Bureau Statewide Strategies

Bassey Onyile

TRB 2019

DEPARTMENT OF TRANSPORTATION
THE STATE OF NEW JERSEY

The 98th Annual TRB Meeting Recap

Focus Areas of Interest

Asset Management

- Making Asset Management the New Normal: Moving from Implementation to Integration
- Transportation Asset Management Committee
- Emerging Asset Management Tools, Techniques, and Performance Measures

Resilience

- Operations Resilience: How to Keep Operating When the Sh*t Hits the Fan
- Integrating Extreme Weather Resilience into Transportation Asset Management

Knowledge Management

- Knowledge Management Task Force
- Visualization in Transportation Committee

Making Asset Management the New Normal:

Moving from Implementation to Integration

Key Takeaways	• Document the methodology for project prioritization • Geocode everything (GIS is a must!!)
Lessons Learned	• Benefits of visualization to tell your story • Asset Management practices should be woven into the human resources, planning, programming, and maintenance processes
Implementation Potential	• Asset Management Cycle (CalTrans) • Prioritize action items • Automation effort

Operations Resilience:

How to Keep Operating When the Sh*t Hits the Fan

Key Takeaways

- Impact scale vs. impact frequency
- Break down communication silos

Lessons Learned

- Preparedness & prevention
- Understand and document your core business functions

Implementation potential

- Resiliency working group


EXECUTIVE LEADERSHIP CHAMPIONS the CAUSE
TOTAL LEADERSHIP BUY-IN FROM PLANNING AND DESIGN
DESIGN RESILIENT INFRASTRUCTURE DOWN the ROAD
RESILIENCE
COMMUNICATE! ONE VOICE -
INTERNALLY AND EXTERNALLY
DO RECOVERY IN a FRAMEWORK OF RESILIENCE
CONNECT TO PARTNERS- BEFORE, DURING AND AFTER CRISIS
BAKE RESILIENCE INTO EVERYTHING WE DO-
INSTITUTIONALIZE
PLANNING FOR CLIMATE IMPACTS AND OTHER THREATS
INSTITUTIONALIZE RESILIENCE

Knowledge Management Task Force

Key Takeaways

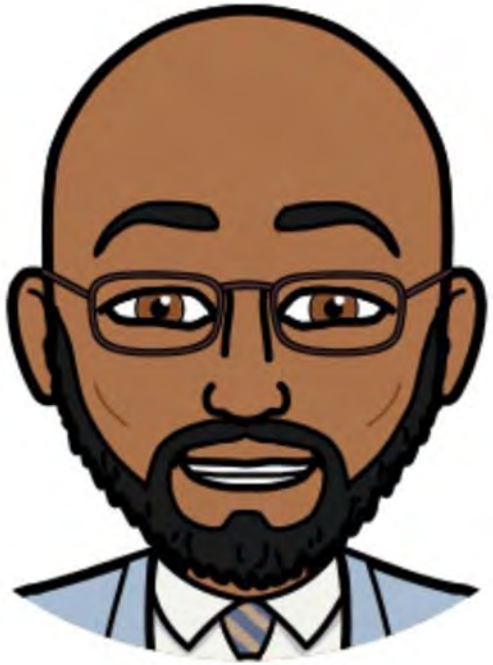
- People
- Process
- Technology

Lessons Learned

- Knowledge Creation vs. Knowledge Retention
- Link the past with the present to the future
- Relevant information should be findable quickly

Implementation potential

- Establish a knowledge management system



Thank You

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Bureau Statewide Strategies

Tom Houck

98th Annual TRB Annual Meeting

NJDOT Roundtable Recap

Monday, February 11, 2019

1:00 – 3:00 PM

DIVISION OF STATEWIDE PLANNING

BUREAU OF STATEWIDE STRATEGIES

CONNECTED AND AUTONOMOUS VEHICLES

Reducing the uncertainty of evolving transportation technology, how it will influence the built environment, inclusive of the transportation system will allow the Department to make better and informed decisions guiding our policies formation and funding allocations.

ACCESS MANAGEMENT

Keeping up to date on the management of vehicle access point to adjacent land parcels promotes the safe and efficient use of the transportation network. Access Management provides an important proactive means of maintaining mobility thereby preserving the functional integrity and overall operational viability of the statewide roadway networks.

