Transportation Mobility

Sal Cowan
Wasif Mirza
Susan Catlett
Jeff Rockower
Gail Yazersky
Ridwan Ahmed

Transportation Mobility
TRB 2019

Transportation Mobility
"Improving Lives By Improving Mobility"

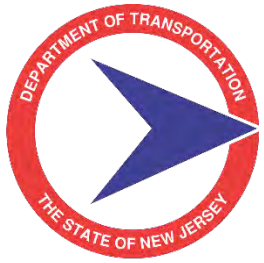
Presenters

- Sal Cowan – Senior Director
- Wasif Mirza – Director
- Susan Catlett – Project Manager
- Jeff Rockower – Administrative Analyst 3, Information Systems
- Gail Yazersky – Transportation Planner
- Ridwan Ahmed – Assistant Engineer

TRB By The Numbers

Number of Sessions Attended – 52 (**without Wasif #'s)**

Number of Committee Meetings Attended – 4



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Examining the Disruptive Forces Facing DOTs: An Update of the Foresight Series

Stephanie Pollack – MassDOT

Kyle Schneweis – Nebraska DOT

Roger Millar – Washington State DOT

Leslie Richards – PennDOT

Carlos Braceras – Utah DOT

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Examining the Disruptive Forces Facing DOTs: An Update of the Foresight Series

-$16 billion investment
- Multi year funding
(11.9-cent gas tax increase)
(3rd highest in the nation)

- Cooperative Automated Transportation Working Group
- Explains their efforts
- Pilots (weather, signals, work zone)

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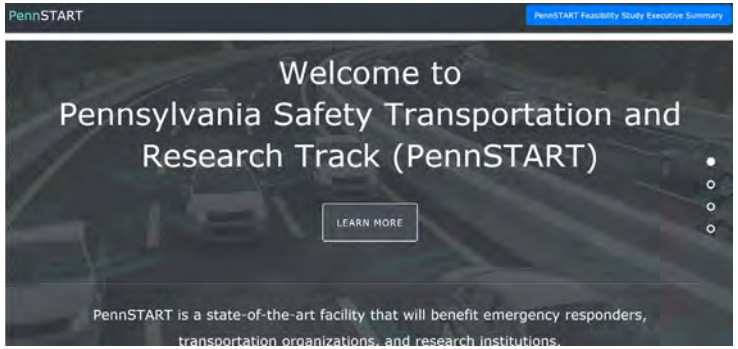
Examining the Disruptive Forces Facing DOTs: An Update of the Foresight Series



- Traffic Incident Management
- Connected & Automated Vehicle
- Tolling, ITS and Traffic Signals
- Work Zones
- Commercial Vehicles
- Transit Vehicles

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Examining the Disruptive Forces Facing DOTs: An Update of the Foresight Series

Moving Massachusetts Forward. massDOT

Massachusetts Department of Transportation

EO # 579: Establishing the Commission on the Future of Transportation in the Commonwealth (plan for 2020-2040)

Created Commission on the Future of Transportation in the Commonwealth

(Climate and Resiliency, Electrification, CAV, MaaS, Land Use, Demo)

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Examining the Disruptive Forces Facing DOTs:
An Update of the Foresight Series

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

Biggest take away?

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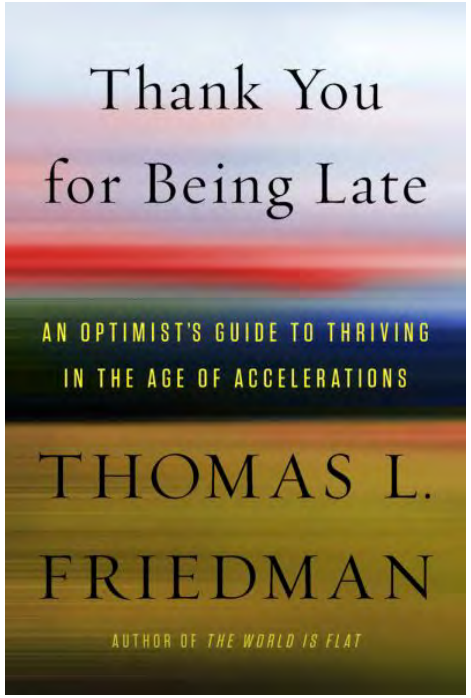
Examining the Disruptive Forces Facing DOTs:
An Update of the Foresight Series

- Automation
- Electrification
- MaaS



Expanding and Enhancing the Capabilities of Traffic Management System

Michigan DOT

- invest time requirements document (1500 in theirs)

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vic roads

Freeway to Freeway Signal

Managed Lanes

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Today's Teen, Tomorrow's Transportation Professional: Adapting and Preparing for the Future of Work

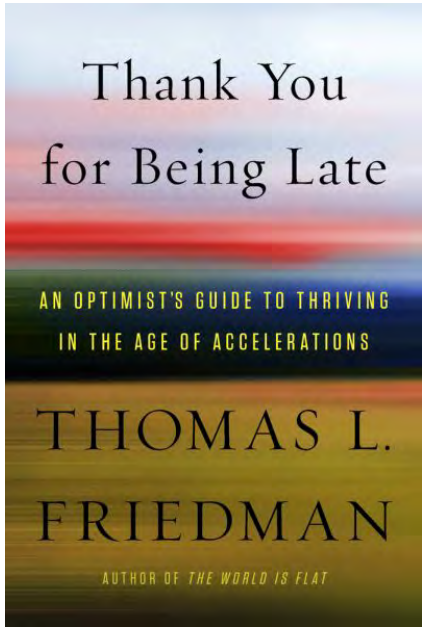
What are we doing to educate people about our industry?

