Applications and Impacts Breakout
Group I: Environmental

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• One breakout group will identify promising applications to achieve goals related to transportation-related environmental impacts.

• For the purposes of this breakout, transformative environmental impacts have occurred when the transportation system has:
  – the capability to reliably deliver goods and passengers safely through the transportation system at current levels with transformative reductions in environmental impacts resulting from transportation-related emissions and fuel consumption.
Today’s Exercise
(Part 1) Measuring Impact

- Feedback materials
  - Application scorecard
  - 3 poker chips (for voting)
- Facilitators preview overall exercise
- Facilitators lead group discussion on measuring transformative impact
  - Three example measures given
  - Participants may suggest others
  - Simple hand-count voting to determine up to three to be further explored
- Flip-chart exercise (group discussion)
  - Measure definition and current baseline (if known)
  - What change represents transformative impact?
Today’s Exercise
(Part 2) High Impact Apps

• As we did yesterday, consider up to 10 applications in each impact area
  – One slide per concept, brief clarifying discussion
  – Record High-Medium-Low rating on your scorecard for each of the measures
• 3-2-1 Poker chip voting for the applications most likely to have transformative impact (per your measures)
• Facilitated discussion about the application with the highest vote total
  – Identify key data, communications and research needs for this application
  – How close to transformative will this application get us?
• Repeat facilitated discussion for second highest ranked application (time permitting)
• Reconvene to consider results within each breakout
  – Discuss the implications of your group process
  – Identify a presenter from your group for the breakout report at 11 AM
Exercise Ground Rules

• For today’s exercise, these items can’t be changed
  – Breakout group impact area definitions
  – No adding new application concepts
• Data environment assumptions from yesterday can be relaxed, however
  – Assumptions about what data is available can be tailored in this exercise
• Policy-related issues are NOT in play for discussion
  – If these topics come up, we will park the discussion until this afternoon, when we have special session to deal with these in turn
Impact Measure
Definition Activity
Environmental Impact Measures

- Tons of GHG, total emissions
- Total gallons of fuel consumed
- Total vehicle-miles traveled (VMT)
- Are these the right measures?
- Can we better refine them?
- How many measures are needed (up to 3)?
- For each selected measure:
  - Record definition
  - Establish current baseline (if known)
  - Set transformative target

Facilitators: Please record on flip charts. Use simple hand-count votes when needed.
Application Scorecard
Activity
• Next, we’re going to go through application concepts that address the environmental impact area
• We will present each concept on a single slide
  – You can ask clarifying questions, or offer suggestions about how data might be leveraged
  – But the concept itself cannot be altered, modified or enhanced in discussion
• Record an notes/comments on each application with an assessment on your scorecard for each criteria (High-Medium-Low)
  – Let’s fill in our selected measures now on your scorecard
• Consider how you will vote for the applications with the most potential to achieve our transformative targets
  – What applications have the most potential to help us reach our transformative target by 2025?
Application #1: SPD-HARM

• Dynamic Speed Harmonization
• Problem Addressed:
  – Improve throughput and reduce risk of collision by optimizing for lane-specific speed limits on a freeway facility
• Description
  – Monitor traffic and weather data captured from multiple sources, and calculate a target speed for vehicles
  – Target speeds may be advisory or enforced, and may vary by location, e.g., distance upstream of a recurrent bottleneck, and by lane
  – Communicate target speeds through overhead dynamic signage, via DSRC to enabled vehicles with range (I2V) and from vehicle to vehicle (V2V)
Application #2: ECO

- **Connected Eco Driving**
- **Problem Addressed:**
  - Improve fuel economy and reduce emissions by improving driver awareness of local road topography, signal status, and weather condition.
- **Description**
  - Modify vehicle operation to improve fuel economy and reduce emissions considering grade, predicted speed changes or braking, and real-time traffic
  - Adapts based on driver aggressiveness, energy/fuel consumption, brake regeneration, engine/drive torque-speed characteristics, other factors
  - Provide feedback to the driver (or electronic control signals to semi-autonomous systems) to keep the vehicle operating in target range
Application #3: 
ICM

• IntelliDrive-Driven Integrated Corridor Management
• Problem Addressed:
  – Incompatible operational and data collection procedures limit coordination among freeway, signal system, and transit system operators in a corridor
• Description
  – Aggregate, consolidate and exchange data on alternate routes and modes to provide true corridor-wide traveler information services
  – Enable traffic management and transit agencies to coordinate their existing systems to improve corridor performance
  – Support integrated and coordinated response during major incidents and emergencies within corridor boundaries
Application #4: RAMP

• IntelliDrive-Driven Ramp Metering System
• Problem Addressed:
  – Improve current ramp metering systems capability to respond to changing traffic conditions in real time
• Description
  – Leverage new mobile source data to calculate optimal ramp metering rates resulting in improved throughput and reduced emissions
  – Broadcast timing information (analogous to SPaT data) allowing vehicles to decelerate or accelerate
  – Integrate with HOV bypass, arterial signal coordination and dynamic speed harmonization applications deployed in same interchange
Application #5: D-RIDE

• Dynamic Ridesharing

• Problem Addressed:
  – Logistical constraints of traditional carpooling (e.g., long-term commitments, fixed schedules, and communication difficulties) prevent ridesharing from realizing its full potential

• Description
  – Leverage in-vehicle and hand-held devices to allow ride-matching
  – Integrate carpooling functions into vehicle computer and displays, use voice activated ridesharing technology to reduce distraction effects
  – Vehicle-data integration utilized by HOV/HOT enforcement agencies to verify vehicle occupancy
Application #6: I-SIG

- **IntelliDrive-Driven Traffic Signal System**
- **Problem Addressed:**
  - Improve the accuracy and timeliness of data used to control signal systems, reducing delays, costs and emissions while improving travel reliability
- **Description**
  - Utilize data from vehicles to accurately predict lane-specific platoon flow, platoon size, and other traffic characteristics
  - Reduce time and cost barriers to updating traffic signal timings, both periodic and real-time updates
  - Consider (freight/transit/light) vehicle mix in signal timing plans
Application #7: SIG-FLOW

- Adaptive Speed Control for Efficient Traversal of Intersections
- Problem Addressed:
  - Address under-utilization of the space-time resource within an intersection, reducing delays and improving emissions
- Description
  - Vehicles with adaptive cruise control coordinate with intersections
  - Each vehicle is assigned just the amount of space-time needed within the intersection to enable safe passage by an intersection manager agent
  - Target vehicle speeds through the intersection managed by an in-vehicle driver agent, although the driver may over-ride
• Dynamic Transit Operations
• Problem Addressed:
  – Traditional fixed route/fixed schedule transit is inherently inefficient for the traveler in low density, low ridership, and dispersed origin/destination areas
• Description
  – Enable demand-responsive transportation services utilizing GPS and mapping capabilities of mobile devices
  – Travelers input a desired destination and time of departure tagged with their current location
  – Central system dynamically schedules and dispatches or modifies the route of an in-service vehicle by matching compatible trips together
  – Like a stock exchange, providers can bid/trade within a transparent platform
Application #9: VMT

- **IntelliDrive-Driven Mileage Based User Fees**
- **Problem Addressed:**
  - Projected reduced gas tax revenue for same vehicle miles traveled (VMT), while cost of providing transportation system increases with inflation
- **Description**
  - Integrate IntelliDrive and Mileage Based User Fees (MBUF) to eliminate redundant GPS, maps, driver interfaces, and communications in the vehicle
  - Accumulate miles driven in categories determined by policy and charge for the miles driven, ensure interoperability among jurisdictions
  - Considerations may include vehicle type, time of day, roadway type, jurisdiction, direction of travel, and geographic area of travel
Voting
Breakout Exercise (Part 2) Voting

• Now that we’ve worked through all the applications, vote for the three most promising applications
  – BLUE = 3 points (top priority)
  – RED = 2 points (second-highest priority)
  – WHITE = 1 point (third-highest priority)
  – Deposit your chips in the voting bins identified for each application (also turn in your scorecards)
• We’ll take a quick break (5 minutes) to tabulate the results
• One Bin, One Participant, One Chip rule
  – Do NOT dump all of your chips in a single bin
  – We want your individual priority of the top THREE applications
Quick Break
Exercise Results
Exercise Complete