NOTICE OF A MEETING
SMART REGION TASK FORCE
MID-OHIO REGIONAL PLANNING COMMISSION
111 LIBERTY STREET, SUITE 100, COLUMBUS, OHIO 43215
SCIOTO CONFERENCE ROOM

September 13, 2019, 9:00 am – 10:30 am

AGENDA

1. Welcome – Dana McDaniel, Chair

2. Smart Region Updates – Aaron Schill, MORPC

3. Ohio Framework for CV/AV Infrastructure – Preeti Choudhary, AECOM

4. Work on Deliverables

5. Other Business

6. Adjourn – Dana McDaniel, Chair

Please notify Lynn Kaufman at 614-233-4189 or LKaufman@morpc.org to confirm your attendance for this meeting or if you require special assistance.

The next Smart Region Task Force meeting is
November 12, 2019, 2:00 p.m. – 3:30 p.m.
111 Liberty Street, Suite 100, Columbus, Ohio 43215

PARKING AND TRANSIT: When parking in MORPC's parking lot, please be sure to park in a MORPC visitor space or in a space marked with a yellow “M”. Handicapped parking is available at the side of MORPC’s building. MORPC is accessible by CBUS. The closest bus stop to MORPC is S. Front Street & W. Blenkner St. Buses that accommodate this stop are the Number 61 - Grove City, the Number 5 - West 5th Ave./Refugee, and the Number 8 - Karl/S. High/Parsons. One electric vehicle charging station is available for MORPC guests.
Creating Ohio’s Framework for Connected/Automated Vehicles to Help Agencies Better Plan

Building the Nation’s First Ever Statewide CV/AV Framework
DriveOhio initiated a systems engineering analysis to create the nation’s first ever statewide framework and guidebook for Connected and Automated Vehicle (CV/AV) technology deployments. This framework will promote consistency and interoperability as various projects are implemented at varying scales by a wide range of stakeholders. It also offers users a significant head start in performing systems engineering analyses for individual projects, when needed, along with helpful tools for planning and implementation.

Uncovering Top Safety and Traffic Concerns
DriveOhio and the AECOM consultant team embarked on a series of regional information-sharing and fact-finding workshops in 2018. Based on stakeholder input and technical analysis, we cataloged current and planned CV/AV initiatives and identified what safety and traffic issues could be addressed by smart technologies. Approximately 260 stakeholders participated to provide important local insights. Statewide, these user needs surfaced consistently:

- Traffic signal timing optimization and coordination within a jurisdiction or with other jurisdictions
- Multi-agency/jurisdictional, real-time information sharing (congestion, incident, closures, surface conditions, etc.) for day-to-day operations
- Bike/pedestrian safety at or near intersections or along roadways
- Staffing skills, knowledge and resources to support technology

User needs specific to each region also emerged, as shown in the table below.