$15,000 to train a new employee

Chief Learning (not Training) Officer (Utah)

Knowledge Management is critical (Washington State)

DOT's replace employees instead of expanding knowledge



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Wasif Mirza

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Sue Catlett

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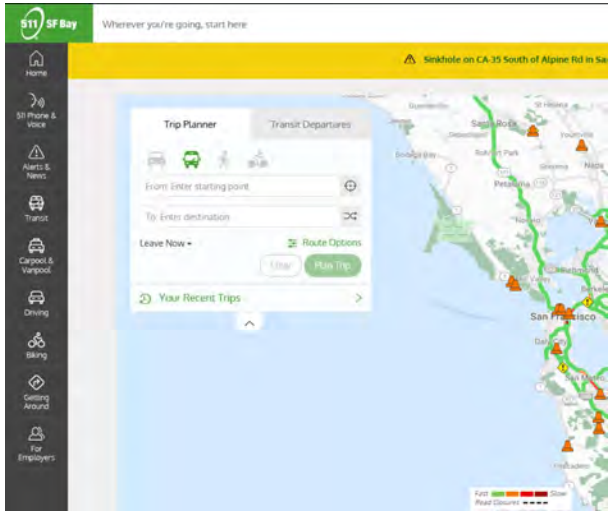
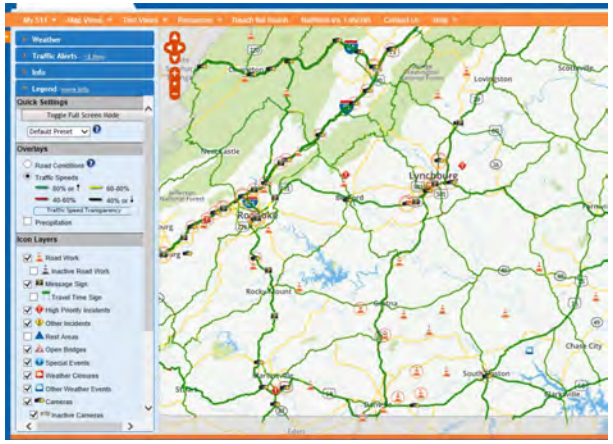
Migrating to the next Generation of Traveler Information & Communication (aka 511)

Panel consisted of agencies and consultants representing agencies

- ✓ Spikes in usage of system caused by weather and road events was noted
- ✓ VA added additional information such as truck parking and RWIS (Road Weather Information System)
- ✓ Creation of mobile apps for the phone instead of just desk computers
- ✓ One was branching out to having a kiosk display at shopping centers
- ✓ Most have streaming video of traffic cameras
- ✓ Strive to provide services to commuters such as Park N Ride lots, train information, etc.
- ✓ San Francisco Bay Area has 511 available through “Alexa” – meeting the customer where he/she is
- ✓ Questions asked – what does the future hold in store for when vehicles will communicate in some fashion
- ✓ DOTs remain best source of construction event information, winter road conditions and expected clearance times
- ✓ DOT can influence decisions but can’t control motorists





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A National Dialogue on Highway Automation: Advancing the Conversation (2 Sessions)

- Recap what happened in the 6 sessions (June –December 2
  - Kickoff
  - Policy & Planning
  - Digital Infrastructure and Data
  - Freight
  - Operations
  - Infrastructure Design & Planning

FHWA NATIONAL DIALOGUE ON HIGHWAY AUTOMATION
Building a community to support the safe and efficient integration of automated vehicles onto the Nation's roads

- The 2 panels had representation from state/FHWA/MPOs, industry and interested societies/organizations
- High level review – discussed some of the topics brought up at different sessions, such as updating MUTCD
- 4 Objectives of National Dialogue Series:
  - ✓ Listen: Gather detailed input from a diverse group of stakeholders regarding opportunities and challenges on highway automation, such as infrastructure readiness, traffic operations, policy, planning and other areas.
  - ✓ Engage: Facilitate information sharing among industry, public agencies, and others to understand the current state of automated vehicle technologies and inform FHWA actions.
  - ✓ Inform: Raise awareness of FHWA and USDOT initiatives in automation, serving as a resource for the transportation community.
  - ✓ Evolve: Update institutional structures for working with existing and new stakeholders to develop new partnerships and strengthen coordination channels.
- Reports of each session will eventually be posted on website.
  - https://ops.fhwa.dot.gov/automationdialogue/index.htm

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Automated Vehicles (AV) 3.0

- Was issued October 2018

- Items mentioned in report:
  - Safety 1st
  - Technology Neutral (US DOT is not looking to specify a particular technology)
  - Modernize Regulation (some regulations may need to be adjusted for technology)
  - Prepare for Automation (what needs to happen so we are prepared for automation)
  - Website: https://www.transportation.gov/av/3

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Jeff Rockower

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What happened to your files?

All your files encrypted with RSA-2048 encryption, For more information search in Google 'RSA Encryption'

How to recover files?

RSA is a asymmetric cryptographic algorithm, You need one key for encryption and one key for decryption
So you need Private key to recover your files.
It's not possible to recover your files without private key

How to get private key?

