FDOT District 5 Connected and Autonomous Vehicle Work

» Jeremy Dilmore
» D5 TSMO Program Administrator
» Jeremy.Dilmore@dot.state.fl.us
» 386 943-5360
• Data Initiative Projects
• CV Projects
• ATCMTD Grant Projects
DATA INITIATIVES

ITSIQA
ATSPM & Intersection Movement Counts
Data Sandbox
Regional Integrated Corridor Management System
Route and Mode Choice
Data Fusion

- Sets Stage for CV dataset fusing to work needs

- Spatial Normalization
- Temporal Normalization
ATSPM & INTERSECTION MOVEMENT COUNTS

ATSPM
• 20TB currently with 250 signals reporting
  – More data than USDOT CV Pilots are generating
• Set to scale to 1000 Signals within 2 year

Intersection Movement Counts
• 33 Intersections currently
• Video Analytics for multimodal data
• Scaling throughout Seminole County
DATA SANDBOX

• Collect once, Share often
  • Multiple Projects
  • Multiple Users
  • Multiple Technologies
REGIONAL INTEGRATED CORRIDOR MANAGEMENT SYSTEM

Incident Detection

Response Plan w/ Diversion Route

Data Fusion Environment

Signal Timing Plan Selection and Optimization

Mesoscopic Simulation for Realtime 30 Minute Forecasting
NON-RECURRING INCIDENT DETECTION & RESPONSE

- **Design Time:**
  - Repository of Response Plans having Diversion Routes
  - Rules engine mapping event attributes to response plans

- **Run-Time:**
  - Rules Engine Selects response plan for active incident
  - Mesoscopic simulation engine predicts measures of effectiveness 30 minutes into future
  - Operator and Agency Approval obtained prior to activation
• Separate offline process
• Grouping and clustering time intervals
  • Based on similarities of traffic demand and capacity
  • Considers every approach in the intersection
• Highway Capacity Software used for recommended offsets and cycle lengths
• Traffic Engineer Role:
  • Review,
  • Make adjustments,
  • Request recalculate measures of effectiveness
  • Approve and Implement via local agency traffic signal ATMS

\[ I_d = \sqrt{\sum_{i=0}^{n} \left( \frac{v_{i,j} - v_{i,k}}{c_i} \right)^2} \]
## STAKEHOLDER COORDINATION & AGENCY APPROVAL

- System Concept and Design
- Response Plan Development
- Actions Taken in Realtime

### Integrated Corridor Management System

#### Limited Access Roadway Incident - Corridor Diversion Response Plan – Approval Status

<table>
<thead>
<tr>
<th>Agency</th>
<th>Time</th>
<th>Point of Contact</th>
<th>Items Pending Approval</th>
<th>Items Rejected</th>
<th>Items Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminole County</td>
<td>6:01 PM</td>
<td>Darren Wilson 407-354-8746, Pete Vazquez 407-833-8577</td>
<td></td>
<td></td>
<td>Flush Plan Set 6x</td>
</tr>
<tr>
<td>FDOT</td>
<td>6:03 PM</td>
<td>Owen Kittelson 408-580-7122</td>
<td></td>
<td></td>
<td>DMS 75N248, DMS 75N245</td>
</tr>
<tr>
<td>Orange County</td>
<td></td>
<td>Tom Castanza 407-341-3413</td>
<td></td>
<td></td>
<td>Flush Plan Set 6x</td>
</tr>
<tr>
<td>Orange County</td>
<td></td>
<td>Tom Castanza 407-341-3413</td>
<td></td>
<td></td>
<td>Flush Plan Set 8x</td>
</tr>
</tbody>
</table>
ROUTE AND MODE CHOICE

- Allow one stop shopping for trip choices
- Allows for integration of Ride Hailing Services
CONNECTED VEHICLE PROJECTS

SR 434
I-75 FRAME
7 Signalized Intersections in Seminole County
Survey with LIDAR
Nastec 980s
Seminole ATMS
Applications: TSP; Preempt; I-Ped
System Manager Contract
Looking at interaction with ASCT
• 62 Signals near Ocala
• 30 Cabinets on the I-75
• Survey with Differential GPS Backpack
• Siemens and Econolight Controllers
• Applications: TSP; Preempt; I-Ped, ATSPM
• City of Ocala and Marion County ATMS
• Looking at interaction with ATSPM
CONNECTING THE EAST ORLANDO COMMUNITIES

Overview of Advanced Transportation and Congestion Management Technologies Deployment Grant
PROJECT PARTNERS
WHAT TRANSPORTATION CHALLENGES ARE WE ADDRESSING

- Pedestrian and Bicycle Safety
- Vehicular Safety
- Generation doesn’t want to drive and expects choices
- Emerging technology changing the game
- Crash related congestion
- Congestion during peak hours
WHAT WE ARE DOING

- Pedestrian, Bike, and Bus Safety
  - Detectors determine conflict likely to occur
  - Cell Phone Alerts to prevent crashes
• Modal Choice
  - Deploy Autonomous Shuttle
  - Engine that connects trips transit (including shuttle), vehicle, Uber, and Lyft
  - Deploy with App at UCF
  - Provide transit kiosk
WHAT WE ARE DOING

• Ready for next wave

• Deploying Autonomous Vehicle; kicking the tires

• Connected Vehicle
  • Fleets with devices
  • Signals Equipped
  • Smart Signals ready for upgrade
WHAT WE ARE DOING

• Smart Signal Timing
  • Let the signals tell us when they need to be retimed
  • Connect data to engineers to develop timings

• Coordination
  • Let Signals and Traffic Management Center detect events
  • In Real-time evaluate potential actions; activate one provides best result across agencies
  • Call best timing available to the controller
  • Change DMS
  • Alert LYNX
THANK YOU

Jeremy Dilmore
D5 TSMO Program Administrator
Jeremy.Dilmore@dot.state.fl.us
386 943-5360