Your Presenters Today:

- Traffic Operations
- Statewide Planning
- Environmental Resources
- Civil Rights & Affirmative Action
- Multimodal Services
- Capital Program Support
- Bridge Engineering & Infrastructure Management
Traffic Operations -- Transportation Systems Management

Sal Cowan
Jon Martinez
Jeff Rockower
Ahsan Ali
Saidul Islam
NJDOT – Transportation Systems Management

“Improving Lives by Improving Mobility”

& the future of transportation
Findings from the Automated Vehicles Symposium 2017

TRB’s Session # 129

By: Salvatore Cowan
Findings from the Automated Vehicles Symposium 2017

- 27 Countries, 43 States, 45% of Attendees from the Manufacturing Industry

- Four main topics:
  - Regulation
  - Trucking
  - Shared Mobility
  - Policy

- Kevin Dopart is FHWA ITS-JPO's primary POC for CV/AV
Findings from the Automated Vehicles Symposium 2017

- 1st Speaker – LA General Manager for Transportation
  - “LA Transportation Strategy” from 2016
  - Provide data as a service
  - Waze
  - GOLA app that combines multiple transportation service applications (MAAS)
  - 4500 Traffic Signals with 2-way communication is a carrot for those looking to do pilots

Presenter: Salvatore Cowan
Findings from the Automated Vehicles Symposium 2017

• 2nd Speaker – from German University
  • Pegasus project – research that has supported prototypes, pilots, and lab testing into products they’re using in Germany
  • Research looking into the “Analysis of Scenarios” that vehicles in the AV/CV environment could encounter.
Findings from the Automated Vehicles Symposium 2017

- 3rd Speaker from Britain DOT
  - FITS (Future ITS). Pillars of the program: Connected, Automated, Electric, Shared, and Pricing
  - HUGE amount of information CV/AV will require and inclusion of insurance industry
  - Britain DOT established a Data Board to understand what they have, how to use it and find the data gaps
  - Working to develop Connected Intelligent Infrastructure (CITS)
  - MAAS to be a focus in Britain
  - Pacing to spend $250,000,000 on 51 CV/AV pilot/test programs by 2020
Findings from the Automated Vehicles Symposium 2017

- 4th Speaker from RAND Corp
  - Focused on the regulations
  - Barrier to deploying certain AV’s (lack of driver) but there are exemptions for limited use (exemptions only allow 2500 vehicles to use an exemption – limited testing)
  - New federal regulations (SELF DRIVE Act and AV START Act) increase # of exemptions OEM’s can file for (up to 100,000 per year)
  - Regs will likely not be corrected at first…no way to demonstrate the safety prior to real-environment deployment
  - Learn to balance tradeoff between risk and information and don’t wait for perfect technology, no such thing
NJDOT – Transportation Systems Management
“Improving Lives by Improving Mobility”

Sessions Attended

191 – After the Hurricanes
203 – Mobility of the Future
268 – Competing Visions of Transportation’s Future
354 – Intelligent Transportation Systems: State of Industry 2018
RTSMO Connected and Automated Vehicles Submittee, AHB10(12)
476 – Economic Benefits of Connected, Autonomous, and Shared Mobility
614 – Connected and Autonomous Vehicle Sensory System Performance
675 – Why You Will Own an Autonomous or Connected Vehicle Part 2
755 – Connected and Automated Vehicle Systems in Complex Transportation
881 – Vision Zero Evaluation Workshop

By: Jon Martinez
Mobility of the Future

• Projecting Travelers into a World of Self-Driving Vehicles: Estimating Travel Behavior Implications via a Naturalistic Experiment
  • Georgia Tech
  • ITS UC Davis - Institute of Transportation Studies
  • ITS Berkeley - Institute of Transportation Studies

• With self-driving vehicles quickly approaching and governments racing to develop policies, how will fully autonomous vehicles impact travel and activity behavior?

Presenter: Jon Martinez
Mobility of the Future

• Key Findings
  • 83% increase in VMT
  • Change in Activity Patterns

• Project Limitations
  • Resource Limitations
  • Context Limitations
  • Technology limitations

Presenter: Jon Martinez
RTSMO Connected and Automated Vehicles Subcommittee, AHB10(12)

- Eileen Singleton – Baltimore Metropolitan Council
- AMPO’s Connected & Autonomous Vehicle Planning Working Group
  - Comprised of 15-20 Core Members
  - Variety of backgrounds
    - Policy
    - Operations
    - Modeling
    - ITS
  - Three working group meetings and a fourth planned
    - April 2017 – MPO Focused
    - August 2017 – State DOT and MPO Focused
    - November 2017 – Federal/State DOT and MPO Focused
    - Early 2018 – Private Sector Focused
RTSMO Connected and Automated Vehicles Subcommittee, AHB10(12)

- Blain Leonard – Utah DOT

- AASHTO SPaT Challenge
  - DSRC RSU
  - 20 Signalized Intersections
  - 50 States
  - Year 2020

- 7 projects – 5 States - March of 2017
- 29 projects – 19 States - January of 2018

- Resources
  - National Operations Center of Excellence Website

- Next Steps?
  - Connected Fleet Challenge

Presenter: Jon Martinez
NJDOT – Transportation Systems Management
“Improving Lives by Improving Mobility”

Sessions Attended

191 – After Hurricanes
Critical Transportation Infrastructure Protection Committee Meeting

Physical Security Sub-committee Meeting
Information Systems in Construction Management Joint Sub-committee Meeting

461 – The Future of Transportation and Reliance on Knowledge Sharing Among Transportation Organizations

Cyber Security Sub-committee Meeting

592 – Cybersecurity Challenges for Connected and Autonomous Vehicles: Fact vs. Myth

801 – What did the 2017 Solar Eclipse Teach Us about Resilience?