You can get your private key in 3 easy step:
Step1: You must send us 0.7 BitCoin for each affected PC OR 3 BitCoins to receive ALL Private Keys for ALL affected PC's.
Step2: After you send us 0.7 BitCoin, Leave a comment on our Site with this detail: Just write Your 'Host name' in your comment
*Your Host name is: Redacted

Step3: We will reply to your comment with a decryption software, You should run it on your affected PC and all encrypted files will be recovered
* Our Site Address: http://jcmi5n4c3mvgtyt5.onion/familiarisingly/
* Our BitCoin Address: 1MddNbqRCJa825ywjdbjbAQpstWBpEHmPR

(If you send us 3 BitCoins for all PC's, Leave a comment on our site with this detail: Just write 'For All Affected PC's' in your comment)
(Also if you want pay for 'all affected PC's' You can pay 1.5 Bitcoins to receive half of keys(randomly) and after you verify it send 2nd half to receive all

How To Access To Our Site

For access to our site you must install Tor browser and enter our site URL in your tor browser.
You can download tor browser from https://www.torproject.org/download/download.html.en
For more information please search in Google 'How to access onion sites'

Test Decryption

Check our site, You can upload 2 encrypted files and we will decrypt your files as demo.

If you are worry that you don't get your keys after you paid, You can get one key for free on you choise(except important servers), Tel
Also you can get some single key and if all single BTC taht you paid reached to all keys price you will get all keys
Anyway be sure that you will get all your keys if you paid for them and we don't want damage our reliability
With buying the first key you will find that we are honest.

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- Connected & Autonomous Vehicles
- Traveler Information
- Traffic Signals
- Ramp Metering
- Express Lanes
- Storm Management
- Variable Speed Limits & Active Traffic Management

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- Demanded 3 ₿ ≈ 51,000 USD
- 25 – 150 IT internal people
- Sever from other networks
- Business network and core were attacked
- Federal and Gubernatorial Support

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- Hacked Dynamic Message Signs
- Impact is low compared to an entire system
- Public Embarrassment
- Major Public Safety Risk
- Lowers credibility of State Agencies
- Threatens public's faith in more advanced technologies like CV/AV

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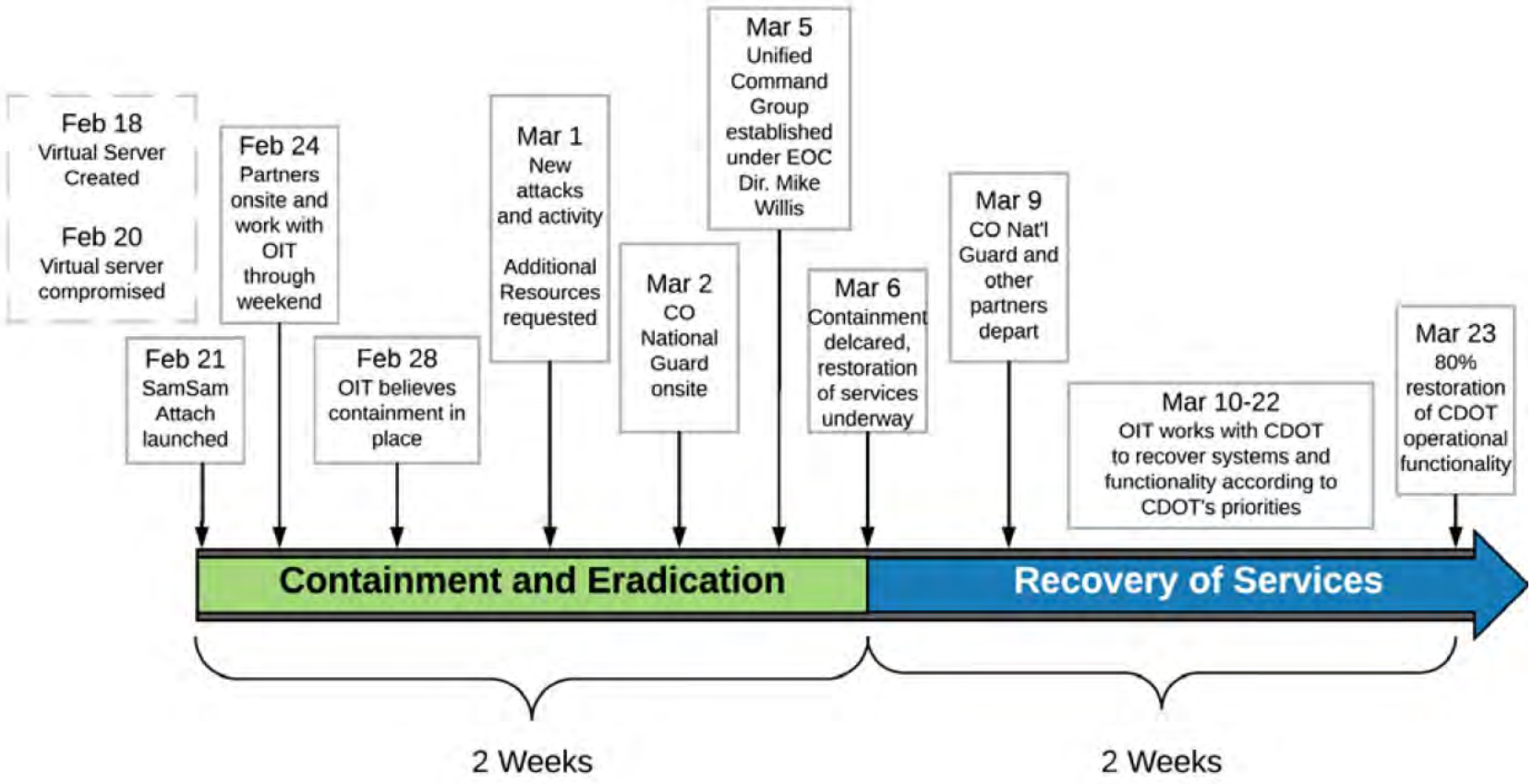
Incident Timeline



