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Applications and Impacts Breakout
Group I: Environmental

Mobility and Environment Workshop – December 1, 2010

U. S. Department of Transportation
Research and Innovative Technology Administration

Transformative Impact Measures

- Measure 1: Tons of Total Emissions Reduced (includes GHG and criteria pollutants)
  - Baseline: 2010 US EPA NAA QS and GHG
  - Target: 2020 EPA targets
- Measure 2: Total Gallons of Fuel Equivalents Reduced
  - Baseline: 2010 reference EPA / CAFE
  - Target: 20 – 30 % reduction within 10 years
- Measure 3: Mode Split Increased (percentages of non-SOV trips)
  - Baseline: 2010
  - Target: 20 – 30% improvement within 10 years

Voting Results: Environmental Impact

Rank	Code	Application Name	Votes
#1	ICM	Integrated Corridor Management	20
#2	VMT	Mileage Based User Fees	19
#3	I-SIG	Traffic Signal System	14
#4	ECO	Connected Eco Driving	9
#4	D-RIDE	Dynamic Ridesharing	9
#6	T-DISP	Dynamic Transit Operations	7

Top Environmental Application

- IntelliDrive-Driven Integrated Corridor Management (ICM)

- Key data and communication needs discussion points
  - Need to have full market penetration (across all modes) for transformative benefits (especially, for feedback)
  - Agencies need to have access to vehicle emissions data (engine data)
  - Disseminate information (travel conditions, emissions, available modes, pricing information) to travelers
  - Need arterial data and ability to control arterial signal operations
  - Standardize data so that jurisdictions within the corridor can share data

Top Environmental Application (cont.)

- IntelliDrive-Driven Integrated Corridor Management (ICM)

- Key research needs
  - Quantify the env. benefits for different deployment levels
  - How to incentivize travel choices
  - Need a better system to allocate cost in transportation

- How close can this application bring us to the transformative target?
  - Assumes other applications (e.g., traffic signal system, ramp metering) are in place, it will be transformative.

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Applications and Impacts Breakout
Group II: Productivity

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Transformative Impact Measures

- Ratio of loaded moves to total moves
- Travel time reliability
- Freight tons or Passengers per mile per day

Voting Results: Productivity Impact

Rank	Code	Application Name	Votes
#1	F-DRG	Freight Dynamic Route Guidance	16
#2	F-ATIS	Freight Real-Time Traveler Information with Performance Monitoring	13
#3	SPD-HARM	Dynamic Speed Harmonization	10
#4	DR-OPT	Drayage Optimization	8
#5	S-PARK	Smart Park and Ride System	5

Top Productivity Application

- Freight/Commercial Vehicle Dynamic Route Guidance
- Key data and communication needs discussion points
  - Turn radius
  - Overhead clearance
  - Weight Restrictions
  - Roadway geometry
  - Special speed limits
  - Truck only lanes
  - No DSRC requirement
  - Carbon Tracking
  - Truck Parking
- Key research needs
  - Driver Distraction
  - Routing algorithms
  - Modeling
  - Dispatch/En-route/Transport for Emergency Vehicles
  - Determine appropriate federal, state and private role
- How close can this application bring us to the transformative target?
  - Depends on ability of private sector to commercialize application

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Applications and Impacts Breakout
Group III: Mobility

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Transformative Impact Measures

- **Travel Time Reliability at Known Cost**
  - Across all trip modes/segments (full trip)
  - Day to day variance in travel time at known cost
- **Accessibility/Livability**
  - Increase traveler choice for sustainable modes
  - Consider all travelers, demographic changes, ADA
  - Improved perception of traveler choice in real-time
- **Portability/Availability/Extensibility**
  - Percent of geography/population with access to or availability to service or application

Voting Results: Mobility Impact

Rank	Code	Application Name	Votes
#1	ATIS	Advanced Traveler Information Systems	62
#2	ICM	Integrated Corridor Management	35
#3	TSP	Transit Signal Priority	21
#T4	TCONNECT	Connection Protection	14
#T4	DRG	Dynamic Route Guidance	14
#6	EFP	Integrated Electronic Fare Payment	12

