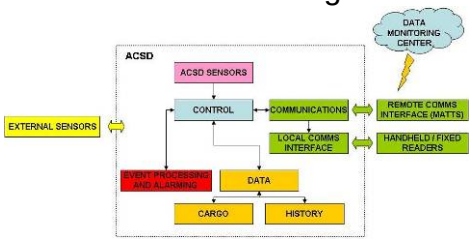
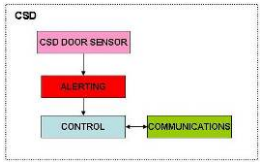
DHS S&T Cargo Security Programs

Advanced Container Security Device (ACSD) - Monitors container's 6 sides for intrusion as well as human cargo

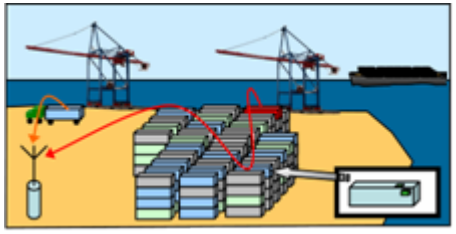


Container Security Device (CSD) - Monitors the container doors only (in advance of an ACSD capability)



Composite Container - Next generation container constructed of alternative materials and allows utilization of embedded security sensor technology

Marine Asset Tag Tracking System (MATTS) - Provides remote communications capability for an ACSD (and potentially CSD) to transmit alarm and status info



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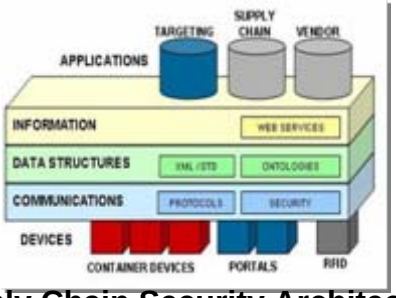
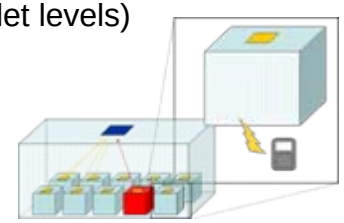


Supply Chain Security Architecture Defines systems multi-level, multi-security data flow, structures and COMMS for all elements for movement of secure freight

Secure Carton - Monitors tampering of cargo packages (box, carton, or pallet levels)



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Advanced Screening and Targeting (ASAT) - Advanced anomaly and pattern detection tools to improve targeting algorithm

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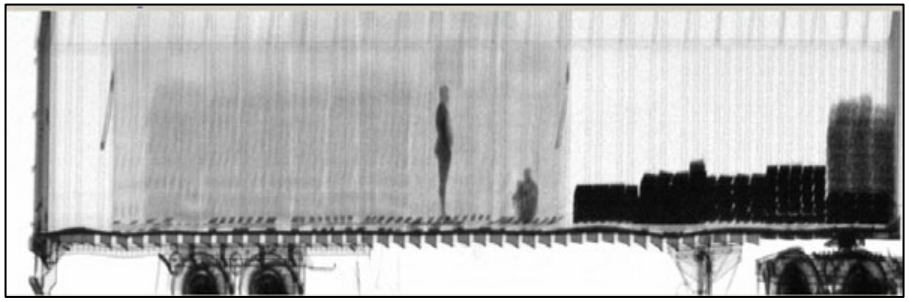
Cargo Technology Challenge

Container Scanning and Imaging

- The ability to conduct *effective* non-intrusive inspection of steel containers through scanning and imaging is Custom and Border Protection's (CBP) highest priority gap
- Current non-intrusive inspection (NII) systems provide limited penetration capabilities, low resolution and throughput
- Radiographic methods employed cannot be harmful to people and food products
- **Is it possible for imaging systems to have increased penetration and enhanced resolution while being safe to humans (operators and possible stowaways) and food products?**
- Considerations:
  - Which emerging technologies, or combination of technologies, could possibly increase steel container scanning penetration, image resolution and throughput?
  - Could these technologies be safe for humans – CBP operators or stowaways?
  - Are these technologies mobile and interoperable?
  - How could these technologies be utilized and operated (CONOPS) in the port environment?



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Cargo Technology Challenges

Cargo Sensors

- Sensors to detect WMD materials (e.g. chem/bio/explosives) in containers that can survive the supply chain environment (extreme temperatures and conditions), are low cost, can be sustained for long periods (70 days to multi-year), and have high Pd and low Pfa, etc. are NOT currently available.
- Considerations:
  - Long-dwell sensors that transit with the container
  - Short-dwell sensors, such as operator handheld devices
  - Sensitivity levels; Pfa required <.0001
  - Interoperable with deployed systems (e.g. NII) and next generation systems (e.g. CSD/ACSD)
  - Operations can easily be incorporated into the port environment (power, small foot print, skill level of workforce)

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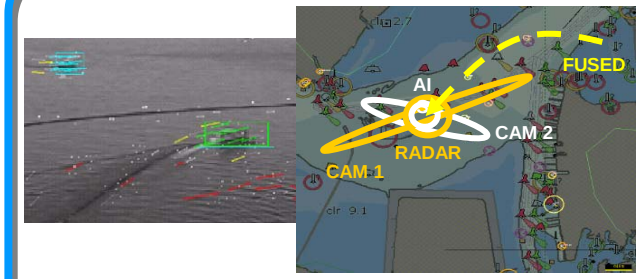
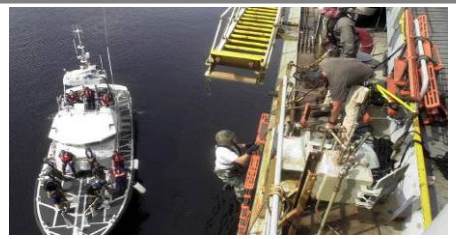


Automated Scene Understanding – Uses cameras to automatically detect, classify, & track objects and people, learn normal behavior and alert anomalies

Vessel Stopping -Permits safe interdiction by law enforcement personnel with Non-lethal compliance measure for vehicles and vessels (or aircraft) engaged in illegal migrant operations, contraband transport, fishing, security threats or general law violation

Port and Coastal RADAR Improvement - Assesses current RADARS (Furuno-SCC Miami; Terma-JHOC Hampton Roads) and record maintenance and operator use to evaluate performance



Boarding Team Communications - Replaces intermittent and unreliable USCG Boarding Team communications with a continuous, reliable, inter-deck and team-to-ship communications platform

Affordable Wide-Area Surveillance (WAS) – Cues USCG and allows time to investigate suspicious vessels or anomalous behavior 12-60+ miles offshore before the vessel enters port

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Maritime Technology Challenge

Finding vessels while at sea before they reach port

- Small target relative to the large areas of interest
- “Needle in a Haystack”
- Detect, Track & Identify with risk assessment

Identifying objects of interest in a cluttered environment

- Many objects/vessel in an area
- Detect, Track & Identify with risk assessment

Employing non-lethal/less-lethal technologies

- Stop people and vessels

Safely deploying more capability to the field

- New sensors for agents/officers to carry
- Near real-time sampling in field location transmitted to experts in labs

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