<table>
<thead>
<tr>
<th>Region</th>
<th>Needs</th>
<th>Potential CV/AV Apps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbus</td>
<td>Safety, traffic operations, work zone safety, bike/pedestrian safety</td>
<td>• Red Light Violation Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pedestrian Collision Warning</td>
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<td></td>
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<td>• Reduced Speed Zone Warning/ Lane Closure</td>
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<td>• Warnings About Hazards in a Work Zone</td>
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<td></td>
<td></td>
<td>• Intelligent Traffic Signal System (I-SIG)</td>
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<tr>
<td></td>
<td></td>
<td>• Cooperative Adaptive Cruise Control</td>
</tr>
<tr>
<td>Toledo</td>
<td>Funding, better data, signals, distracted driving, collaboration</td>
<td>• Data Distribution</td>
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<tr>
<td></td>
<td></td>
<td>• Intelligent Traffic Signal System (I-SIG)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Emergency Electronic Brake Light</td>
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<tr>
<td></td>
<td></td>
<td>• Transit Signal Priority</td>
</tr>
<tr>
<td>Cleveland</td>
<td>Signals, pedestrian/bike safety, funding, collaboration</td>
<td>• Data Distribution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intelligent Traffic Signal System (I-SIG)</td>
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<tr>
<td></td>
<td></td>
<td>• Pedestrian in Signalized Crosswalk Warning (Transit)</td>
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<tr>
<td></td>
<td></td>
<td>• Transit Signal Priority</td>
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<tr>
<td>Dayton</td>
<td>Signals, traffic information, funding, collaboration</td>
<td>• Data Distribution</td>
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<tr>
<td></td>
<td></td>
<td>• Intelligent Traffic Signal System (I-SIG)</td>
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<tr>
<td></td>
<td></td>
<td>• Advanced Traveler Information Systems</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>Better data, bike/pedestrian safety, signals, staff skills, first/last mile connections, collaboration</td>
<td>• Intelligent Traffic Signal System (I-SIG)</td>
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<td></td>
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<td>• Transit Connection Protection</td>
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<td>• Smart Truck Parking</td>
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<tr>
<td>Akron</td>
<td>Better data, bike/pedestrian safety, real time transit information, collaboration</td>
<td>• Pedestrian in Signalized Crosswalk Warning (Transit)</td>
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<td></td>
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<td>• Data Distribution</td>
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<tr>
<td></td>
<td></td>
<td>• Intelligent Traffic Signal System (I-SIG)</td>
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<td>• Advanced Traveler Information Systems</td>
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<tr>
<td></td>
<td></td>
<td>• Emergency Electronic Brake Light</td>
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<td></td>
<td>• Dynamic Ridesharing (D-RIDE)</td>
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<tr>
<td>Youngstown</td>
<td>Better data, bike/pedestrian safety, signals, staff skills, mobility access, distracted driving</td>
<td>• Intelligent Traffic Signal System (I-SIG)</td>
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<td>• Pedestrian in Signalized Crosswalk Warning (Transit)</td>
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<td>• Dynamic Ridesharing (D-RIDE)</td>
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Developing Ohio's CV/AV Guidebook

All findings from stakeholder input and the team's technical analysis are being incorporated into an easy-to-use guidebook to assist agencies in planning, deploying and monitoring CV/AV projects. It will contain a standardized CV/AV project deployment process, CV/AV systems engineering documentation, and links to an up-to-date repository of current and upcoming statewide CV/AV projects.

Guidebook Chapters

**PLANNING TOOLS**

- **CV/AV Architecture**
  - Illustrates the integration of CV/AV and ITS projects

- **Concept of Operations**
  - Describes the suite of need-based CV/AV applications for potential implementation

- **Communications Master Plan**
  - Evaluates communications capacity and projected demand

- **P3 Approach**
  - Explores cost and effort sharing opportunities

- **Program Plan**
  - Identifies CV/AV deployment opportunities

**DEPLOYMENT & MONITORING TOOLS**

- **System Requirements**
  - Specifies what the systems and applications shall do

- **Communication Requirements**
  - Specifies the communications requirements for specific CV applications

- **Software & Data Requirements**
  - Specifies what the applications' supporting software shall do

- **High Level System Design**
  - Describes how components and systems will interact

- **Detailed System Design**
  - Provides construction drawings for infrastructure components

- **Verification Plan**
  - Provides test plans to verify each application's requirements

Guidebook CV/AV Project Deployment

1. Identify primary needs
2. Map needs to CV/AV apps
3. Pull CV/AV requirements for chosen apps
4. Confirm functional requirements meet project goals
5. Complete systems engineering review form to obtain project approval
6. Use compiled package for procurement
7. Update statewide docs & drawings to assist future users
8. Update document set with local/project-specific requirements & drawings

Coming Soon — the Ohio CV/AV Guidebook

Check the DriveOhio website to find the guidebook which will be published soon.

As the guidebook is intended as a living, fluid document, please plan to contribute updates that may assist future users.

Questions? Please Contact Us

Nick Hegemier, P.E., Managing Director, Infrastructure/Vehicle Deployment

Nick.Hegemier@drive.ohio.gov | (614) 387-4099

AECOM

ENGAGE
PUBLIC AFFAIRS
Ohio’s Framework for Connected/Automated Vehicles
September 13, 2019
Goal: Create Statewide Framework

- This Framework is first of its kind in U.S.
- DriveOhio’s first initiative: Coordinate statewide CV/AV technology deployments
Framework Outcome

Completed or underway: tools needed to **plan**, **deploy** and **monitor** CV/AV projects that will work together.