Top Mobility Application

- Advanced Traveler Information Systems

- Key data and communication needs discussion points
  - Aggregate clean data/data fusion/historic data/multi-modal data
    - Accessibility data
  - Fine granularity of data with documented structure and meta data
    - Including quality and latency attributes
  - National standardized map database(s)
    - Is this a desirable outcome? Can this
  - Public to user information flow: work zones, incidents, other…

- Key research needs
  - What data do users need to make specific decisions?
  - Prototype end-product

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Applications and Impacts Breakout
Group IV: Safety and Security

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Transformative Impact Measures

- **Fatalities per ? (normalization TBD)**
  - Definition/metric (units):
  - Baseline:
  - Transformative threshold:

- **Delay due to incidents**
  - Definition/metric (units):
  - Baseline:
  - Transformative threshold:

- **Reduction of secondary crashes**
  - Definition/metric (units):
  - Baseline:
  - Transformative threshold:

Voting Results: Safety and Security Impact

Rank	Code	Application Name	Votes
#1	Q-WARN	Queue Warning	28
#2	INC-ZONE	Incident Scene and Work Zone Alerts for Drivers and Workers	17
#3	PED-SIG	Mobile Accessible Pedestrian Signal System	11
#4	WX-MDSS	Enhanced MDSS Communications	10
#5	RESP-STG	Incident Scene Pre-Arrival Staging Guidance for Emergency Responders	8
#6	CACC	Cooperative adaptive cruise control	4

Top Safety and Security Application

- Q-WARN: Queue Warning
- Key data and communication needs discussion points
  - Can use variety of mobile wireless comm.
  - Need queue detection technology , whether probes (highly preferred) or infrastructure
  - Need sufficient warning time
  - Synergies with req'ts for other safety applications as well as dynamic speed harmonization
  - Distinguish between warning and alert: this is more of an alert
- Key research needs
  - Tuning algorithm: parameters for triggering and sending alerts, and response time for alerts
  - Queue detection algorithms
  - HMI and driver distraction
  - Develop arterial/intersection extension to this application or to other hazards, e.g., work zones, fog, etc.
- How close can this application bring us to the transformative target?
  - One study: About half of rear-end freeway crashes are end of queue crashes

2nd Safety and Security Application

- INC-ZONE: Incident Scene and Work Zone Alerts for Drivers and Worker
- Key data and communication needs discussion points
  - Can use variety of mobile wireless comm.
  - Need standardized data formats
  - Need sufficient warning time
  - Synergies with req’ts for other safety applications as well as dynamic speed harmonization
  - Real-time database of areas of interest (work zones, incident scenes)?
  - Very complimentary application with Queue Warning (alert)

2nd Safety and Security Application

- INC-ZONE: Incident Scene and Work Zone Alerts for Drivers and Worker
- Key research needs
  - Human factors: driver and worker reaction to alerts
  - Tuning algorithm: parameters for triggering and sending alerts, and response time for alerts
  - HMI and driver distraction
  - Develop arterial/intersection extension to this application or to other hazards, e.g., work zones, fog, etc.
- How close can this application bring us to the transformative target?
  - About 700 road workers killed each year

3rd PED-SIG Application

- PED-SIG
- Key data and communication needs discussion points
  - Likely similar to other alerting applications
  - May need comm. From crossing pedestrians as well as to them
- Key research needs
  - What is the best means of providing this service? Operational concept needs to be researched
  - Dealing with differing abilities of pedestrians
- How close can this application bring us to the transformative target?
  - Serves disadvantaged groups as well as general pedestrian population

4th Safety and Security Application

- WX-MDSS: Enhanced MDSS Communications
  - Current systems rely on widely spaced RWIS stations, this allows data collection on all roadways covered by fleet vehicles – this is the real advantage of this application
  - Multi-modal impact
  - Overlaps with AERIS applications
- Key data and communication needs discussion points
  - 2-way communications with fleet (fleet as specialized probe and directions to driver), not just comm. TO vehicles
- Key research needs
  - Best communications media to meet requirements at lowest cost
- How close can this application bring us to the transformative target?