NW 33 INNOVATION CORRIDOR & FIBER AND SMART MOBILITY INITIATIVE

October 2016
Formation of the Collaborative

- Representatives from the City of Dublin, City of Marysville, Jerome Township, Millcreek Township, LUC, and Union County began meeting in February 2014.

- The initial goal was to bring everyone together to discuss and collectively plan the development and infrastructure along the corridor.

- Formed two committees: (1) NW 33 Innovation Corridor Group, comprised mostly of policy leaders that oversees issues related to land use, infrastructure, and economic development; and, (2) NW 33 Development Team, comprised mostly of planners and engineers, that focuses on specific development planned or underway along the corridor.
Planning/Land Use Accomplishments

- In cooperation with LUC, hired Planning NEXT to develop the Crossroads Area Plan, which has since been adopted by Dublin, Marysville, and Union County. (Jerome Township Trustees to consider in November, 2016)

- Researched uniform Architectural Design policies along US 33 and Industrial/Northwest Parkway

- Formed bi-monthly Development Team meetings to jointly review projects
Infrastructure Accomplishments

• **Collaboration on US 33/I-270 Interchange Rebuild**: gathered support letters from communities and businesses

• **Collaboration on US 33/OH-161 Interchange Rebuild**: joint grant applications

• **Dublin Green – Cosgray/OH-161 Roundabout**: Dublin, Franklin County, Developer, and Union County covering expenses
Economic Development Accomplishments

• Approved Joint Economic Development District (JEDD) with Millcreek Township

• JEDD discussion with Jerome Township; ongoing 1+ years

• Developed new brand for the corridor dubbed the “NW 33 Innovation Corridor”

• Jointly marketed the corridor in Columbus Business First

• Completed a joint business mission trip to Detroit, MI

• Developed an Automotive Cluster Map that shows over 50 automotive related companies along the corridor
Economic Development Accomplishments (continued)

**Fiber Collaborative**

- Fiber collaborative formed between Dublin, Marysville and Union County with goal of extending fiber along the corridor on both US 33 and Industrial Parkway to improve connectivity and speed for economic and commercial use

- Recently learned that ODOT has agreed to cover expenses (estimated $10-12M) related to the fiber installation

**Smart Mobility**

- In collaboration with OSU, Honda of America Mfg., TRC, and Battelle, applied for a USDOT grant to turn the corridor into a smart mobility testing area for autonomous and connected vehicles

- Recently learned that we will be receiving the nearly $6M USDOT grant that will allow for the installation of Digital Short Range Communication (DSRC) units along the corridor
Economic Development Accomplishments (continued)

**Council of Governments**

- Working to create Council of Governments between Dublin, Marysville and Union County
- With the construction of the fiber and DSRC units being covered by ODOT and USDOT, the COG will manage and operate the fiber and potentially the DSRC units

**Smart City Partnership**

- Goal is to partner with Columbus to potentially tie into the Smart City Challenge project.
Why Fiber and Smart Mobility?

- A 2016 McKinsey report suggests that the overall economic potential from autonomous vehicle technology will range between $0.2 trillion and $1.9 trillion annually by 2025.

- Dublin, Marysville, Union County, and the Columbus Region can lead Ohio and the nation in the development of this new industry.
NW 33 Automotive Cluster

The NW 33 Innovation Corridor is one of the fastest growing industrial and R&D corridors in Ohio.
Proposed Fiber Network

- Fiber network would extend approximately 35+ miles.
- Laterals will occur in Dublin, Marysville, near Honda, and Industrial Parkway.
- Communication towers for smart mobility will be placed approximately every 600 meters.
- Signaled intersections will become more “intelligent”.
The Smart Mobility Initiative

• Shortly after pursuing the fiber collaborative, we were engaged by OSU and TRC concerning the possibility of making the NW 33 Corridor the first smart mobility corridor in Ohio.

• The fiber network is necessary for the smart mobility initiative to become reality.

• By increasing the intelligence of vehicles and infrastructure, smart mobility will improve traffic congestion, safety, and traffic flow along the 33 corridor and in the City of Dublin and Marysville.

