Response, Emergency Staging, Communications, Uniform Management, and Evacuation (R.E.S.C.U.M.E.)

NRITS Session D1: Public Safety Applications
Linda Dodge, USDOT

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St. Cloud, MN
Overview

- Dynamic Mobility Applications (DMA) Program Overview

- R.E.S.C.U.M.E. Status and Plans
USDOT ITS Program

- ~$100 million annual research program addressing intelligent vehicles and infrastructure
- Primary focus on “connected vehicles” to address safety, mobility and environmental challenges
- The ITS Joint Program Office, housed in RITA, coordinates multimodal research initiatives across six USDOT administrations: FHWA, NHTSA, FTA, FMCSA, FRA, and MARAD.
ITS Research Program Components

**Applications**
- Safety
  - V2V
  - V2I
  - Safety Pilot
- Mobility
  - Real Time Data Capture & Management
  - Dynamic Mobility Applications
- Environment
  - AERIS
  - Road Weather Applications

**Technology**
- Harmonization of International Standards & Architecture
- Human Factors
- Systems Engineering
- Certification
- Test Environments

**Policy**
- Deployment Scenarios
- Financing & Investment Models
- Operations & Governance
- Institutional Issues
Mobility Program

Real-time Data Capture and Management

- Vehicle Status Data
- Infrastructure Status Data
- Weather Data
- Truck Data
- Transit Data
- Location Data

Dynamic Mobility Applications

- Reduce Speed 35 MPH
- Transit Signal Priority
- Weather Application
- Real-Time Travel Info
- Fleet Management/Dynamic Route Guidance
- Signal Phase & Timing Adjusts Real-Time Conditions
- Safety Alerts and Warnings
Key Research Questions for the Mobility Program

- What are the benefits of applications enabled by connected vehicle and connected traveler data?
- What testing is required to prepare applications for eventual demonstration and deployment?
- What are the cross-cutting data and communication needs among DMA bundles?
- What is the role of Basic Safety Message (BSM)?
- How do we successfully implement Open Data and Open Source concepts within the program?
Data Capture and Management and Dynamic Mobility Applications Programs: Integrated Roadmap

<table>
<thead>
<tr>
<th>Program Activity Area</th>
<th>FOUNDATIONAL ANALYSIS PHASE 1</th>
<th>RESEARCH, DEVELOPMENT &amp; TESTING PHASE 2</th>
<th>DEMONSTRATION PHASE 3</th>
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</thead>
<tbody>
<tr>
<td>Organizing and Utilizing Connected Vehicle Data</td>
<td>9/09 Develop Research Data Exchange</td>
<td>9/11 Maintain and Enhance Research Data Exchange</td>
<td>9/14 Define Implementation State Data Environment(s)</td>
</tr>
<tr>
<td>Defining, Prototyping and Testing Applications</td>
<td>Prototype Data Environment</td>
<td>Research Data Exchange (RDE)</td>
<td>Application Prototyping and Testing</td>
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<tr>
<td>Real-World Application Demonstrations</td>
<td>Phase 2 Applications Downselect</td>
<td>Cross-Cutting Testing/Determine Data and Communications Needs</td>
<td>Downselect Applications Ready for Demonstration</td>
</tr>
<tr>
<td>Demo Coordination Planning</td>
<td>Data to RDE</td>
<td>Safety Pilot Model Deployment</td>
<td>Data to RDE</td>
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<tr>
<td>Other Demonstrations (e.g., FDOT)</td>
<td>Phase 3 Demo Sites Downselect</td>
<td>Mobility Demo Planning</td>
<td>Data to RDE</td>
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<tr>
<td>Role of Standards</td>
<td>Standards Planning and Development</td>
<td>Standards Testing and Assessment</td>
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<tr>
<td>Mobility Benefits Evaluation</td>
<td>Define Mobility Measures</td>
<td>Develop and Refine Tools/Analytics For Impacts Assessment</td>
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<tr>
<td>BSM Assessment</td>
<td>BSM Assessment/OEM Engagement</td>
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LEGEND: RDE Data Feed, Mobility Applications, Research Data Exchange, Data Environment, Decision Point, Key Activity Informing BSM Assessment

DCM/DMA Integrated Roadmap v1.1 (11/26/2012)
Dynamic Mobility Applications Program

Vision
- Expedite development, testing, commercialization, and deployment of innovative mobility application
  - Maximize system productivity
  - Enhance mobility of individuals within the system