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- Balance Competing Priorities
- OIT vs. DOT
- Governor Reports every 6 hours
- Prioritizing Business Functions

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- Maintaining “Business as Usual”
- Combating Psychological Stress
- Working without Internet or computers
  - Paper versions of EVERYTHING
  - Time sheets, contracts, payroll, etc.

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FEMA

CDOT

MSI

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- Impact of the Ransomware Attack
  - $1.5 – 2.6 Million of State Funds
  - No Federal Reimbursement of Federal Funds

- Worldwide Impacts of Malware Attacks
  - $11.5 Billion

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KNOWLEDGE MANAGEMENT

- Creating
- Sharing
- Using
- Managing
- Capturing the knowledge and information of an organization

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KNOWLEDGE MANAGEMENT

The purpose of KM in an organization

- Dependent on the particular organization's goals and needs
  - To mitigate the potential loss of knowledge due to retirements and the changing workforce;
  - To make knowledge and information findable;
  - To improve performance;
  - To support innovation.

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KNOWLEDGE MANAGEMENT

- Capturing knowledge of employees who leave is paramount

- Over 12% of employees at TM in last 5 years
- Average time spent in TM is only 11 years
- Another 10% will retire in next 5 years.

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KNOWLEDGE MANAGEMENT

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Gail Yazersky AICP/NJ-PP

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Sessions and Committee Meetings Attended

- Transportation Demand Management Committee Meeting (incl presentations)
- **Emerging and Innovative Public Transport and Technologies Committee Meeting (incl presentations)**
- Using Managed Lanes and Congestion Pricing for Innovation in Mobility & Technology - poster session
- **Shared Mobility, Ridehailing and Emerging Transportation Trends**
- Research Access Management Subcommittee Meeting
- Recent Research on Pricing and Managed Lanes
- Shared Mobility and Changing Travel Behaviors
- Access Management Committee Meeting
- Advanced Automated Transit: Integration into Smart Cities
- Emergency Response: Why is Data a Roadblock
- **Intelligent Transportation Systems Project Updates**

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AP020 Committee Meeting

Emerging and Innovative Public Transport and Technologies

- **Considers new, emerging and innovative concepts of public transport systems and technologies**
  - **related to: public and private transport modes, equipment, facilities, information systems and communication technologies, propulsion systems, and transit technology integration with land use, smart parking, carsharing and bike sharing**
  - **MaaS, microtransit and MOD also components**
  - **4 Presentations : TNCs, Microtransit, EU shared and connected mobility, MPO ride-hailing research (Boston)**
  - **Michigan DOT Mobility Challenge – many good suggestions could be implemented in NJ and support recent initiatives in this area**

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Michigan DOT Mobility Challenge - Jean Ruestman, MI DOT/Committee Co-Chair

Governor Snyder announced $8 Million Michigan Mobility Challenge grant initiative

Goal: **Address core mobility gaps for seniors, persons with disabilities and veterans statewide**

- Collaborative effort between multiple state agencies:
  - Michigan Department of Transportation (MDOT), PlanetM/Michigan Economic Development Corporation, Michigan Dept. of Health and Human Services, Michigan Veterans Affairs Agency, Bureau of Services for Blind Persons, and Michigan Department of Civil Rights
- Opportunity to create and deploy innovative transportation solutions
- Secondary goal = further position the state as a leader in testing/deployment
- Process: hold workshop, form partnerships and work in teams to develop grant opportunities for demonstration pilots
- Outcome: received 43 proposals from organizations and partnerships formed through workshop valued at $27 million – 8 selected in first round
- See https://www.michigan.gov/mdot/0,4616,7-151-9621_17216_86614---,00.html for more information

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Sample Pilots - first round awardees (from website):

- Piloting autonomous wheelchair securements – within 25 seconds
  - Improve independence for people with wheelchairs, reduce boarding time, improve on-time performance, and create a better customer experience
- Test delivery of food and pharmaceuticals with autonomous delivery vehicle
  - Unique application of integration of its software and hardware into an AV uniquely designed to operate both indoors and on open roads
  - Big part of the mobility future is its intersection with healthcare
- Technology solutions to assist with the "last 50 feet" problem of locating bus stops and final destinations
- Develop specialized mobile app: on-demand, personalized transport geared to this population
- Wayfinding for Veterans including the Visually Impaired

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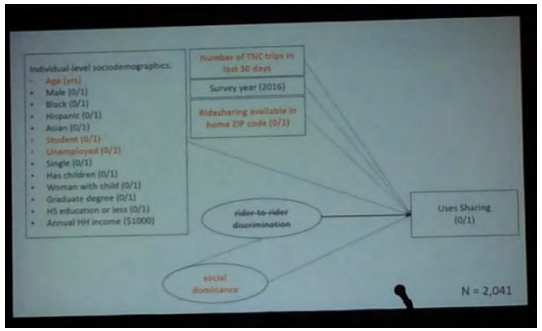
Shared Mobility, Ride hailing and Emerging Transportation Trends (5 presentations)



