We Are at a Crossroads
WE ARE AT A CROSSROADS......

Can we make the right decisions?
Do we have the right people, technology, policy, drive?

What is motivating your agency?
What are your Key Performance Indicators?
HOW TECHNOLOGY INFLUENCES OUR LIVES

Technology has changed *the way* we live for some time

At some point we started using technology *to* live

Really, we want smart technology *to help* us live
WHAT CAN BE ACCOMPLISHED: IMPROVED QUALITY OF LIFE
US DOT SMART CITIES CHALLENGE: WHAT CITIES ARE TELLING US

Providing first-mile and last-mile service for transit users to connect underserved communities to jobs

The typical job is accessible to only about 27 percent of its metropolitan workforce by transit in 90 minutes or less.

Facilitating the movement of goods into and within a city

Trucks stuck in stop-and-go traffic in metropolitan areas cost shippers an estimated $28 million annually in truck operating costs and wasted fuel.

Coordinating data collection and analysis across systems and sectors

28 percent of all of the transit agencies in the United States have open data systems that freely provided transit times to the public.

Reducing inefficiency in parking systems and payment

An estimated 30 percent of traffic in urban areas is caused by cars looking for parking.

Limiting the impacts of climate change and reducing carbon emissions

The 78 applicant cities represent over one billion metric tons of CO₂ emissions per year.

Optimizing traffic flow on congested freeways and arterial streets

Outdated traffic signal timing causes more than 10 percent of all traffic delay on major routes in urban areas.
US DOT SMART CITIES CHALLENGE: WHAT CITIES ARE TELLING US

How We Move
44 cities proposed projects to test the use of automated shared use vehicles to help travelers connect to their destinations.

How We Move Things
11 cities envisioned improving urban freight delivery by implementing smarter curb space management (through sensors, dynamic reservations, and other technologies) to speed loading and unloading.

How We Adapt
17 cities proposed using inductive wireless charging to charge electric vehicles, buses, or shuttles.

How We Move Better
53 cities proposed implementing Dedicated Short Range Communication (DSRC) to connect vehicles to infrastructure and each other.

How We Grow Opportunity
9 cities proposed providing free public WiFi on buses, taxis, and public spaces. The seven Smart City Challenge finalists proposed over 60 unique strategies to increase access to jobs, provide training, reach underserved areas, and ensure connectivity for all.

How We Align Decisions and Dollars
45 cities proposed implementing a unified traffic or transportation data analytics platform, which would help them make better decisions with their limited resources.
SMART CITIES MARKET OVERVIEW

Annual Smart City Revenue by Region, World Markets: 2016-2025

Source: ©2017 Navigant Consulting, Inc.
2017 ITE ACTIVITIES

- 8 District & 2 Section Listening Sessions
- 246 survey responses
- Growing twitter feeds
SMART COMMUNITIES...

At least 70% said… “Is a subject I am interested in” & “Should consider various elements including operations and maintenance after deployment”
“On a scale of (1-5) how would you rate your awareness of Smart Communities?”
“On a scale of 1-5, how important is Smart Communities to TSM&O?”
“Which elements would you like to learn more about? (check all that apply)”

>60%

“Which elements appeal to you? (check all that apply)”

>50%

~50%
THERE IS GREAT DEMAND FOR THIS INFORMATION

- It wasn’t only what we heard, but also what we didn’t hear.
  - Members were interested in learning, but often times not confident enough in the subject area to speak up.
  - Many members do not realize what they are already doing in this space.
  - Some agencies expressed reluctance to make decisions today because of the unknown. “Should we go ahead with a programmed investment in transit infrastructure since we know everything is going to be changing soon?”
  - Many equated DSRC and Automated Vehicles with Smart Communities.
OVERARCHING IDEAS

• Technology to improve communities, NOT technology for technology’s sake.

• Leveraging transportation assets outside of transportation.

• User-based focus, NOT vendor-based focus

• Address Urban, Suburban, and Rural issues

• Members need practical information, what decisions do I need to make right now
LET’S THINK BEYOND THE VEHICLES

Planning for connected and automated vehicles is not one dimensional – it is EVERYTHING planning.... Smart City, Smart Community, State, Regional, Local.
APA ADOPTED AV POLICY PRINCIPLES IN JANUARY 2018

1. Mobility, connectivity and access
2. Energy and sustainability
3. Research and development
4. Safety and security
5. Data and decision making
6. Economics and fiscal planning

Aren’t these ALSO Smart Community Goals? CAV Goals? If not, why not?
DISRUPTIVE IDEAS....PARTNERSHIP OPPORTUNITIES?

- Congestion management
- Transit services
- Goods movement
- Transportation Network Companies (Uber, Lyft)
- Data companies
- Shared ownership and use
- Mobility-as-a-Service
- Electric vehicles
HERE, THERE, AND EVERYWHERE

- ITS 2.0
- Vertical Take Offs and Landings (VTOLs)
- Fourth Industrial Revolution, Industry 4.0, Internet of Things
- The big Data Question
CONSIDERATIONS

https://binged.it/2rGryOW
https://youtu.be/Xy8CHSqzTac
https://binged.it/2KYk16P
https://binged.it/2rHD2BB (Stop at 1:02)
SKYPORT by Gannett Fleming
Inspiring hub seeks to reshape our cities to be cleaner, quieter, simpler, and smarter.

