

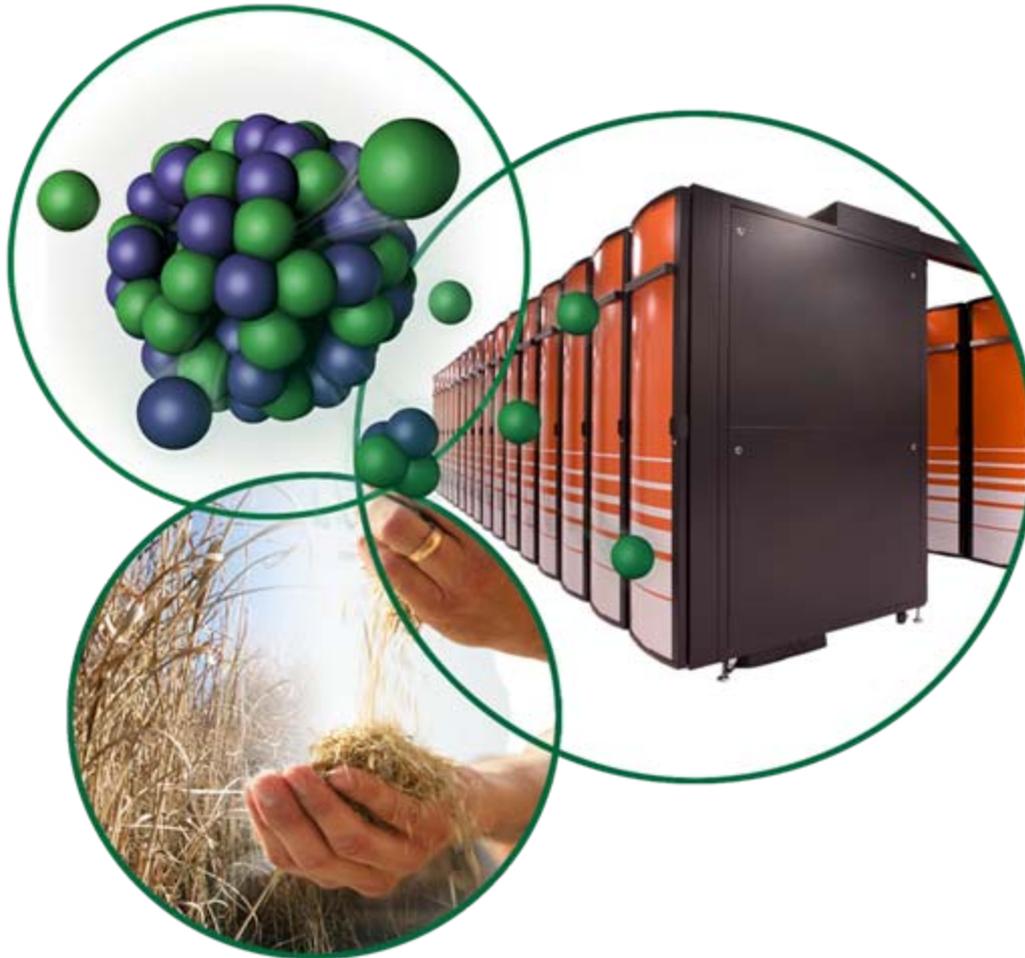
Oak Ridge National Laboratory: Delivering 21st Century Science and Technology

“Experiences with Multiple Uses of Weigh-in-Motion (WIM) Data”

Presented at:
**2008 North American Travel
Monitoring Exhibition &
Conference**

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**Omni Shoreham Hotel, Washington, DC
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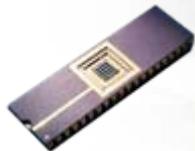
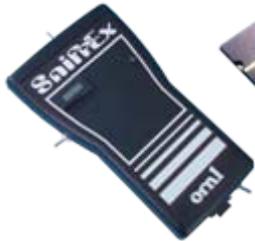
Today's Agenda