840 – Private Data and Public Interest: Access to Data for Understanding Transportation Network Company Impacts in Urban Areas

881 – Vision Zero Evaluation Workshop

By: Jeff Rockower
After the Hurricanes

- Sparse supplies of IV bags
- Oversized trucks getting through toll roads
- InfraGuard Communication System
Security – Physical & Cyber

• Physical security is not limited to bridges, culverts, and other key structures in our infrastructure
• Cabinets, controllers, and data centers
• Cybersecurity challenges – what we are doing about it
• ITS Communications Redundancy – Elmwood Park, Cherry Hill,
• Co-located Data Centers
• Following the NIST Cybersecurity Framework
CV/AV Complexity

- Carputer and infotainment challenges for multiple computing systems
- Use of a flat computer network
- Landing on the moon – 141,000 lines of code
- CV/AV – millions of lines of code
- CV/AV – Security
- Car Hacker’s Handbook
  - http://opengarages.org/handbook/
NJDOT – Transportation Systems Management
“Improving Lives by Improving Mobility”

Sessions Attended

194 – Selecting Your Sector
285 – Maintenance and Operations Workforce: Assessing the Effects of Technology and Demographics
354 – Intelligent Transportation Systems: State of the Industry 2018
547 – Diets, Diamonds, and Daring New Ideas for Intersections
611 – Using Decision Support Sybsystems to Automate the Use of Traffic Operational Strategies and Control Plans
585 – Six-Minute Pitch
686 – Traffic Signal Timing for Multimodal Operations
819 – Drivers Behavior as a Function of Their Characteristics and the Driving Environment
Regional Transportation Systems Management and Operations Committee
881 – Vision Zero Evaluation Workshop
Misc – Next Step in Automated Vehicles

By: Ahsan Ali
**Maintenance and Operations Workforce: Assessing the Effects of Technology and Demographics**

- **1st Speaker: Utah DOT**
  - Discussion about training their employees as the sector evolves
  - Problem started with retention, and it wasn’t Millennials that were an issue, it was Maintenance
  - Estimated cost of overturn: $17,492
    - Including Safety, Training, Interviews, etc.
  - Safety risk is greatest in first year
  - Physically, emotionally, mentally happy staff perform better

- **2nd Speaker: University of Wisconsin**
  - Surveyed Maintenance about Technology Basis
    - Early days of Internet, GIS, microprocessor, computer modeling, etc.
  - Automation will take time to adjust
  - Controlled environment: such as connected vehicles enable growth
  - Obstacles are uncontrolled or unknown environment
Daring Ideas in Intersection Design

What is a contraflow left-turn pocket lane?

Presenter: Ahsan Ali
Vision Zero Workshop

- What is it?
  - Project that aims at no fatalities or serious injuries involving road traffic.
- Workshop format: think tank strategies & idea sharing
- Vision zero presentations and ideas discussed:
  - Road Diet
  - Traffic calming
  - Expanded public education
  - Better enforcement
- Practice at NJDOT
  - Local aid funding available for cities looking to participate in Vision Zero
  - Engineers should take mitigation measures into account for each project

Presenter: Ahsan Ali
Next Step in Automated Vehicles

Presenter: Ahsan Ali
Advanced Traffic Signal Performance Measure (ATSPMs)
Innovation in Control Delay Calculation
Work Zone Lane Capacity
Proactive Signal Control Systems for Congestion Mitigation on Arterial
By: Saidul Islam
**Advanced Traffic Signal Performance Measure (ATSPMs)**

- At present the existing ATSPMs are focused on the performance of individual movements or intersections.
- A need for system level metrics has emerged.
- Purdue U researchers developed a method for evaluating corridor performance at the system level using high-resolution data.
- This method develops five sub scores for the areas of communication (percentage of intersection online):
  - Detection
  - Safety (Rate of red light violation)
  - Capacity allocation (split failure)
  - Progression (platoon ratio, v/c ratio)
Advanced Traffic Signal Performance Measure (ATSPMs)

- Several shortcomings of the tool are a lack of data quality control and the extent of resources required to properly use the tool for system-wide management.

- To address these shortcomings, Iowa State, Portland State, and Northern AZ U collaboratively performed a research which looked interesting to me.

- They presented ITSPMs, using the concepts of machine learning, traffic flow theory, and data visualization to reduce the operator resources needed for overseeing data driven signal management systems.
Innovation in Control Delay Calculation

- Purdue and UDOT developed a method for computing control delay using commercial probe vehicle trajectory data
- To identify relevant data for the study, virtual detection box were defined between eight signalized intersections along a corridor in Utah
- The method they developed will allow agencies to scale travel time studies cost-effectively
Work Zone Lane Capacity

- Short term work zones have a significant effect on the capacity of signalized intersections

- HCM methodology incorporates a reduction factor which was based on a study done by some researchers in 2012

- This study done by NYU prof Elena Prassas found that current HCM methodology underestimates capacity when estimating capacity at work zones
Proactive Signal Control Systems for Congestion Mitigation on Arterial

- The system utilizes connected vehicles to accurately predict the volumes entering the intersection through different movements.
- The optimal signal is based on a short-term prediction of total delay at the intersection.
- For three consecutive intersections, the system was able to reduce the average vehicle stop delay up to 49%.

Presenter: Saidul Islam
THANK YOU!!

FROM: TRANSPORTATION SYSTEMS MANAGEMENT