A. Rider to Rider Discriminatory Attitudes and Ridesharing Behavior

- Identified discrimination with ride pooling for Lyft and Uber customers
- These are barriers to pool type efforts of these TNCs and lowers use
- Most riders male and female preferred sharing rides with women

B. Impacts Of Travel Demand Information Diffusion On Reducing Empty Vehicle Miles Traveled By Ridesourcing Vehicles

- Opportunities to reduce TNC VMT as ridership shifts from more efficient modes like transit
- Examined induced demand and VMT increases from TNC vehicles cruising for next customer; many ride empty or utilize curb space making unavailable for other uses
- Researchers developed TOD machine learning model using heuristic algorithm
- Data from 2 different TNCs: RideAustin (TX) and Didi (China)- largest TNC anywhere-over 25 million daily trips
- Conclusions showed demand information diffusion can lead to **substantial** deadheading distance reductions
  - Mileage reduction between 67% to 82% was observed by varying drivers waiting time for RideAustin.
  - DiDi sample data application showed 56-59% reduction of deadheading miles for an average trip.

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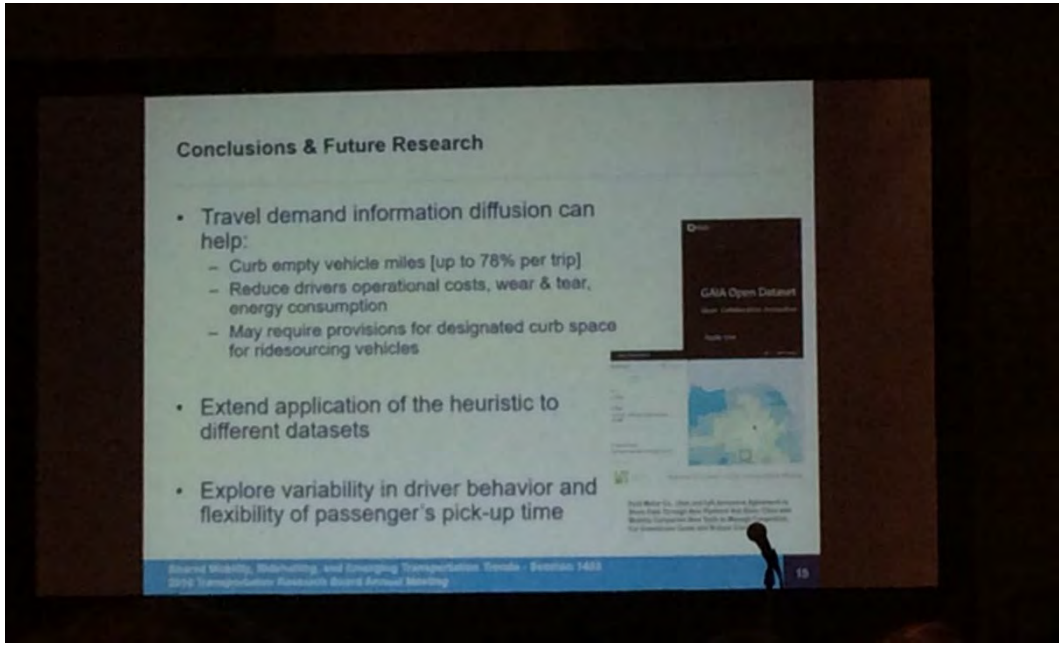
- Future Research suggestions could go far in maximizing TNC usage while minimizing impacts to VMT
- As TNC use increases - significant potential to help roadway agencies keep upper hand in congestion battle while supporting this demand-responsive mode to serve NJ travelers.



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Intelligent Transportation System
Project Updates-International, Part 1- Canada

International Updates and Perspectives – Highlights in a NJ Minute

- Transport Canada – Innovation Centre
  - 2030 Strategic Vision: Traveler-centric, Safer, Green and Innovative, Waterways, Coasts and The North, Trade Corridors to Global Markets
  - 4 key areas: Strategic Vision, Innovation Centre, Trends and governance, & Activities in C/AV
  - Cooperative Truck Platooning System-electronic coupling/fuel savings
    - No Truck Test track in US – all testing done in Canada

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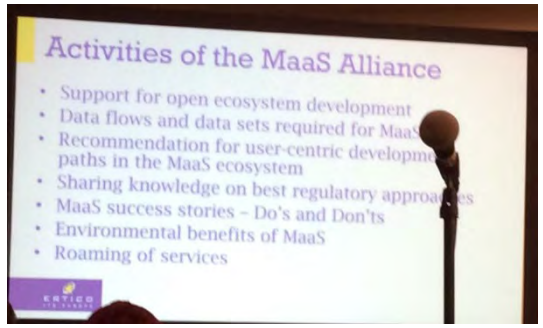
Intelligent Transportation System
Project Updates-International, Part 2- EU

- ITS Vision towards 2030- ERTICO / 120 partners/vision zero, reregulate market, bring new services, MaaS Alliance
- Created MOD Alliance with ITS America
- Sharing rides, vehicles, infrastructure, data sharing, standards development
- ERTICO encourages startups to bring innovation



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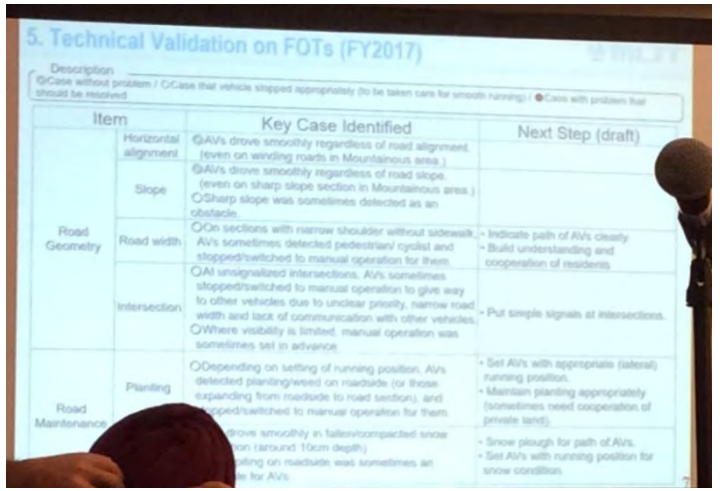
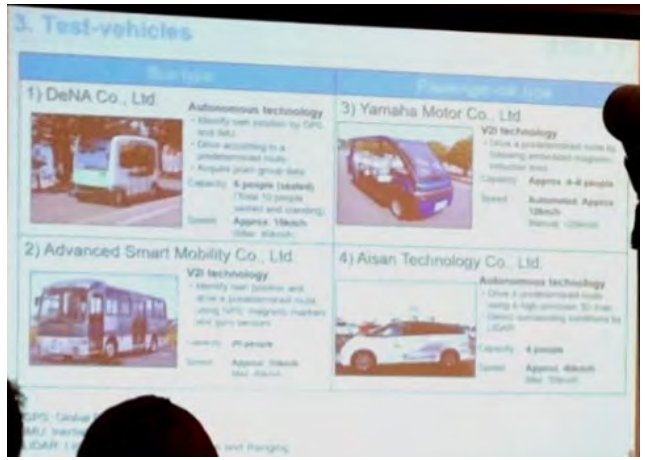
Intelligent Transportation System Project Updates-International, Part 3 - Japan

- Looking at first and last mile needs
- Evaluating transitional phases between now and Level 5 AV
- Truck driver shortage projected – over 40% older than age 50
- Studying speed differential between regular and automated vehicles
- Roadside maintenance improvement needed
- What to do when GPS signal is lost
- Various business models being tested
- Many tech and business impacts





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Sessions Attended :

- Innovative Traffic Monitoring Technologies and Platforms #1099
- Automated Transportation and Shared Mobility #1174
- Safety and Reliability of Work Zone Safety Measures #1267
- Speed Limits 2019: Current Perceptions, Technologies, and the Future #1339
- Connected Vehicles Pilots: Lessons Learned #1380
- Visibility of Signs and Roadway Markings #1415
- State DOT Innovation Programs: Identifying New Technologies and Practices from the Front Lines #1471
- Eye in the Sky: Transportation Infrastructure Monitoring Using Unmanned Aerial Technologies #1527

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Visibility of Signs and Roadway Markings

LiDAR-based Assessment of Highway Traffic Sign Visibility

University of Alberta, Edmonton, AB, Canada

- Key Findings
  - ➢ Current procedures that assess the visibility of traffic signs carried out in the field are dangerous, labor-intensive, and time-consuming.
  - ➢ Light Detection and Ranging (LiDAR) technology can be use for assessing traffic sign visibility.
  - ➢ LiDAR-based visibility assessment ensure traffic sign infrastructure meets the needs of current and future driving populations.
  - ➢ Cost effective compare to manual assessment

- Limitation
  - ➢ Although the assessment procedure was automated, traffic sign classification was done manually.
  - ➢ This procedure was tested on rural highways but can also be used on urban roads.