- **Status of ORNL WIM with respect to:**
 - Fixed and Mobile Uses at Sites in US Military
 - Fixed Sites at Federal and State Safety and Enforcement Agencies
- **“Multiple Use” Integrated Theme – Technology Integration for Knowledge Management**
 - Sensor Integration,
 - Disparate Data Integration → Knowledge Management, and
 - Web 2.0 Level 0-3 Applications*
- **Expanded themes**
 - **Multiple Use with other Sensors - Interdiction, detection, emergency response**
 - Mobile, Transportation Corridors, Ports, Military Bases
 - Check Points
 - **Real-Time Data Management**
 - Collection, Dissemination, Archiving
 - **Analysis**
 - Cost, Performance Prediction, Risk vs Benefit
 - **Wide-area ubiquitous sensing, actuation, and deployment**
 - Orchestrating the functionality across a large system of distributed sensors/processors
 - **Cross-agency and cross-administrative boundary data-sharing and interoperability**
 - Standards and policies
 - **Net-Centric Services**

Current Uses of WIM Generated Data

- **US Military Applications**
 - **Deployment Data to support Logistical Unit Moves**
- **Federal and State Weight data at Weigh and Inspection Stations**
 - **Total Weight and Axle Weight for Safety compliance**

Enhancing National/Homeland Security



Uses of ORNL WIM – US Military

- **Fixed and Portable Uses of WIM in US Military**
 - **Evaluated at 10 Sites (9 portable and 2 Dual Use)**
 - Ft. Bragg, NC,
 - Ft. Lewis, WA,
 - Wheeler Army Airfield, Schofield Barracks, HI,
 - Ft. Sill, OK,
 - Ft. Eustis, VA,
 - Ft. Drum, NY,
 - Naval Mobile Construction Battalion (NMCB) and 20th Seabees Readiness Group (SRG), Gulfport, MS,
 - NMCB & 31st SRG, Port Hueneme, CA, and
 - Surface Deployment and Distribution Command (SDDC) at Port of Beaumont, TX, Ft. Hood, TX
 - **Used in real-world exercises, actual deployments and retrograde missions for DOE and DoD**
 - Seabees - Fleet and Mount Out Exercise for Air Detachment
 - US Army - Wheeler Army Airfield, Schofield Barracks, HI – Used during deployment of 3rd Brigade, 25th ID in support of Operation Iraqi Freedom (OIF)
 - DOE - Retrograde of Highly Enriched Uranium

Weigh-In-Motion Data Associated with Military Movements

- Electronically Retrieves Deployment Information
- Identifies Vehicle
- Automatically Weighs & Determines COB
- Dynamic or Static
- Digital Imaging provides
 - Length, Width, Height
 - Cube
- “Actual” Data processed to Appropriate Deployment IT System (Surface, Air or Sea)
- Eliminates Stress, Weather Related and Other Human Errors
- Automated In-Motion Vehicle Evaluation Environment (AIMVEE)

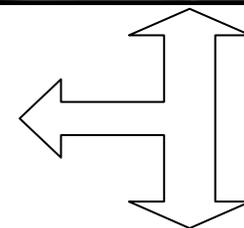
- 48 Hour Mount Out
 - Night
 - Day



ORNL WIM ... Weighing a Stryker



Ft. Lewis, WA



Click on picture to view video in mpg format.

ORNL WIM ... Weighing a Stryker Static Scale Conversion to WIM



Click on picture to view video in mpg format.

ORNL WIM ... Weighing Helicopters



[Blackhawk Movie \(Quick Time Movie\) click on text](#)

Uses of ORNL Technologies in Association with WIM Data



- **Fixed Sites at Federal and State Safety and Enforcement Agencies**
 - Tennessee – I-75/I-40 Weigh and Inspection Station
 - South Carolina – I-26 Dorchester County Weigh and Inspection Station
 - Kentucky – I-75 Laurel County Weigh and Inspection Station
- **Mobile System**
 - All sites are a candidate for introduction of portable WIM to create a Virtual Weigh and Inspection Station

Leverage SensorNet ConOps: Sensor Integration for Real-Time Enforcement Inspection Decisions