Objectives
- Create applications using frequently collected and rapidly disseminated multi-source data from connected travelers, vehicles (automobiles, transit, freight) and infrastructure
- Develop and assess applications showing potential to improve nature, accuracy, precision and/or speed of dynamic decision
- Demonstrate promising applications predicted to significantly improve capability of transportation system
- Determine required infrastructure for transformative applications implementation, along with associated costs and benefits

Project Partners
- Strong internal and external participation: ITS JPO, FTA, FHWA R&D, FHWA Office of Operations, FMCSA, NHTSA, FHWA Office of Safety

Transformative Mobility Applications
(May have more impact when BUNDLED together)
## Dynamic Mobility Application Bundles

<table>
<thead>
<tr>
<th>Bundle</th>
<th>Description</th>
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<tr>
<td><strong>MMITSS:</strong></td>
<td>Multimodal Intelligent Traffic Signal System</td>
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<tr>
<td><strong>INFLO:</strong></td>
<td>Intelligent Network Flow Optimization</td>
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<tr>
<td><strong>R.E.S.C.U.M.E.:</strong></td>
<td>Response, Emergency Staging and Communications, Uniform Management, and Evacuation</td>
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<tr>
<td><strong>Enable ATIS:</strong></td>
<td>Enable Advanced Traveler Information Systems</td>
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<tr>
<td><strong>IDTO:</strong></td>
<td>Integrated Dynamic Transit Operations</td>
</tr>
<tr>
<td><strong>FRATIS:</strong></td>
<td>Freight Advanced Traveler Information Systems</td>
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</table>
R.E.S.C.U.M.E.
Response, Emergency Staging and Communications, Uniform Management, and Evacuation

- Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)
- Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)
- Emergency Communications and Evacuation (EVAC)
Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)

- Situational awareness info to responders while en route
- Input to responder vehicle routing, staging and secondary dispatch decisions
  - Staging plans
  - Satellite imagery
  - GIS data
  - Current weather data
  - Real-time modeling outputs

Source: Oconto County, WI
Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)

Two components

1. Alerts drivers of lane closings and unsafe speeds for temporary work zones
   - Could be augmented with merging and speed guidance to drivers.

2. Warns on-scene workers of vehicles with trajectories or speeds that pose a high risk to their safety
Emergency Comm and Evacuation (EVAC)

Addresses the needs of two different evacuee groups:

1. Those using their own transportation
   - Dynamic route guidance information
   - Current traffic and road conditions
   - Location of available lodging
   - Location of fuel, food, water, cash machines and other necessitates

2. Those requiring assistance
   - Identify and locate people who are more likely to require guidance and assistance
   - Identify existing service providers and other available resources
The Rural Connection

INC–ZONE
- Warn public safety and transportation responders of imminent dangers in high-risk rural incident zones

RESP-STG
- Enhances incident response and departure times (e.g., ambulance departing the crash scene for hospitals)
  - Closures can be more challenging given limited alternate routes and spacing of rural roadways

EVAC
- Supports large-scale regional evacuations that traverse rural areas
  - Hurricane Rita, estimated 3.7 million people evacuated the Texas coastline
    - 107 evacuation-related fatalities – 24 on bus with poor maintenance records
    - Motorists stranded for hours without fuel, lodging, food and water
R.E.S.C.U.M.E. Program Status

Phase I (FY12-FY13)

- Completed ConOps, Systems Requirements Document, and Test Readiness Assessment

Phase II (FY13-FY14)

- Prototype Development and Testing
  - Develop and test prototypes for INC-ZONE and RESP-STG
  - Define an architecture for EVAC and identify institutional issues
  - Awarded to Battelle/UMD-CATT team; kickoff 8/28/2013

- Impacts Assessment
  - Estimate impacts of integrated multi-application deployments using standardized messages and shared communication networks
  - Awarded to Booz Allen; kickoff in mid-September
DMA and R.E.S.C.U.M.E. Outlook

Phase III Demonstrations (FY15-FY16)
- Showcase promising integrated system alternatives identified in the Phase II development and testing. Not every demo will include every bundle or application.
- Demo sites and applications to be selected in FY15.

Key Assumptions/Expectations
- Overall market penetration of connected vehicles in this timeframe will be relatively low
- Market penetration of connected travelers with mobile devices may be higher
- New forms of data capture must be integrated with legacy systems
- Private sector likely to play an important role
For More Information

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