KEY

2019 TRB
Conference

TAKEAWAYS

GLOBAL CAV PROGRESS

2010 2020 2030 2040

Commonalities Among Participants

- Public Agency Leadership
- Private Market Cooperation
- Integrated in all Modes

Shared Broad Goals

- Shared Mobility
- Electric Vehicles
- Social Acceptance

USDOT CV Pilots

	WYDOT	NYCDOT	THEA
Location Description:	Wyoming, I-80	NYC	Downtown Tampa
Localized Pilot Issues:	High Freight/Sever Weather Corridor	Multi-Modal Safety and Efficiency	Urban Congestion
Deployment Description:			
	400 Fleet & Commercial Vehicles With On Board Units (OBUs)	8,000 Total Equipped Vehicles	1,600 Privately Owned Vehicles
		100 Vulnerable User Devices	500+ Pedestrian Participants
	75 Roadside Units Receiving/Broadcasting Dedicated Short Range Communication (DSRC)	10 Pedestrian Detection System	10 + 10 Buses + Street Cars
		353 Roadside Units	40 Roadside Units

NATIONAL CV PROGRESS

2010 2020 2030 2040

USDOT CV Pilots – Lessons Learned

WYDOT

NYCDOT

THEA

Pilot Lessons Learned:

- Keep Stakeholders and Public Informed
- Work with Local Agencies
- Promote Interoperability
- Incentivize Community Use
- Provide Open Source CV Applications
- Share Data & Collaborate

Practical Lessons:

- Outsource the Management of OBUs
- Solidify Standards Early
- Understand Available Application Maturity
- Complete Integration of Testing Prior to Vehicle Installation
- DON'T TRUST EVERYTING YOUR VENDER SAYS!!!!

NATIONAL CV PROGRESS

2010 2020 2030 2040

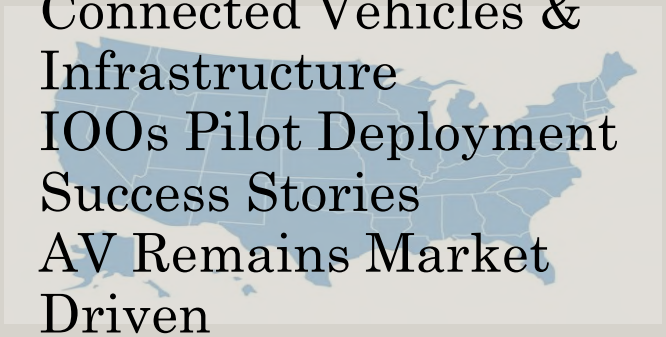
LIFE MOVES PRETTY FAST IF YOU DON'T STOP AND LOOK AROUND ONCE IN A WHILE, YOU COULD MISS IT.

TAKEAWAYS FOR NJDOT

TAKEAWAYS FOR NJDOT

CAV TRENDS

- Electrification
- Shared Mobility
- Autonomous Acceptance



- Connected Vehicles & Infrastructure
- IOOs Pilot Deployment Success Stories
- AV Remains Market Driven

DEPARTMENT OF TRANSPORTATION
THE STATE OF NEW JERSEY

FUTURE CHALLENGES

- AV Deployment Pressure
- Diminishing Traditional Funding
- Mobility Equity
- Infrastructure Requirements
- Development of Standards

THANK YOU

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SESSION SUMMARIES

PRICING IN AN EVOLVING MOBILITY ECOSYSTEM

SESSION 1096

ESTIMATING THE EQUITY OF ADDING ADDITIONAL PARAMETER TO MILEAGE-BASED ROAD USAGE CHARGE FOR SEVEN STATES

Kyle Schroeckenthaler

The feasibility and sensitivity of a mileage-based road usage charge (RUC) as an alternative to the gas tax was explored with the specific purpose of evaluating factors that could be considered when setting a charge to account for the complex makeup of statewide motor fleets, and to consider the diversity of household driving behaviors and experiences. The researchers considered a range of potential parameters before choosing to focus on fuel type and fuel efficiency. If based on annually adjusted efficiency quantiles, a parameterized RUC could prevent revenue erosion over time. Formulas based on these parameters were compared to the current fuel excise tax and a flat RUC. Distributional effects of parameters were assessed for urban, mixed, and rural household categories and for vehicles of different fuel types. Results show that households in urban tracts tend to pay slightly more under all formulations, and households in mixed and rural tracts pay less compared to an excise-based gas tax. In addition to changes across regions of a state, the method allows examination of the groups within these categories. Research found that adjusting for fuel efficiency reduced the change in incidence between urban, mixed, and rural census tracts, and between fuel types, that results from moving to a flat RUC. Fuel type parameters resulted in only small differences from the flat rate RUC because of low alternative fuel penetration in most states. This may change over time depending on the rate of integration of alternative fuels into the passenger car fleet.