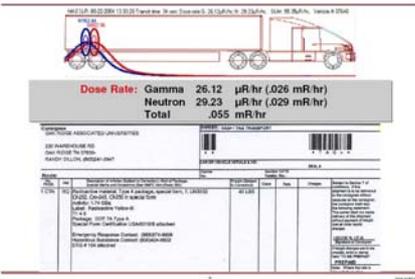


Knox County, Tennessee



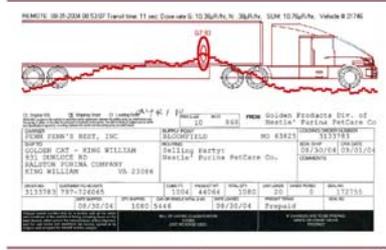
Dorchester County, South Carolina

Example: Point Source

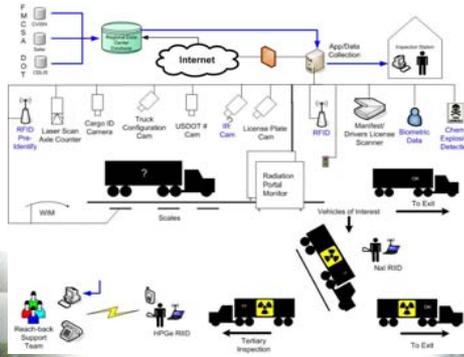


“The more alternatives, the more difficult the choice” - Abbe' D'Allanival

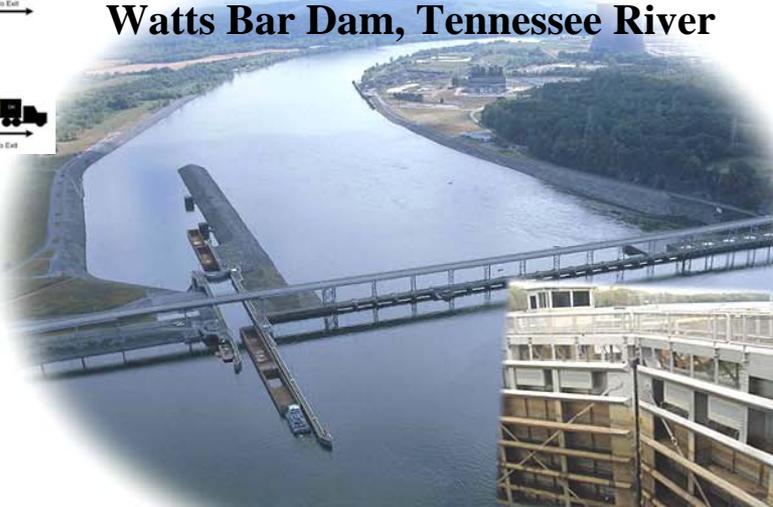
Example: Distributed Load



Laurel County, Kentucky



Watts Bar Dam, Tennessee River





“Multiple Use” Integrated Theme – Technology Integration for Knowledge Management

“Multiple Use” Integrated Theme

Technology Integration for Knowledge Management

- **Three Requirements**

- **Security**

- **Guarantee that vehicles in commerce transporting unlawful material do not pose security risk to the general public**