Our SKYPORT design concept is an integral component of the transportation evolution envisioned by Uber.

CLIENT: Uber

LOCATION: Various


DATA:
Size: 1.3-acre footprint, 4-story building
Construction Cost: Estimated $150M
Completed: Conceptual design
Type: New Construction

OUTCOMES: Anticipated outcomes:
- Safe, comfortable access to on-demand urban air transportation
- Decreased traffic congestion and quicker and easier daily commutes
- Efficient, intuitive integration of ground and air movement
- Less pollution, cleaner air, and improved quality of life.

https://youtu.be/WxBmpCwngVI
Big Data or Big Data?

- What, where, who?
- Use it to tell the story
- Outputs vs Outcomes
- Artificial Intelligence, Machine Learning, Edge Computing
- Performance Metrics vs Performance Measures
- Data Driven Decisions – Day to day and Future
INFRASTRUCTURE IMPLICATIONS: HIGHWAY AUTOMATION

- Lane Markings
- Pavement Designs
- Communication Networks
SHARED SERVICES

- Curb Management
- Downtown Deliveries – Everywhere Deliveries
- Shared Use Policies
- Parking Implications
- Multimodal
WORKFORCE, EDUCATION AND OUTREACH

- Adaptable Workforce
- Changing Knowledge, Skills, and Abilities
- Work with Research Entities
- Partner with Universities
- Public Relations
HUMAN FACTORS

- Cybersecurity
- Behavior
- Trust

https://youtu.be/AdZ8nx6nRfA
SAFETY

- Full Implications
- Traffic Incident Management
- Partnering Opportunities
Resources for Connected and Autonomous Vehicles

The deployment of connected and automated vehicles presents specific challenges for state transportation agencies, including infrastructure improvement, policy changes...
The SPaT Challenge

Challenge state and local public sector transportation Infrastructure Owners & Operators (IOOs) to achieve deployment of DSRC infrastructure with SPaT broadcasts in at least one coordinated corridor or network (approximately 20 signalized intersections) in each state by January 2020.
Planning and Research

OBJECTIVE 13: ESTABLISH CAV PILOT PROGRAMS THAT REQUIRE INTER-AGENCY AND CROSS-SECTOR COLLABORATION

Goals Addressed:
1. Improve Safety
2. Enhance Mobility
3. Prepare Workforce
4. Foster and Sustain Partnerships
5. Increase Public Awareness
6. Support Economic Competitiveness

To increase public awareness and stakeholder buy-in, demonstrate the discernible and measurable benefits of CAV technologies in Pennsylvania. To achieve this, the CAV Strategic Plan proposes a set of pilot projects designed to demonstrate the impact of CAV on Pennsylvania. However, these projects must still conform to the regional planning process and be properly programmed by planning partners across the Commonwealth. Since many of the proposed pilot projects require close coordination between state, regional, and local officials, it is necessary to use the systems engineering process and a strong partnering approach to achieve project implementation. Recent lessons learned from pilot deployments have shown that a lack of integration with other projects at the state level and a lack of local partnering have hampered implementation efforts. Successful procurement of Federal grants to assist with pilot implementation will rely on an implementation plan that incorporates these lessons.

Achieving this objective will help PennDOT obtain a better understanding of this technology. Completing this objective will set a foundation for all future deployment of CAV applications.

Day 1 Benefits – Some immediate applications from achieving this objective include setting priority for CAV development and identifying a cross section of stakeholders correctly. This will also help set priority for CAV deployment with stakeholder buy-in.

Impacts – No immediate impact to existing or planned activities anticipated with the fulfillment of this objective. However, as pilot projects are programmed, funding may shift from one project to these pilots.

Recommended Steps:

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<tr>
<th>0-1Yrs.</th>
<th>2-4Yrs.</th>
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<tr>
<td>Conduct Workshops to Develop Support for Pilot Projects</td>
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<tr>
<td>Number of Projects Programmed – at least one per year</td>
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<tr>
<td>Plan Pilot Projects and Establish Funding Levels</td>
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<tr>
<td>Number of Projects Completed</td>
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<tr>
<td>Apply for Grants for CAV Pilot Projects</td>
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<tr>
<td>Number of Grants Applied for / Success Rate</td>
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<tr>
<td>Develop a DSRC Deployment Plan</td>
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<tr>
<td>Plan Developed / Number of Pieces of Equipment Deployed / Uptime</td>
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<tr>
<td>Assess PennDOT Connects for CAV Inclusion</td>
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<tr>
<td>Number of CAV projects in PennDOT Connects</td>
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Lead:
- PennDOT Bureau of Planning and Research

Key Stakeholders:
- PennDOT Districts, PTC, MPOs / RPOs, Local Municipalities

Level of Investment:
- Level 3

CMM Dimension Impact:
- Business Processes, Systems and Technology, Collaboration

Assumptions:
- Adequate funding levels are available; the technology is mature enough for deployment.
- DSRC is the current technology used. If otherwise, use applicable technology.
OFFICE OF POLICY PLANNING

GUIDANCE FOR ASSESSING PLANNING IMPACTS AND OPPORTUNITIES OF AUTOMATED, CONNECTED, ELECTRIC AND SHARED-USE VEHICLES

FDOT
MAY 2018
We’re gathered at this crossroads....

- Do we have the drive or will we wait?
- This is not traditional engineering
- Remember the human element
THANK YOU

Questions?