EDR GROUP

THE DEVELOPMENT OF TRAFFIC-BASED CONGESTIONS PRICING AND ITS APPLICATION TO AUTONOMOUS VEHICLES

Jooyong Lee

Proper management techniques are needed to reduce congestion on the road network. In this paper, a reactive congestion pricing is suggested to reduce the congestion with varying tolls over time. Revenues for congestion levels can be earned through pricing to improve the travel status of other routes in the network. In addition, the development of automated vehicles shed light on improving traffic conditions with advanced driving performance of these vehicles. Therefore, congestion pricing techniques and the adoption of automated vehicles are applied to analyze changes in traffic conditions. The analysis shows that drivers with higher value of travel time (VOTT) are more likely to use tolled road than the drivers of lower VOTT. 23% of total drivers using the tolled road were higher VOTT drivers, while lower VOTT drivers were only 15% of them. The tolled road will experience improved travel conditions, but the other roads without tolls will experience more congestion. The travel speed of tolled road would increase to 4%, while that of non-tolled alternative roads would experience a 15% decrease of travel speed. However, because the positive surplus is larger than the negative impact of the pricing strategy, the overall travel condition of the network improves. More than $600 per hour in benefits can be generated from the tolling strategy applied to a virtual network for simulation. In all scenarios, automated vehicle implementation results in improved traffic conditions, which is beneficial to the network.

BENEFITS AND COSTS OF RIDESHARING IN SHARED AUTONOMOUS VEHICLES ACROSS AUSTIN, TEXAS: OPPORTUNITIES FOR CONGESTION PRICING

Krishna Murthy Gurumurthy

A self-driving, fully automated, or "autonomous" vehicle (AV) revolution is imminent, with the potential to eliminate driver costs and driver error, while ushering in an era of shared mobility. Dynamic ride-sharing (or DRS, which refers to sharing rides with strangers en route) is growing, with top transportation network companies (TNCs) providing such services. This work uses an agent-based simulation tool called MATSim to simulate travel patterns in Austin, Texas in the presence of personal AVs, and shared AVs (SAVs), with DRS and advanced pricing policies in place. Fleet size, pricing, and fare level impacts are analyzed in depth to provide insight into how SAVs ought to be introduced in a city. Results indicate that the cost-effectiveness of traveling with strangers overcomes inconvenience and privacy issues at moderate-to-low fare levels, with high fares being more detrimental than the base case. A moderately-sized Austin, Texas fleet (1 SAV serving 25 people) serves nearly 30% of all trips made during the day. The average vehicle occupancy (AVO) of this fleet was around 1.48 (after including the 12.7% of SAV vehicle-miles traveled [VMT] that is empty/without passengers), with a 4.5% increase in VMT. This same fleet performs better when advanced pricing is enforced in the peak periods (4 hours a day), moderating VMT by 2%, increasing SAV demand and in turn fleet-manager revenue. SAVs are able to earn around $100 per SAV per day even after paying tolls, but only at low-fare levels.

CONGESTION PRICING IN A WORLD OF SELF-DRIVING VEHICLES: AN ANALYSIS OF DIFFERENT STRATEGIES IN ALTERNATIVE FUTURE SCENARIOS

Michele Simoni

The introduction of autonomous (self-driving) and shared autonomous vehicles (AVs and SAVs) will affect travel destinations and distances, mode choice, and congestion. This work develops multiple CP and tolling strategies in alternative future scenarios, and investigates their effects on the Austin, Texas network conditions and traveler welfare, using the agent-based simulation model MATSim. Results suggest that, while all pricing strategies reduce congestion, their social welfare impacts differ in meaningful ways.

