FMCSA R&T:
Today and Tomorrow

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U.S. Department of Transportation
Federal Motor Carrier Safety Administration

TRB

Hazardous Materials Safety and Security Operational Test

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Federal Motor Carrier Safety Administration

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Project Goals

- Demonstrate that existing technologies “can” improve the safety and security of HazMat
- Quantify the benefits and costs of this approach

Project Partners

- Deployment Team led by Battelle
- Evaluation Team led by SAIC
- Working group from other Federal agencies
- 9 Motor carriers
- 7 Shippers
- 5 Original engine manufacturers
- 6 Agencies in 4 States (NY, IL, CA, and TX)

Research Objectives

PICKUP

- Driver verification and identification (shipper, vehicle, and dispatch)
- Cargo verification
- Cargo tampering
- Remote cargo locking/unlocking

EN ROUTE

- Driver verification and identification (dispatch, enforcement, and vehicle)
- Cargo location tracking
- Cargo route adherence
- Untethered trailer tracking
- Cargo tampering alert
- Remote cargo locking/unlocking
- Real-time alerts for emergencies and unauthorized drivers
- Real-time alerts to enforcement and emergency response
- Remote vehicle disabling (driver, dispatcher, and loss of signal)

DELIVERY

- Driver verification and identification (receiver)
- Cargo verification
- Remote cargo locking/unlocking
- Receipt confirmation to driver and dispatcher

PUBLIC SECTOR

- Driver verification and identification (enforcement)
- Cargo route adherence (dispatch and enforcement)
- Real-time alerts from dispatch to enforcement and emergency response

First Step: Conduct Risk/Threat Assessment

Sets the stage for the rest of the project:

- Considers commodities, quantity, frequency, operation type, routing and loading/ transfer points
- Organizes the safety and security risks
- Frames the problem
- Identifies vulnerabilities

Development of Transportation Scenarios

4 scenarios (several sub-scenarios)

- Bulk Petroleum
- LTL
- Bulk Chemicals
- Truckload Explosives

Scenario selection based on:

- Results of the risk/threat assessment
- Desire to look at cross-section of the industry
- Need to address as many vulnerabilities with technologies as possible

Selection of Technologies

Wireless Communications

Personal Identification

On-Vehicle Technologies

Public Sector Users

Vehicle Tracking

Smart Card

On-Board Computers

- Vehicle disabling
- Remote lock/unlock

Evaluation Approach – Part 1

Concept of Operations

Scenario-Specific Operational Parameters

Industry segmentation
Technologies deployed
Supply chain dynamics
Number of units/participants
Time period of deployment

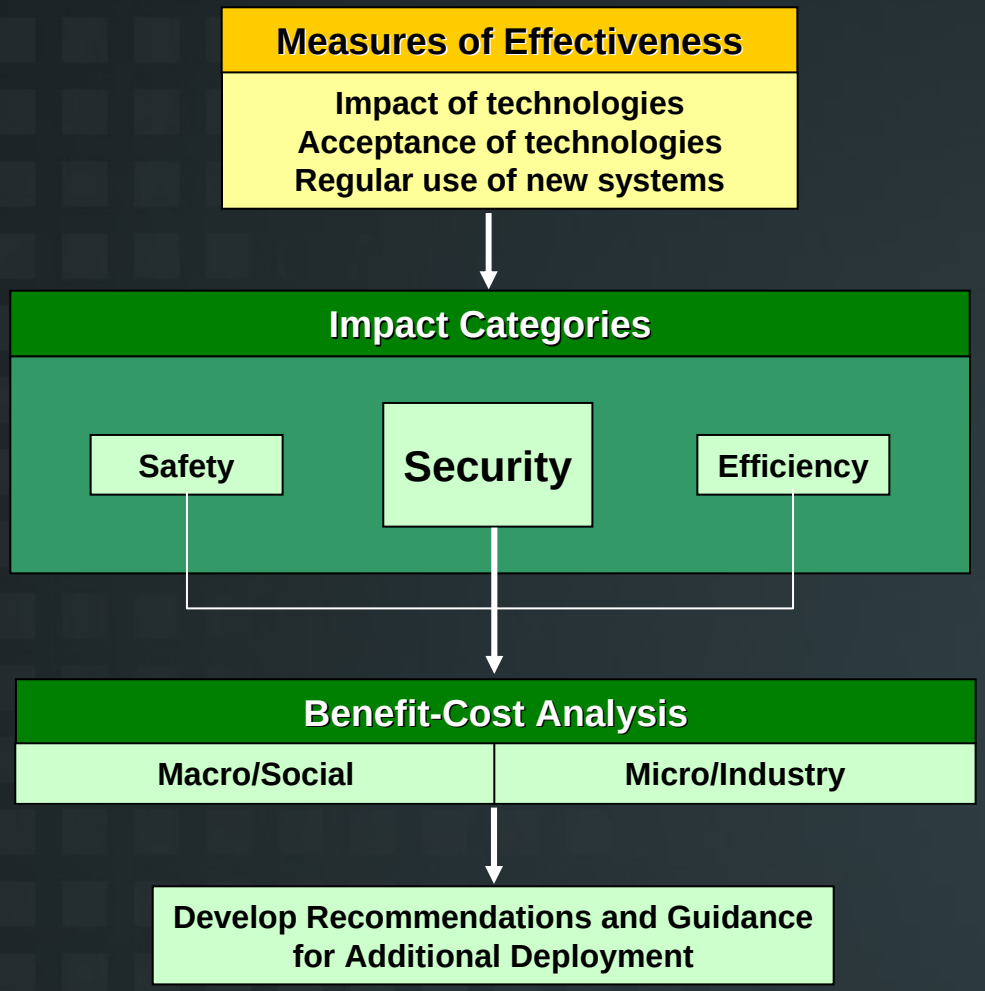
Types of Data

Qualitative vs. Quantitative	Field vs. Staged
System generated Observation based Interview based	Directly collected from daily operations Planned events in controlled environment

Measures of Effectiveness

Impact of technologies
Acceptance of technologies
Regular use of new systems

Evaluation Approach – Part 2



Evaluation: Efficiency Impacts

Overview

- The microeconomic/private sector benefit cost analysis is driven by these impacts
- The analysis of the Return on Investment (ROI) considers both the individual technologies and suites
- ROI metrics such as trailer utilization, reduction in mileage/fuel costs, etc. are considered

Presentation of results

- Monthly benefits (per truck)
- Payback periods

Evaluation: Safety Impacts

Overview

- Considers accident/release reduction and mitigation before and after the deployment of technology
- Use risk assessment techniques and existing databases in the analysis

Presentation of results

- Reduction in accidents (monetary benefits) from reduced mileage

Evaluation: Public Sector

Considers:

- Reduced time for
  - Response through faster notification
  - Driver identification
  - Finding missing off-route vehicles
- Improved quality of information

Evaluation: Security Impacts Overview

Expert Panel

- Includes representatives from TSA, major industry associations and other security and counter terrorism experts
- Gives input on staged and controlled tests
- Provides input into Delphi process
- Reviews of draft final analysis

2 Delphi questionnaires (before and after to measure threat and vulnerability reduction)

Evaluation: Security Impacts Overview

- Reduction in threat and vulnerability measured through 2 Delphi questionnaires
  1. Baseline
  2. After technology
  - Each questionnaire will be repeated multiple times for consensus
- Results will be applied to impacts identified in the risk/threat assessment

Evaluation: Security Impacts Presentation of Results

- Vulnerability reductions (percentages)
- Impact reduction
  - Vulnerability reduction X potential impacts
  - 3 different methodologies were employed
    1. Benefit-cost ratios
    2. Net benefits
    3. Break-even points

Evaluation: Overall Benefit-Cost Analysis

A final step

- Adds benefits from all three impact areas
- Gives overall benefit-cost ratios
- Provides insight into percentage of benefits that are realized by the private sector versus the public

The Bottom Line

For the HazMat transportation community

- Are the industry operational efficiency benefits significant enough to drive widespread industry deployment to the technology?
- If not, are the macro benefits large enough to warrant government intervention to drive wide scale national deployment?

For the public sector

- Can response times be improved through faster notification?
- Can we improve the quality of information given to first responders?

For more information:

Come to today's session from 1:30 – 5 p.m. in Marriott Balcony A

or contact

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