• The NW 33 Corridor has the potential of becoming the first test bed for autonomous and connected vehicles in Ohio competing with other research corridors around the nation. Honda and Battelle currently test these vehicles in Michigan and California.

• In October, a $5.9 million USDOT grant was awarded to fund the purchase of Dedicated Short Range Communications (DSRC) along the corridor for connected vehicle and autonomous vehicle testing and research.

• The Ohio Department of Transportation has also joined this initiative, pledging to fund the installation of fiber along the NW 33 Corridor.
Smart Mobility Concepts

**Smart Mobility**: Communication between vehicles, infrastructure, and people that enhances roadway safety and mobility

<table>
<thead>
<tr>
<th>Vehicles with cellular connectivity</th>
<th>Vehicles equipped with dedicated short-range communication (DSRC) radio</th>
<th>Vehicles with embedded sensors that can operate “by themselves”</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Star</td>
<td>Vehicle-to-Infrastructure</td>
<td>Adaptive Cruise Control</td>
</tr>
<tr>
<td>On-Board Wi-Fi</td>
<td>Vehicle-to-Vehicle</td>
<td>Forward Collision Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parking Assist</td>
</tr>
</tbody>
</table>
Connected Vehicle Enabling Technologies

A local or state **back office**, private operator, or traffic management center collects and processes data from the roads and vehicles.

**Backhaul (fiber optics cables)** connect controllers to the back office, ensuring timely data processing.

An **in-vehicle red light violation warning** alerts a driver who is about to run a red light.

A **roadside unit (RSU)** transmits data to the vehicle.

A **traffic signal controller** transfers information on the signal phase (green, yellow, red) and the amount of time remaining until the light changes to the RSU, which then broadcasts that data to the vehicle.

**On-board equipment** receives data from the RSU radio and displays an appropriate alert to the driver.

Source: GAO analysis of Department of Transportation documents. | GAO-15-775
Connected Vehicle Applications

Vehicle-to-Infrastructure Safety
- Red Light Violation Warning
- Curve Speed Warning
- Stop Sign Gap Assist
- Spot Weather Impact Warning
- Reduced Speed/Work Zone Warning
- Pedestrian in Signalized Crosswalk Warning

Vehicle-to-Vehicle Safety
- Emergency Electronic Brake Lights
- Forward Collision Warning
- Intersection Movement Assist
- Left Turn Assist
- Blind Spot/Lane Change Warning
- Do Not Pass Warning
- Vehicle Turning Right in Front of Bus Warning

Agency Data
- Probe-based Pavement Maintenance
- Probe-enabled Traffic Monitoring
- Vehicle Classification-based Traffic Studies
- CV-enabled Turn Movement & Intersection
- CV-enabled Origin-Destination Studies
- Work Zone Traveler Information

Environment
- Eco-Approach and Departure at Signalized

Road Weather
- Motorist Advisories and Warning
- Enhanced MDSS
- Vehicle Data Translator
- Weather Response Traffic Information

Mobility
- Advanced Traveler Information System
- Intelligent Traffic Signal System
- Signal Priority (transit, freight)

Eco
- Eco-Traffic Signal Timing
- Eco-Traffic Signal Priority
- Connected Eco-Driving
- Wireless Inductive/Resonance Charging
- Eco-Lanes Management
- Eco-Speed Harmonization
- Eco-Cooperative Adaptive Cruise Control
- Eco-Traveler Information
- Eco-Ramp Metering
- Low Emissions Zone Management
- AFV Charging/Fueling Information
- Eco-Smart Parking
- Dynamic Eco-Routing (light vehicle, transit, freight)
- Eco-ICM Decision Support System

Smart Roadside
- Mobile Accessible Pedestrian Signal System
- Emergency Vehicle Preemption
- Dynamic Speed Harmonization
- Queue Warning
- Cooperative Adaptive Cruise Control
- Incident Scene Pre-Arrival Staging
- Guidance for Emergency Responders
- Incident Scene Work Zone Alerts for Driver and Passenger
- Emergency Communications and Evacuation
- Connection Protection
- Dynamic Transit Operations
- Dynamic Ridesharing
- Freight-Specific Dynamic Travel Planning and Information
- Drayage Optimization