INNOVATIVE METHODS TOWARD BUILDINGS AND EVALUATING CONGESTION CHARGING SCENARIOS: THE CASE FOR METRO VANCOUVER

Fearghal King

Cities and urban regions around the world are facing challenges associated with growing traffic congestion. Congestion pricing, or mobility pricing, has been shown to be an effective part of a package to reduce the negative impacts of congestion. However, there are challenges associated with pricing, not least regarding public acceptability and fairness. In June 2017 an independent commission was formed in order to understand how mobility pricing could form part of a comprehensive approach to managing congestion in Metro Vancouver, Canada. The Commission's recommendations were guided by three objectives: reduce congestion, promote fairness, and support transportation investment. The paper presented shares a number of innovative approaches that were taken to complete this work and help guide the Commission's recommendations. Two policy tools were explored – congestion point charges and distance-based charges – from which a number of pricing scenarios were developed. Base-level charge rates were constructed by applying the theory of marginal social cost pricing, while a method to develop an estimate for travel time reliability was constructed from modelled output of congestion. The regional transportation model was connected to household data from a trip diary survey to enable an understanding of the impacts of various pricing scenarios on households. Computation of the costs for offsetting inequity was used as part of the evaluation process, while the scenarios were also evaluated against various pricing principles.

BEST PAPERS FROM THE 2018 ACCESS MANAGEMENT CONFERENCE

SESSION 1193

INSTALLATION OF MEDIANS TO REPLACE TWO-WAY LEFT TURN LANES: ECONOMIC IMPACTS

Christopher Cunningham

The North Carolina Department of Transportation has made significant strides to reduce collisions and increase capacity along strategic highway corridors across the state. Efforts have led to the implementation of many different access management techniques along corridors, such as installing medians versus two-way left turn lanes, using leftovers, closing median openings, and installing superstreets. The Department has continued to receive comments from businesses along these corridors indicating their concern that these new designs will have a negative economic impact because of the lack of direct access to their properties. This study employs a perception based survey technique with the use of comparison sites to create a pseudo before-after study. Owners of businesses along treatment corridors viewed access management techniques in a more positive light than the perceptions of those on comparison sites. Their similar performance in terms of business revenues indicates that there is no direct evidence of negative economic impacts due to access management installations.

INSTALLATION OF MEDIANS TO REPLACE TWO-WAY LEFT TURN LANES: ENGAGING THE BUSINESS COMMUNITY

Kristine Williams

Kristine Williams of the Center for Urban Transportation Research at the University of South Florida presented her paper on the installation of medians to replace two-way left turn lanes: engaging the business community as a practitioner's guide. In an aged of socially connected citizens, it is ever more difficult to sway public opinion of transportation solutions with data alone. Transportation officials cannot overlook the importance of involving the business community early in a transportation project's development. By being prepared for this engagement, officials can influence public opinion and produce positive results. Encourage a plan be developed for public engagement for all median projects that communicates the project clearly, satisfies the process values, is inclusive, allows for stakeholder input that is heard, and is most importantly truthful. Opposition arises for a variety of reasons. However, when officials violate the public trust in presenting a process that is unfair, or results that are not indicative of the process, the create the arena for this opposition. Ms. Williams concluded with sharing some basic resources; FHWA's Safe Access is Good For Business, and FDOT's Access Management Brochure.

CUTR
CENTER for URBAN TRANSPORTATION RESEARCH
USF

INFLUENCE OF FRONTAGE ROADS ACCESS POINTS RELATIVE T X-RAMPS VERSUS TRADITIONAL RAMPS AND THEIR ENTRY AND EXIT GORES

Karen Dixon

Texas A&M Transportation Institute has been attempting to provide guidance to improve motorist safety and highway efficiency by utilizing X ramps in lieu of diamond interchanges. By utilizing X ramps the conflict point and opposing entrance\exit or weave\merge movement friction can be moved from the high speed highway to the lower speed frontage roads. This relocation of movements does present access issues for motorists attempting to access adjoining properties in the weave\merger area or gore region. Texas A&M Transportation Institute has pursued a safety investigation to determine the outcomes of this effort. In this study 93 randomly selected sites, 63 included X ramps and 31 included traditional diamond interchanges that met the study objectives, included sufficient boundaries for study, and had sufficient crash, