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

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National Rural ITS Conference – Session S1

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Presentation Overview

- **Introduction to the DMA Program**
- **R.E.S.C.U.M.E. application bundle overview**
- **R.E.S.C.U.M.E. status next steps**
- **Questions/Comments**

ITS Research = Multimodal and Connected

To Improve Safety, Mobility and Environment

Research of technologies and applications that use wireless communications to provide connectivity:

- Among vehicles of all types
- Between vehicles and roadway infrastructure
- Among vehicles, infrastructure and wireless consumer devices

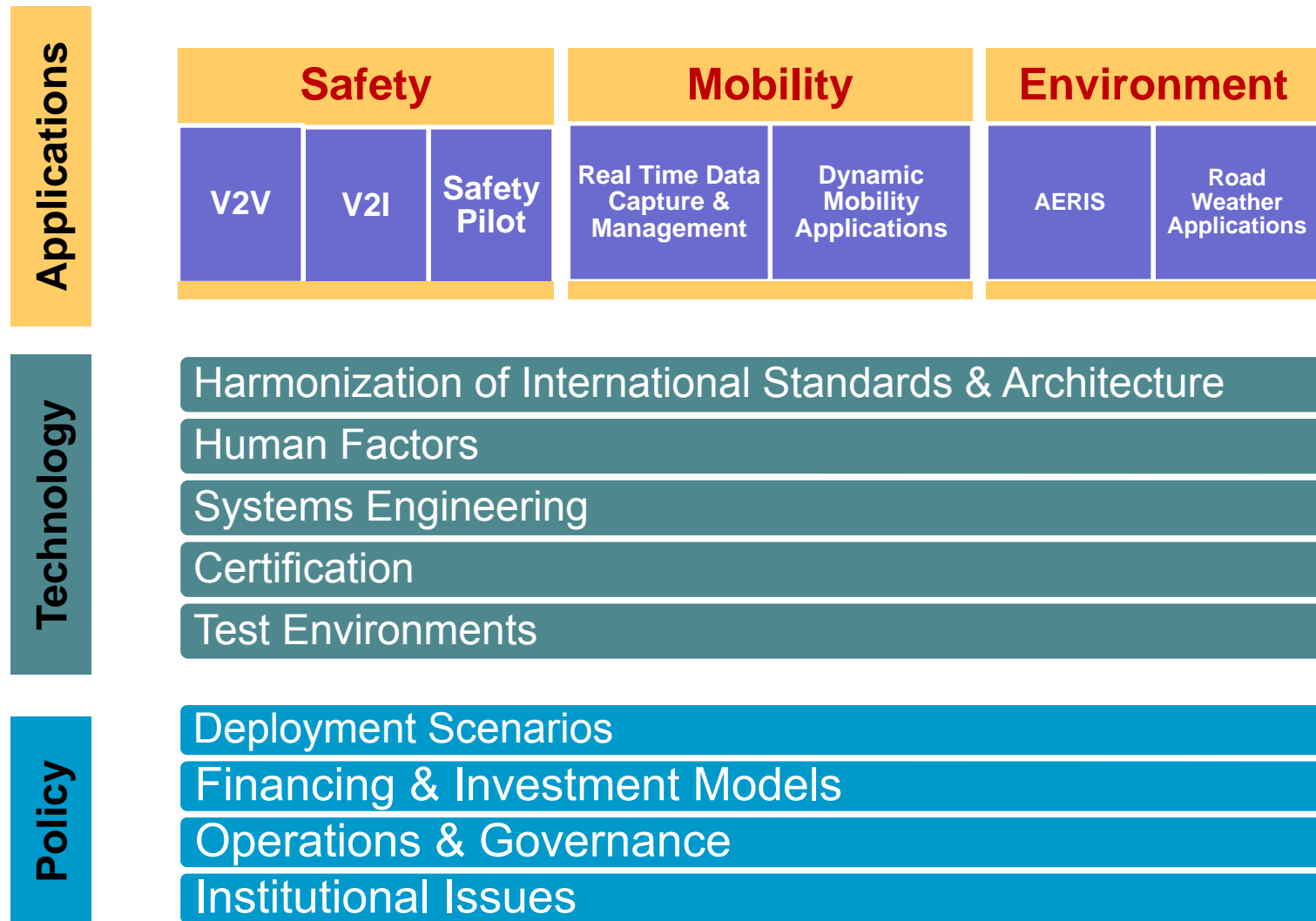FCC Allocated Spectrum at 5.9 GHz for Transportation Safety (known as DSRC)