**PLANNING TOOLS**

- CV/AV Architecture
- Concept of Operations
- Communications Master Plan
- P3 Approach
- Program Plan for CV/AV deployments

**DEPLOYMENT & MONITORING TOOLS**

- System Requirements for all proposed applications
- Verification Plan
- Communication Requirements
- Software & Data Requirements
- Detailed System Design with construction drawings & specs
- High Level System Design for target applications

DriveOhio | AECOM | ENGAGE PUBLIC AFFAIRS
You’ve Informed Our Work
Held 10 Regional Stakeholder Workshops
260+ Attendees

- AMATS (Akron)
- ODOT/DriveOhio
- Eastgate (Youngstown)
- MORPC (Columbus)
- MVRPC (Dayton)
- NOACA (Cleveland)
- OKI (Cincinnati)
- TMACOG (Toledo)
- OARC (Dayton)
- Buckeye Hills (Athens)
Shared Information and Listened to Input

- Explained the process
- Discussed region’s current/planned CV/AV projects
- Identified related stakeholders
Heard Many End-User Needs

Provider Story Name: Lloyd MacAdam

As a (circle/add role: planner, engineer, traffic manager, transit operator, law enforcement officer, emergency management official, fleet owner, elected official, other _________) >:

We need (describe info/action/other):

- a more reliable transportation system from a conditions standpoint.

So that travel is: (circle/add: safer, easier, more convenient, more reliable, more efficient and/or other _________) for our constituents.
Survey Identified More Challenges

- Vehicle crashes at intersections
- Lack of traffic data collection capability
- Provision of real-time travel information (congestion/incident/weather/ construction) to the public
- Congestion on freeways/expressways
- Congestion on arterial roadways
- Congestion caused by roadway construction/maintenance
- Lack of real-time traffic monitoring capability
- Conflicts and safety incidents between pedestrians/cyclists and transit vehicles
- Conflicts and safety incidents between transit vehicles and other vehicles
- Transit on-time performance
- Conflicts and safety incidents between pedestrians/cyclists and non-transit vehicles
- Roadway crashes due to weather conditions
- Rear-end collisions due to traffic backup/queues
- Crashes in and around roadway work zones
Differences/Similarities Across Regions
MORPC Need-Based CV Applications

**Apps**
- Red Light Violation Warning
- Pedestrian Collision Warning
- Reduced Speed Zone Warning/Lane Closure
- Warnings About Hazards in a Work Zone
- Intelligent Traffic Signal System
- Cooperative Adaptive Cruise Control
Determined Top, Statewide User Needs

1. Traffic signal timing optimization and coordination
2. Multi-agency/jurisdictional information exchange/sharing
3. Ped/bike safety at/near intersections or along roadway
4. Staffing skills, knowledge and resources to support technology
Convened Concept of Operations Workshop

- Discussed 8 operational scenarios:
  - Traffic signal operation
  - Rail crossing issues
  - Unplanned incidents
  - Work zones
  - Trucker parking information
  - Mobility support
  - Disruption to mobility ecosystem
  - Safety across transportation modes
Identified Influence of CV/AV on Operational Scenarios: Crash

Current Crash Scenario

Data
Location, severity, traffic impacts

Resources
911 calls by motorists, roadway data

Users
Emergency responders, clean up crews, traffic mgmt. center

Potential CV/AV Tools

- Advanced Traveler Information Systems
- CV-enabled Turning Movement & Intersection Analysis
- Do Not Pass Warning
- + 13 More