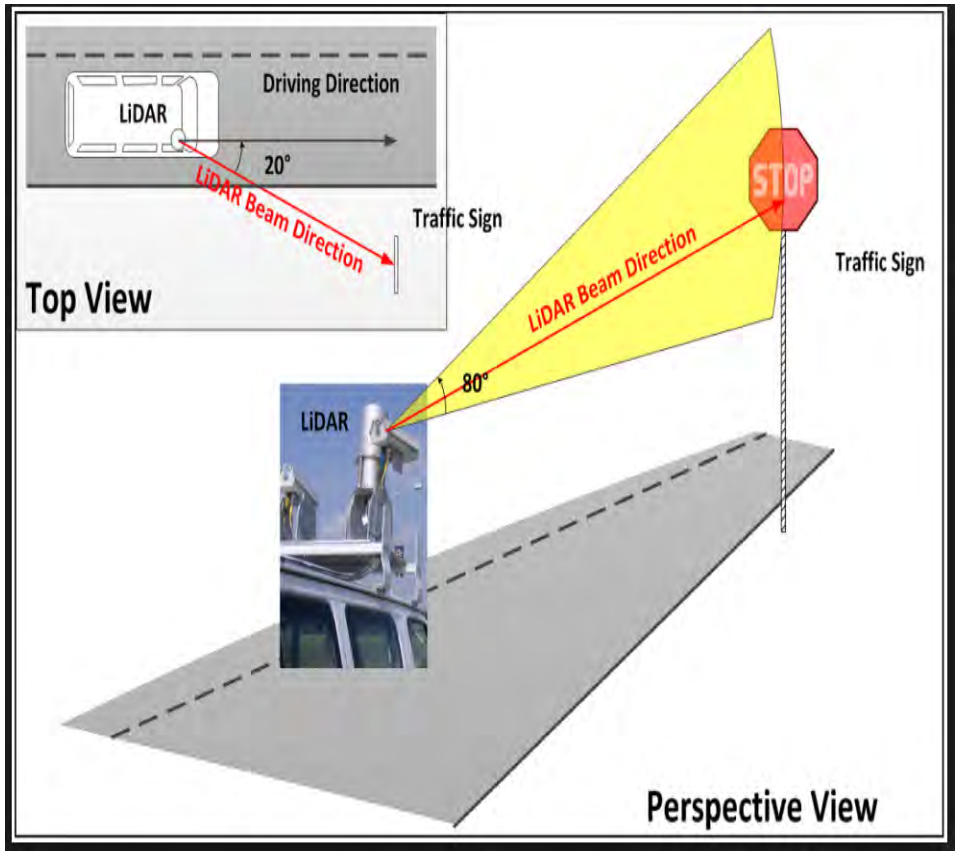

Figure: Assessment of an Enhanced Traffic Sign Detection Method Using LiDAR

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Speed Limits 2019: Current Perceptions, Technologies, and the Future

Quantifying the Impact of Speed-Feedback Signs on Arterial Operations

Presented By: University of Arizona.

- Key Finding
  - Speed-feedback signs (SFS), also known as dynamic speed display signs (DSDS), are roadside signs used to show drivers how fast they are moving.
  - SFS can be safely installed on arterials as a speed treatment without impacting operations.
  - This study finds that, there was no significant difference in mean or variance for any performance measure before and after disabling the SFS.
  - Also, SFS does not have a statistically significant impact the travel time for a segment.

- Appropriateness
  - Speed feedback signs are not appropriate on Arterial Operations

Figure: Speed Feedback Sign

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State DOT Innovation Programs: Identifying New Technologies and Practices from the Front Lines

- Presented By: MnDOT

- In the winter of 2017-18, there were 84 collisions involving motorists and Minnesota Department of Transportation snowplows
- To overcome this problem, MnDOT' s Safety Innovation Team came up with the idea for a lighted plow marker
- Flexible markers that glow orange are very bright, and drivers can see them from up to a half-mile away, even in poor visibility
- The markers also help plow operators see the edge of the blade. That helps them avoid toppling mailboxes, signs or other roadside obstacles as they clear the snow.
- Each plow marker costs about $30 to make
- They are being tested on about 20 vehicles in the metro area.

Figure: The MnDOT is testing new lighted tubes marking the ends of snowplow blades to improve safety.

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Connected Vehicles Pilots: Lessons Learned

- Presented By: WYDOT, NYCDOT, Tampa-Hillsborough Expressway Authority (THEA)
- **Wyoming DOT**
  - ✓ Reduce the number and severity of adverse weather-related incidents in the I-80 Corridor in order to improve safety and reduce incident-related delays.
  - ✓ Focused on the needs of commercial vehicle operators in the State of Wyoming.

- Deployment Status
  - ➢ 60 RSUs of 77 total on the road.
  - ➢ 25 vehicles equipped of 400.
  - ➢ Forward Collision Warning, Distress Notification, Event Logging, and Traveler Information Messages are complete.
  - ➢ TMC Systems in Production

- Key Issues in Measuring Success
  - ➢ Limited number of vehicles
  - ➢ Privacy concerns limit the type of data that can be collected.
  - ➢ Limited OBU capacity
  - ➢ No home base for most of vehicles