Drivers/Operator

Rail

Vehicles and Fleets

Wireless Devices

Infrastructure
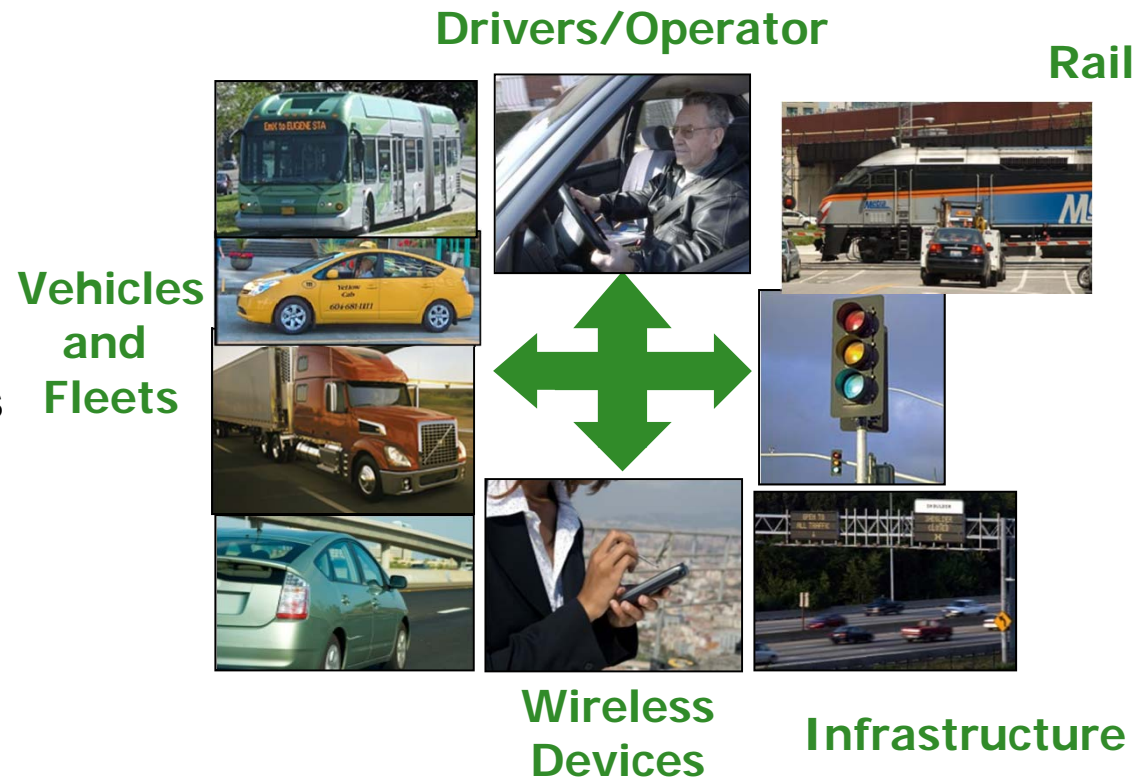
Major Objectives

- Move aggressively on vehicle to vehicle communications
  - Regulatory Decision on In-Vehicle Equipment by 2013
- Accelerate in-vehicle technology
  - "Here I Am" messages
  - Aftermarket Safety Systems
  - Enables safety and active traffic management
- Accelerate infrastructure communications capability
  - Signal Phase and Timing (SPaT) as initial focus
  - Enables safety, mobility, and environmental applications
- On road multi-modal pilot deployments for high-value applications
- Monitor and evaluation of driver distraction issues
- Understand data and communications needs (DSRC/other) of transformative mobility applications – and the potential benefits of these applications
