I-210 ICM Performance Metrics
Performance Metrics

- **Corridor mobility**
  - Corridor
  - Freeways
  - Arterials
  - Transit services
  - Parking facilities

- **Travel reliability**

- **System safety**

- **System awareness**

- **Data processing**

- **Decision support system operations**

- **Intra-agency organizational impacts**

- **Inter-agency collaboration**
Information Sources

- USDOT Integrated Corridor Management (ICM) Initiative
  - Concept of Operations for the I-15 Corridor in San Diego, California
  - Concept of Operations for the US-75 Integrated Corridor in Dallas, Texas

- Integrated Corridor Management Initiative: Demonstration Phase Evaluation
  - Revised National Evaluation Framework
  - San Diego Corridor Performance Analysis Test Plan

- Integrated Corridor Management Initiative: Interstate 80 Integrated Corridor Mobility Project
  - Concept of Operations Final

Not yet Officially Released

- Integrated Corridor Management Analysis, Modeling and Simulation (AMIS) Methodology
  - Caltrans

- PATH
Corridor Mobility

- **Corridor-wide performance**
  - Vehicle throughput
  - Vehicle miles traveled (VMT)
  - Vehicle-hours of delays (VHD)
  - Average travel speed

- Person miles traveled (PMT)
- Person-hours of delay (PHD)
- Person throughput
- Average travel speed

Compilation for all relevant modes of transportation
- Cars
- Buses
- Trucks
- All vehicles
## Corridor Mobility

- **Freeway operations**
  - Vehicle throughput
  - Vehicles Miles traveled (VMT)
  - Vehicle hours of delays (VHD)
  - Average delay per vehicle
  - Level of service (LOS)

- **Person throughput**
  - Person throughput
  - Person miles traveled (PMT)
  - Person-hours of delay (PHD)
  - Average delay per person

Compilation for:
- General purpose lanes
- HOV lanes
- Ramps
- Predefined routes

Compilation for:
- I-210 (SR-134 to Foothill)
- I-605 (north of I-10)
- SR-57 (north of I-10)
- I-10 (I-710 to SR-57)
Operational Performance

- **Arterial operations**
  - Vehicle throughput
  - Vehicles Miles traveled (VMT)
  - Vehicle hours of delays (VHD)
  - Average delay per vehicle
  - Level of service (LOS)

- Person throughput
- Person miles traveled (PMT)
- Person-hours of delay (PHD)
- Average delay per person

Compilation for:
- Individual intersections
- Selected arterial segments

Compilation for:
- Individual arterials selected as viable alternate routes
Operational Performance

- **Transit operations**
  - Average route travel times
  - Average vehicle delay
    - Per intersection
    - Per route segment
  - Percent on-time arrivals
  - Observed ridership, per route/segment

- **Parking operations**
  - Occupancy rate

Compilation for each relevant transit route:
- Gold Line
- Silver Line
- Commuter express buses
- Others?

Compilation for each relevant parking facility:
- Park-and-ride
- Participating garages
Travel Reliability

- Average travel time
- 90th, 95th percentile travel time
- Travel time deviation
- Buffer index
  - Percent travel time that must be added to a trip to account for variability
- Planning time index
  - Ratio of total time needed to ensure 95% on-time arrival relative to free-flow conditions
- Number of congested hours

Compilation for each major system element:
- Freeway general purpose lanes
- HOV lanes
- Freeway ramps
- Arterials
- Predefined routes

Compilation for each relevant transportation mode:
- Cars
- Trucks
- Buses
System Safety

- **Number of incidents**
  - Per day/week/month/year

- **Rate of incidents**
  - Per million VMT and/or million PMT

Compilation by **severity type**:
- Non-injury
- Injury
- Fatality
- Etc.