Wireless Inspection
- Smart Truck Parking
USDOT Advanced Transportation and Congestion Management Technology Deployment

- 5-year program / $60M per year

- 50% local cost share

- Utilize advanced transportation technology to address:
  - Safety
  - Mobility
  - Sustainability
  - Economic vitality
  - Air quality

- 2016 awards:
  - City and County of Denver
  - Los Angeles County MTA
  - City of Los Angeles
  - City of Marysville
  - Niagara Frontier Transportation Authority
  - City of Pittsburgh
  - City and County of San Francisco
  - Texas Department of Transportation
US-33 Smart Mobility Corridor Goals

- Address challenges associated with rapid population and employment growth:
  - Highway congestion on US-33
  - Intersection safety and mobility in Marysville and Dublin
  - Access to jobs throughout corridor
- Demonstrate how smaller suburban and rural jurisdictions can deploy connected / autonomous technology
- Leverage SmartColumbus deployments
- Incorporate private sector participants to make US-33 a preeminent connected / autonomous testbed
US-33 Smart Mobility Corridor Concepts
Queue Warning / Speed Harmonization

- Captures data from vehicles and infrastructure
- Analyzes data to detect congestion
- Communicates queue location and speed harmonization recommendations to drivers
- Decreases end of queue crashes
- Optimizes capacity on congested corridors
INFLO Mobile Application

[Images of INFLO mobile application interface showing current time, slow traffic speeds, and queue distances]
Dynamic Ridesharing

• Allows travelers book a trip via mobile app
• App matches travelers based on origin, destination, and time
• Ideally situated for large, shift-based employers
• Decreases congestion and emissions by taking cars off the road
• Provides carless households with increased job access
C-ride

Next Trip

Today
3:15 PM
240 E Kossuth St Columbus OH
44 min
2 NEIL & 17TH AVE

Upcoming Trips

Today
4:15 PM
330 Huntington Park Columbus OH
50 min
ических мин

Today
5:06 PM
200 W Nationwide Columbus OH
50 min
ических мин

Today
6:05 PM
4600 International Gateway Columbus OH
50 min
ических мин

More Trips

Plan Trip

Trip History

Account

Plan a Trip

Start: Current Location

End: 4600 International Gateway Columbus OH

Time: 4/23/2014 9:00 AM

Search

Trip Details

Trip Summary

Travel: 4/23/2014 6:41 AM
Total Time: 116 min
Total Walk: 1 min
Transfers: 2

44 min
COTA 005
N HIGH ST & W LONG ST

0 min
WALK
N HIGH ST & E GAY ST

28 min
COTA 006
VETERANS ADMINISTRATION

Save

3:28
Tuesday, April 22

C-Ride:
Trip to: 240 E Kossuth St
Columbus OH is about to start
slide to view

> slide to unlock

21
Summary of Proposed Deployments

1. DSRC roadside units along US-33
2. Traffic signals with dynamic phase and timing, pre-emption
3. Pedestrian in crosswalk warning systems
4. Connected fleet vehicles comprising multiple jurisdictions and vehicle types
5. Supporting connected vehicle applications:
   - End of queue warning
   - Speed harmonization
6. Dynamic ridesharing at select major employers
7. Roadside video equipment and sensors to allow autonomous vehicle tracking and open road testing
8. Connection to area data centers
What’s next?

- Connected / autonomous vehicle technology poised to be a trillion dollar industry by 2025
- Local interest is strong due to two recent high-profile wins
- The Columbus region will be connected and data rich

<table>
<thead>
<tr>
<th>In-Vehicle DSRC</th>
<th>3,000</th>
<th>600</th>
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<tbody>
<tr>
<td>Public Fleet</td>
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<td>Private Fleet</td>
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<td>Personal Vehicles</td>
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<tr>
<td>Roadside DSRC</td>
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<tr>
<td>Smart Traffic Signals</td>
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<td>10</td>
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<tr>
<td>Pedestrian Detection</td>
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<td>8</td>
</tr>
</tbody>
</table>

Numbers represent estimates / targets
Questions and Answers

Thank you

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