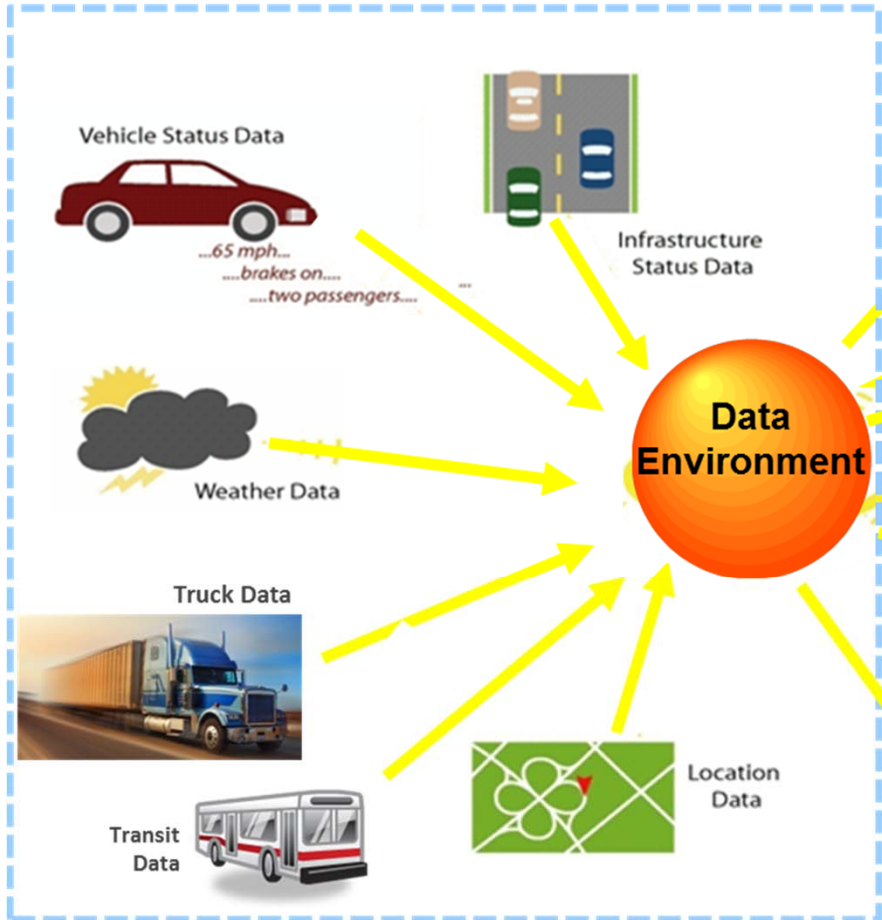
ITS Research Program Components

Applications

Safety			Mobility		Environment	
V2V	V2I	Safety Pilot	Real Time Data Capture & Management	Dynamic Mobility Applications	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
...65 mph...
....brakes on....
....two passengers...

Infrastructure Status Data

Weather Data

Truck Data

Transit Data

Location Data

Data Environment

Dynamic Mobility Applications

Reduce Speed 35 MPH
Weather Application

Transit Signal Priority

Real-Time Travel Info

Fleet Management/ Dynamic Route Guidance

Signal Phase & Timing Adjusts Real-Time Conditions

Safety Alerts and Warnings
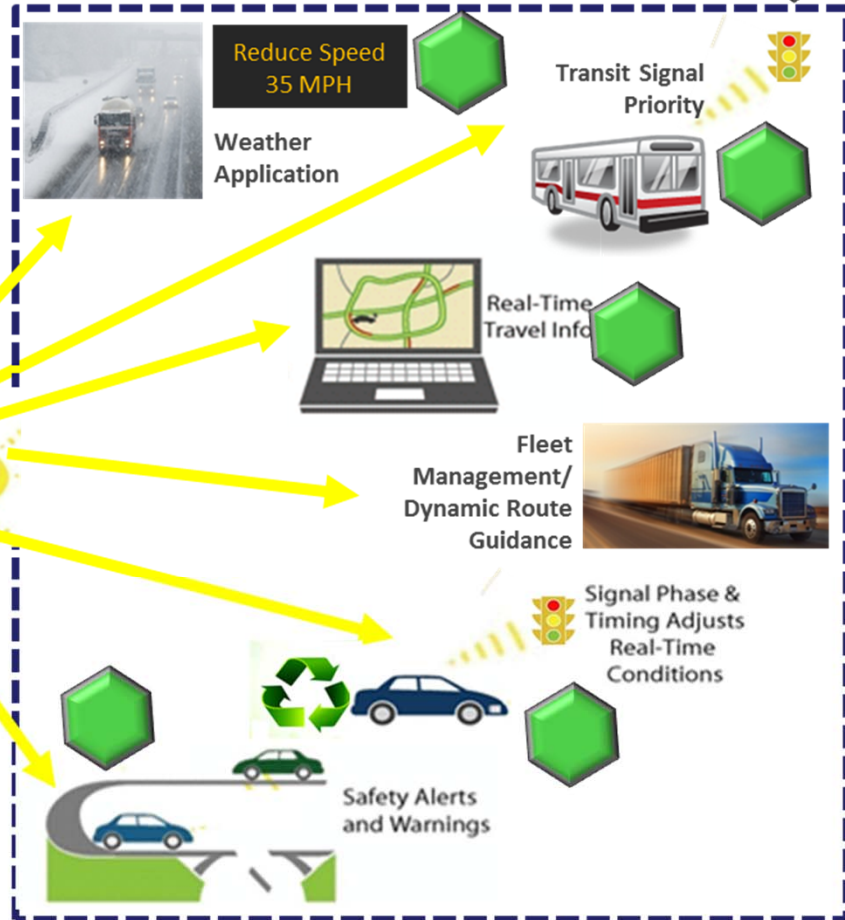
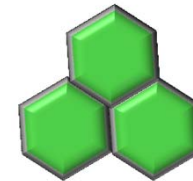# Dynamic Mobility Applications Program