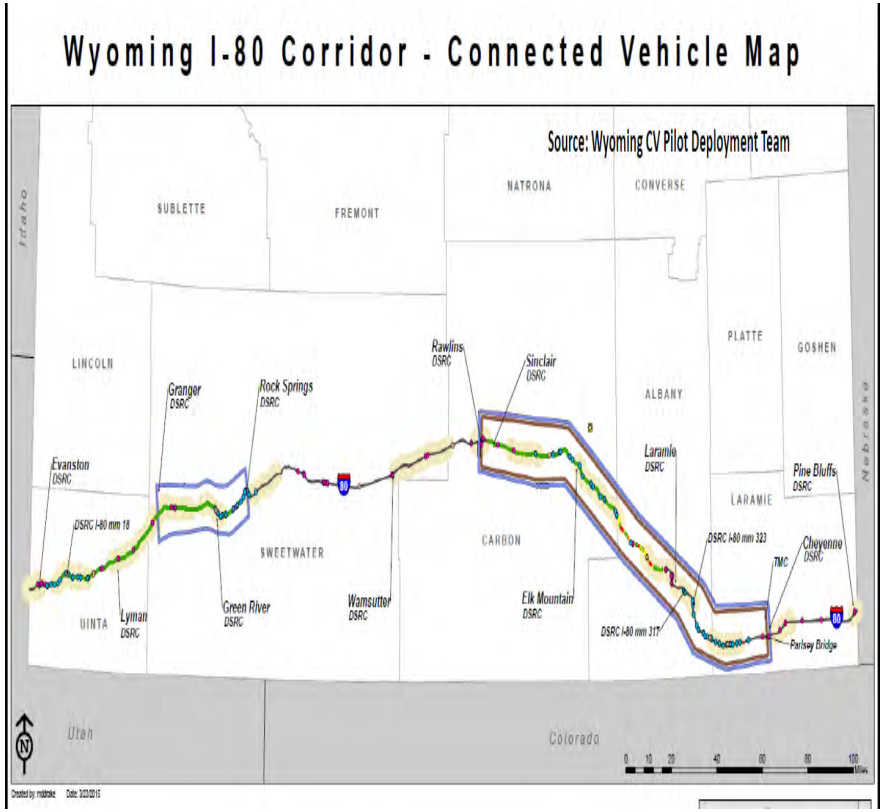

Figure : Pilot Location

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• New York City DOT

- ✓ Improve safety and mobility of travelers in New York City through connected vehicle technologies.
- ✓ V2V technology installed in up to 8,000 vehicles in Midtown Manhattan, and V2I technology installed along high-accident rate arterials in Manhattan and Central Brooklyn.

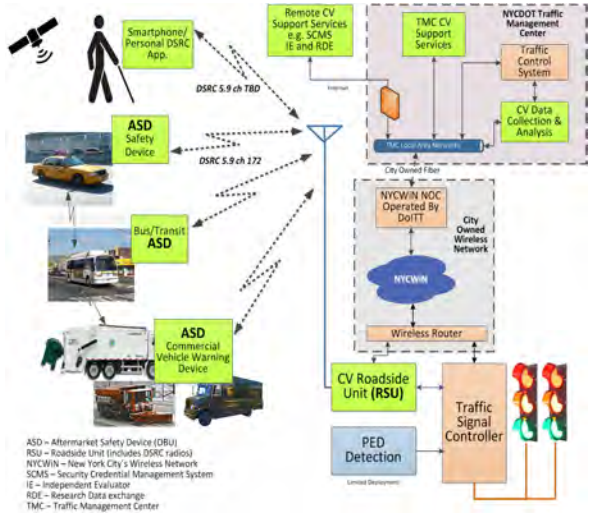

Figure : Overall Deployment Concept

- Deployment Status
  - ➢ 20 Prototypes and 30 Production RSU units have been installed
  - ➢ 50 Prototype ASD(Aftermarket Safety Device)installed in city vehicles
  - ➢ Working through technical and install issues with prototype units
  - ➢ Finalizing the software development and testing
  - ➢ Focus is now on back-office data collection and analysis

- Key Issues in Measuring Success
  - ➢ Data Collection
    - ➢ Storage
    - ➢ Processing
    - ➢ Backhaul communications
    - ➢ Combination with other sources
    - ➢ Data Ownership

Figure : Locations- Manhattan and Brooklyn

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- **Tampa (THEA)**
  - ✓ Alleviate congestion and improve safety during morning commuting hours.
  - ✓ Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the transportation challenges.

- Deployment Status
  - ➢ 1,200 Privately Owned Installs
  - ➢ 8 TECO Line Streetcar Trolleys
  - ➢ 10 Hillsborough Area Regional Transit (HART) buses
  - ➢ 44 Roadside Units
  - ➢ Safety warnings integrated into the rear-view mirror

- Key Issues in Measuring Success
  - ➢ Understanding of "Available RSU and OBU Hardware
  - ➢ Understanding of Vendors' Depth and Resources
  - ➢ Integration Testing Before Private Vehicle Installs Begin
  - ➢ Sourcing of Suppliers

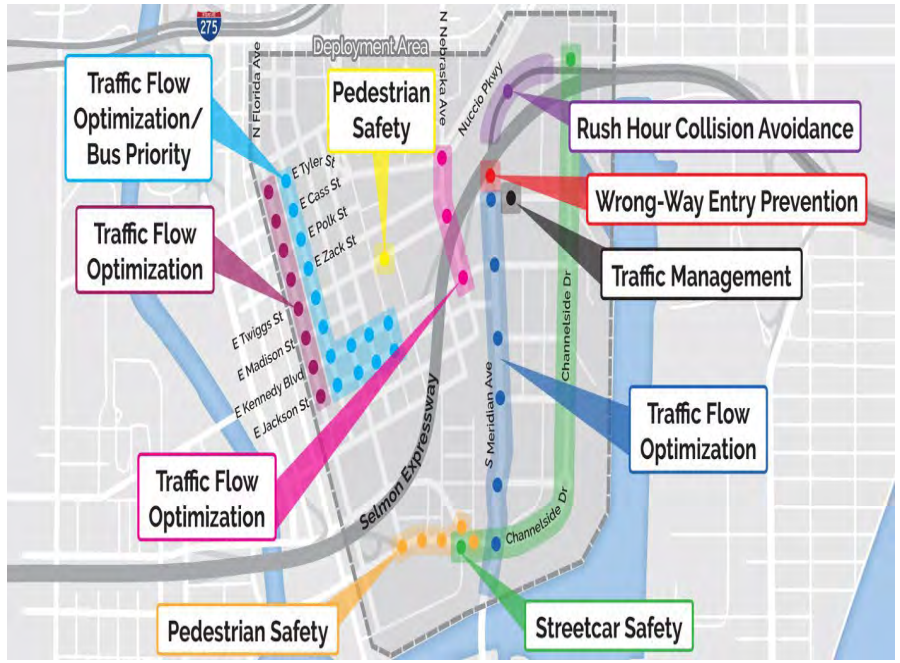

Figure : Focused Deployment Area

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