

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



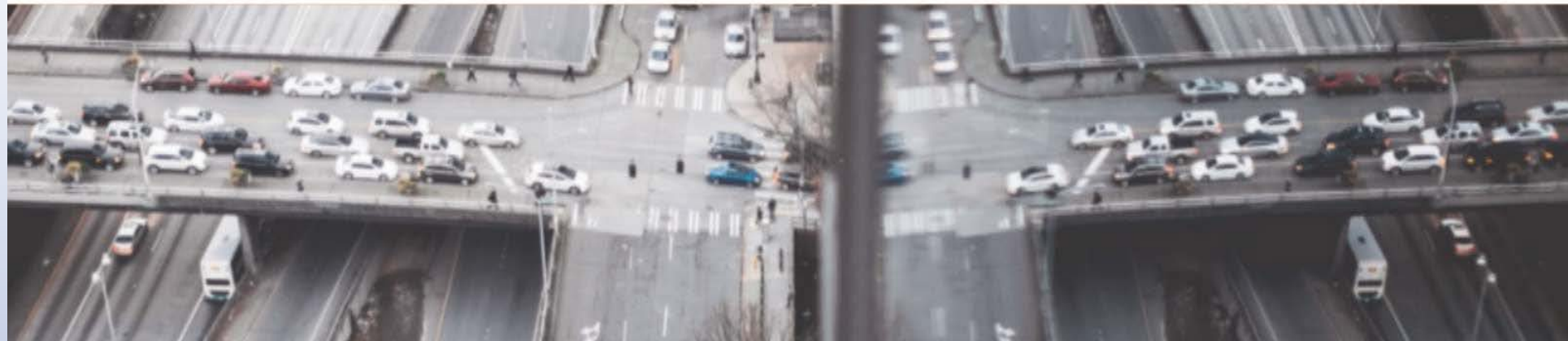
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“Improving Lives by Improving Mobility”



TRB

& the future of transportation





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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

Presenter: Salvatore Cowan



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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
 - GOLLA 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



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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.

Presenter: Salvatore Cowan



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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

Presenter: Salvatore Cowan



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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

Presenter: Salvatore Cowan



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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 Subcommittee, 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



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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



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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

Presenter: Jon Martinez



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



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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

Presenter: Jeff Rockower



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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

Presenter: Jeff Rockower



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/>

Presenter: Jeff Rockower



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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 Systems 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

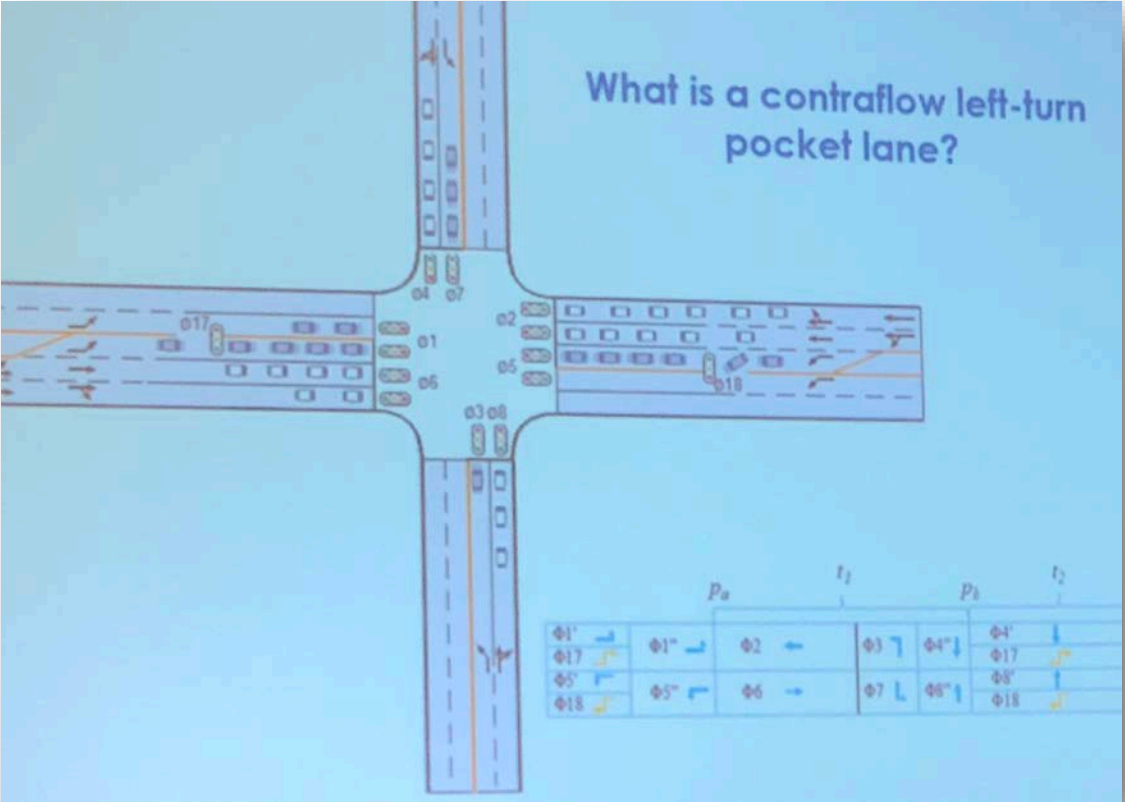
Maintenance and Operations Workforce: Assessing the Effects of Technology and Demographics

- 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

Presenter: Ahsan Ali



Daring Ideas in Intersection Design



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



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Sessions Attended

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 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)

Presenter: Saidul Islam



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

Presenter: Saidul Islam



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 boxes 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

Presenter: Saidul Islam



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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

Presenter: Saidul Islam



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



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THANK YOU!!

FROM: TRANSPORTATION SYSTEMS MANAGEMENT



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