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

Transformative Mobility Applications

(May have more impact when BUNDLED together)

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
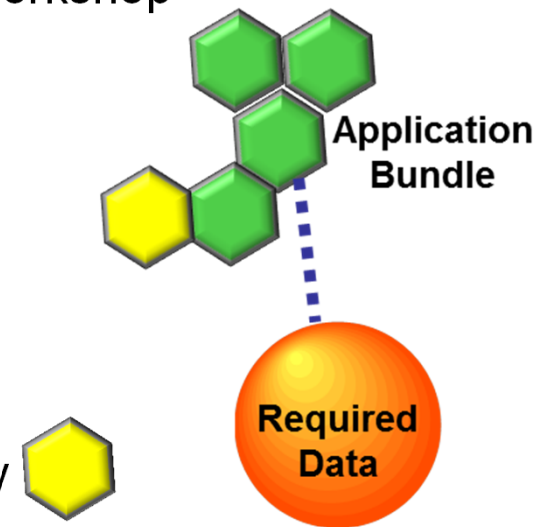
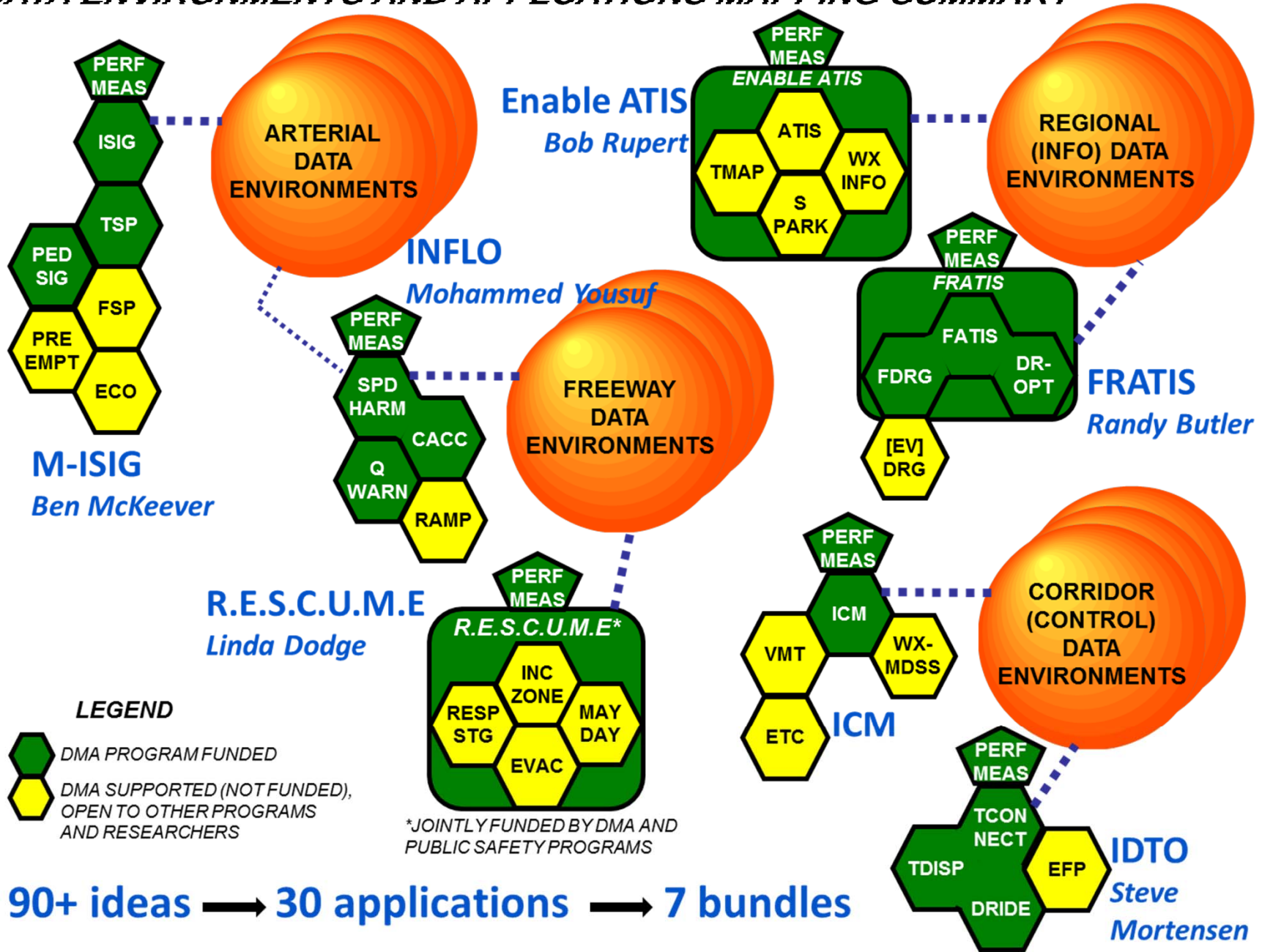# Transformative Application Bundles: Bundling Rationale and Prioritization Process

- Consolidate input from external stakeholder groups, workshop
- Consider internal stakeholder priorities
  - Leveraging on-going or other planned research
- **Group Applications into Bundles**
  - Similar high-level data needs
  - Interaction among applications predicted
  - Evident value in concurrent development
  - Encourage coordinated non-federal research activity
- **Bundling increases transformational impacts and reduces costs of research and development**
- Resource-constrained prioritization process based on expected value of developing application bundles, as well as individual applications
  - Applications the program cannot fund at this time are still candidates for collaborative development with other programs or stakeholders
- **High-Priority Application Bundles announced at TRB 2011**

Application Bundle

Required Data

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DYNAMIC MOBILITY APPLICATIONS PROGRAM
DATA ENVIRONMENTS AND APPLCATIONS MAPPING SUMMARY

M-ISIG
Ben McKeever

PERF MEAS
ISIG
TSP
PED SIG
FSP
PRE EMPT
ECO

ARTERIAL DATA ENVIRONMENTS

Enable ATIS
Bob Rupert

PERF MEAS
ENABLE ATIS
ATIS
TMAP
WX INFO
S PARK

REGIONAL (INFO) DATA ENVIRONMENTS

INFLO
Mohammed Yousuf

PERF MEAS
SPD HARM
CACC
Q WARN
RAMP

FREEWAY DATA ENVIRONMENTS

PERF MEAS
FRATIS
FATIS
FDRG
DR-OPT
[EV] DRG

FRATIS
Randy Butler

R.E.S.C.U.M.E
Linda Dodge

PERF MEAS
R.E.S.C.U.M.E*
INC ZONE
RESP STG
MAY DAY
EVAC

*JOINTLY FUNDED BY DMA AND PUBLIC SAFETY PROGRAMS

PERF MEAS
ICM
VMT
WX-MDSS
ETC
ICM

CORRIDOR (CONTROL) DATA ENVIRONMENTS

PERF MEAS
TCONNECT
TDISP
EFP
DRIDE

IDTO
Steve Mortensen

LEGEND

DMA PROGRAM FUNDED

DMA SUPPORTED (NOT FUNDED), OPEN TO OTHER PROGRAMS AND RESEARCHERS

90+ ideas → 30 applications → 7 bundles

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

- Advanced vehicle-to-vehicle safety messaging over DSRC to improve safety of emergency responders and travelers:
  - Emergency Communications and Evacuation (EVAC)
  - Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)
  - Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)
  - Mayday Relay (MAYDAY)

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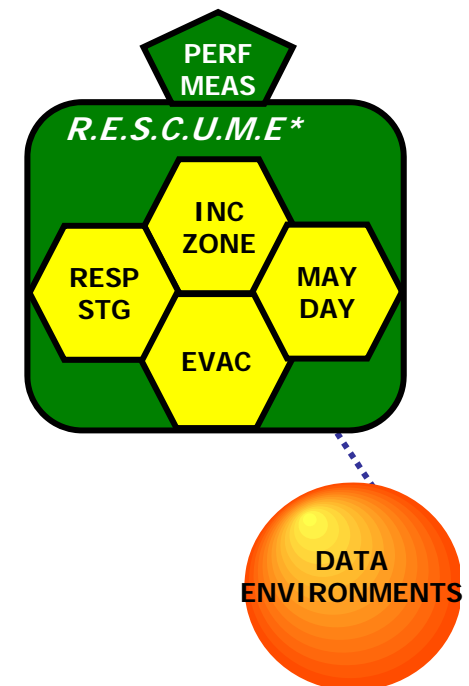
Emergency Communication and Evacuation


- Addresses the needs of two different evacuee groups:
  - Those using their own transportation
    - Dynamic route guidance information,
    - Current traffic and road conditions,
    - Location of available lodging, and
    - Location of fuel, food, water, cash machines and other necessitates
  - Those requiring assistance
    - Identify and locate people who are more likely to require guidance and assistance
    - Identifies existing service providers and other available resources

Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)

- Situational awareness to public safety responders while enroute to establish safer incident work zones

- Valuable input to responder and dispatcher decisions and actions

- Range of data to responders through mobile devices to help support public safety responder vehicle routing, staging and secondary dispatch decision-making, including:

  - Staging plans

  - Satellite imagery

  - GIS data

  - Current weather data

  - Real-time modeling outputs
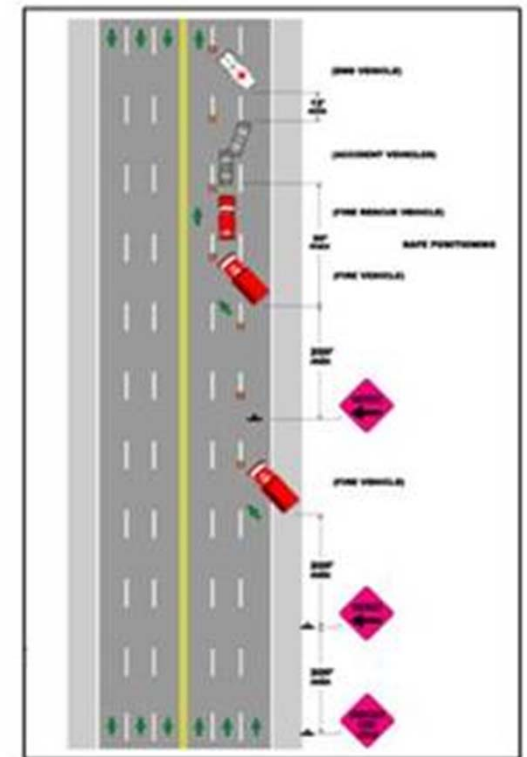
Source: Oconto County, WI

Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)

- Two components

  - Alerts and warns drivers of lane closings and unsafe speeds for the temporary work zones

    - Could ultimately be augmented with the provision of merging and speed guidance to drivers.

- Warns on-scene workers of vehicles with trajectories or speeds that pose a high risk to their safety

  - Workers in the zone (e.g., law enforcement) could then be warned of the risk via an audible warning that is delivered via earpiece or some other device

Source: John Bodie

Mayday Relay (MAYDAY)

- When an enabled vehicle is involved in a crash, this application will automatically send a mayday message. When a passing enabled vehicle receives the mayday message, it will deliver it to a roadside hot spot

- This information will then be relayed to the appropriate PSAP based on the crash location.

Source: Greg Carter Herald Sun

R.E.S.C.U.M.E. Status and Next Steps

- Initiate foundational research that will lead to second phase of focused development and testing
- Engage stakeholders in the public safety and transportation communities to further develop transformative concepts and to refine data and communications need
- Development of a Concept of Operations (ConOps) and functional requirements
- Identification and assessment of key technical and non-technical issues related to field-testing the R.E.S.C.U.M.E. applications

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For More Information …

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