Vehicle detection, cameras, radio, traffic management center resources
Your Input and Technical Findings Drive the Work
## Identified Readiness Status of CV/AV Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Deployment Ready</th>
<th>Deployment Near Ready</th>
<th>Further Development Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Electronic Brake Light</td>
<td>●</td>
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<tr>
<td>Forward Collision Warning</td>
<td>●</td>
<td></td>
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<tr>
<td>Do Not Pass Warning</td>
<td>●</td>
<td></td>
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<tr>
<td>Intersection Movement Assist</td>
<td>●</td>
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<tr>
<td>Vehicle Turning Right in Front of a Transit Vehicle</td>
<td>●</td>
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<tr>
<td>Blind Spot Warning + Lane Change Warning</td>
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<td>●</td>
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<tr>
<td>Left Turn Assist (LTA)</td>
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<td>●</td>
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</tbody>
</table>
Developed Statewide CV/AV Architecture
Provided Training on Incorporating CV/AV into Regional Architecture
Developed Concept of Operations

- Described target system and desired operation
- Includes applications, core systems and infrastructure
Identified 109 CV/AV Applications to Include in the Ohio Framework

<table>
<thead>
<tr>
<th>Application</th>
<th>Need-Based</th>
<th>Project-Based</th>
<th>Future Projects</th>
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</thead>
<tbody>
<tr>
<td>Curve Speed Warning</td>
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<tr>
<td>End of Ramp Deceleration Warning (ERDW)</td>
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<tr>
<td>Reduced Speed Zone Warning/Lane Closure</td>
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<tr>
<td>Pedestrian in Signalized Crosswalk Warning</td>
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<tr>
<td>Red Light Violation Warning</td>
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<tr>
<td>SPaT MAP Display Signal Timing, Time to Green</td>
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<tr>
<td>Wrong Way Entry (WWE)</td>
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<td>Speed Limit Warning</td>
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<td>Spot Weather Impact Warning</td>
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<tr>
<td>Restricted Lane Warnings</td>
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<tr>
<td>Oversize Vehicle Warning</td>
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<tr>
<td>Stop Sign Violation Warning</td>
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<tr>
<td>Stop Sign Gap Assist</td>
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</tbody>
</table>

Identified 109 CV/AV Applications to Include in the Ohio Framework

Pedestrian in Signalized Crosswalk Warning
Described the Support Environment
Developed System + Software Requirements

- Defines baseline CV/AV app functionality, infrastructure needs, institutional support environment
- Identifies standard data sets by application
- Includes security requirements based on data set, source, destination and transfer method
System Requirements Components

**Foundational**

- **General**
  - Systems, software and infrastructure

- **System Security and Privacy**
  - OBU, RSE and TMC Security communication flows

- **Core Services**
  - Management apps that support functional CV/AV apps

**CV/AV Application-Specific Requirements**

- 109 apps included per ConOps

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*Living doc to be updated as apps develop and deploy!*
Prepared Standard Drawings

- Dedicated short range communications
- Closed circuit TV assembly
- Vehicle detector
- Highway advisory radio and beacon sign
- Dynamic message sign
- Destination dynamic message sign
- Ramp meter
What’s Next
CV/AV Project Deployment Process

1. Identify primary needs
2. Map needs to CV/AV apps
3. Pull CV/AV requirements for chosen apps
4. Confirm functional requirements meet project goals
5. Select standard design drawings
6. Update document set with local/project-specific requirements & drawings
7. Use compiled package for procurement
8. Complete SERF to obtain project approval

Update statewide docs & drawings to assist future users
Still to Come

Tools needed to plan, deploy and monitor CV/AV projects that will work together

**PLANNING TOOLS**

- CV/AV Architecture
- Concept of Operations
- Communications Master Plan
- P3 Approach
- Program Plan for CV/AV deployments

**DEPLOYMENT & MONITORING TOOLS**

- System Requirements for all proposed applications
- Verification Plan
- Communication Requirements
- Software & Data Requirements
- Detailed System Design with construction drawings & specs
- High Level System Design for target applications
What You Can Do

▪ Use tools as a resource for planning and deploying of future projects
▪ Contribute updates that may assist future uses
Discussion

▪ How might you use this playbook once finalized?
▪ How can DriveOhio and ODOT help you use the playbook?
Thank You

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Andrew Bremer  | andrew.bremer@drive.ohio.gov