Compilation by **location**:
- Freeway mainline
- HOV lane
- Freeway ramps
- Intersections
- Arterial segments
System Awareness

- Traffic flow detection enhancements
  - Freeways
    - Percentage of freeway sensors operating correctly (*increase*)
    - Percentage of observed data from freeway sensors (*increase*)
  - Arterials
    - Number of signal controllers providing real-time signal status information (*increase*)
    - Number of intersections with real-time traffic information (*increase*)
    - Number of arterials with real-time traffic information (*increase*)
    - Number of sensors providing real-time traffic information (*increase*)
    - Center-miles of arterial with real-time travel information (*increase*)

- Incident detection improvements
  - Number of incident notifications received within X minutes (*increase*)
  - Number of incident clearance notification receive within X minutes after clearance (*increase*)
System Awareness

- **Parking occupancy monitoring enhancements**
  - Number of parking lots providing real-time parking occupancy *(increase)*
  - Number of roadside signs providing real-time parking occupancy *(increase)*

- **Transit monitoring**
  - TBD

- **Information sharing among stakeholders**
  - Number of agencies sharing information *(increase)*
  - Number of data feeds available to each agency *(increase)*
  - Number of Information Service Providers accessing ICM-generated data *(increase)*

- **Traveler information system enhancements**
  - Number of planning tools providing real-time traffic/transit information *(increase)*
  - Number of planning tools providing comparative drive/transit travel times *(increase)*
Data Processing

- **Data processing**
  - Ability to merge probe data with traditional data sources
  - Ability to develop desired performance measures

- **Data quality assessment**
  - Ability to detect invalid/erroneous data
  - Ability to detect duplicate data across several sources
  - Ability to adjust to data gaps
Decision Support System

- **ICM system relevancy**
  - Number of times in a day/week/month a response plan is developed by the ICM system (*reasonable frequency to demonstrate system usefulness*)
  - Number of times ICM system recommends altering specific control elements (ramp meters, traffic signals, CMS, etc) (*reasonable frequency to demonstrate system usefulness*)
  - Number of maintenance/construction events shifted as a result of DSS recommendations (*reasonable frequency to demonstrate system usefulness*)

- **Validity of recommended response plans**
  - Percentage of recommendation in line with TMC operator experience and expectation (*high value*)
  - Percentage of time TMC operators fully implement recommended plans (*high value*)
  - Percentage of time operators alter system recommendations (*low value*)
  - Magnitude of changes made by operators (*minor changes*)
  - Impact of implemented response plan vs. no action (*positive impact*)
Decision Support System

- **System performance**
  - Time required to develop an actionable respond plan (*short time*)
  - Time required to evaluate a proposed respond plan (*short time*)
  - Time required to implement a response plan (*shorter than current practice*)
  - Level of operator intervention required to develop an actionable response plan (*low level to none*)
  - Average number of response scenario evaluated (*high number*)

- **System reliability**
  - Percentage of time assets were available to enable a response plan generation (*high value*)
  - Difference between DSS-predicted and observed traffic conditions (*low value*)
Decision Support System

- **System acceptance**
  - Perceived value of traffic predictions (*high value*)
  - Perceived value of system recommendations (*high value*)
  - Level of comfort in using ICM during complex situation (*high value*)
  - Level of comfort of agencies in partially/fully relinquishing decisions to the ICM system (*high level*)
Intra-Agency Organizational Impacts

- Number of agencies altering their organization following ICM system implementation (*high value*)
- Number of agencies altering operational procedures following ICM system implementation (*high value*)
- Number of agencies adopting corridor-based operational and evaluation practices (*high value*)
Inter-Agency Collaboration

- Number of collaborative agreements signed (*high value*)
- Number of agencies actively participating in ICM development (*high value*)
- Number of agencies actively participating in ICM operations (*high value*)
- Frequency of communications between agencies in support to regular corridor operations (*increase*)
- Frequency of communications between agencies in support to incident/event responses (*increase*)
- Number of agencies using common incident reporting system (*increase*)