- **Safety**

- **Ensure that safety of commercial transporters are safe**

- **Supply Chain**

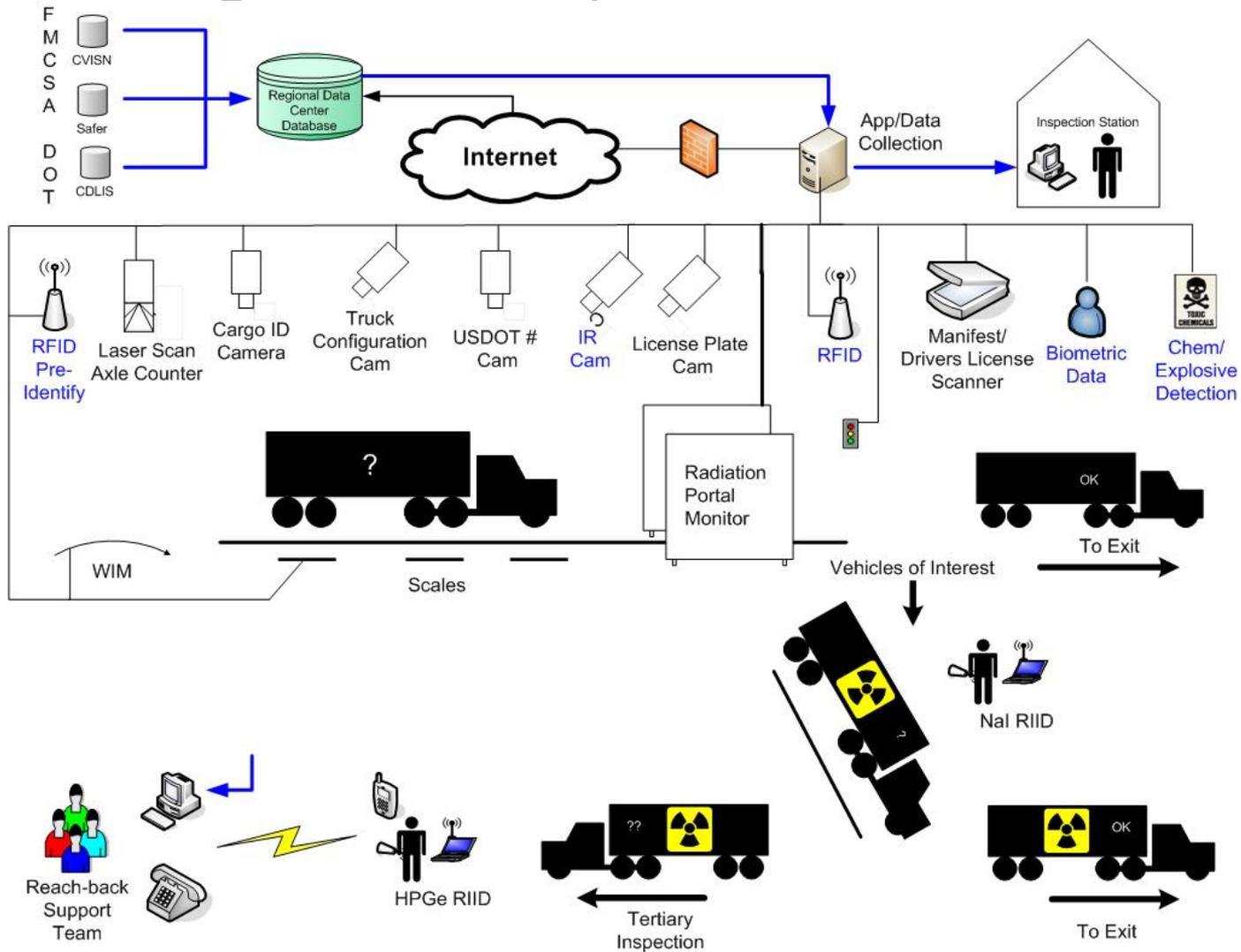
- **Minimize impact on commercial sector while maintaining and ensuring Security and Safety**

“Multiple Use” Integrated Theme – Technology Integration for Knowledge Management

- **Three Requirements (Security, Safety, Supply Chain)**
- **Technologies**
 - Sensor Integration
 - Disparate Data Integration → Knowledge Management
 - Web 2.0 Level 0-3 Applications*
- **Precursor Projects Theme – Integration of Technology and Use of Web 2.0 IT Services for Knowledge Management**
 - IMR*ic*S – Identification and Tracking of Radiation in commerce Shipments (DoD SensorNet - http://bionet.gov/weigh_station_video_high_res.html)
 - RadSTraM – Radiological Source Tracking and Monitoring of Radiological Pharmaceuticals and Industrial Isotopes in the Supply Chain (EPA/DOE)
 - SETCP – Southeast Transportation Corridor Pilot (DHS-DNDO [Domestic Nuclear Detection Office]) – Enhance Security in the Commercial Carrier Inspection Process
 - Anomaly Detection from Heterogeneous Sensor Data (ORNL – Laboratory Directed R&D) – Use of disparate sensors

*Web 2.0 is the business revolution in the computer industry caused by the move to the Internet as a platform, and an attempt to understand the rules for success on that new platform.

Logical Process at Knox County Weigh and Inspection Station



Reprinted from Walker, et. al., "Requirements Definition for ORNL Trusted Corridors Projects," ORNL/TM-2206/519.

Oak Ridge National Laboratory: Meeting the challenges of the 21st century



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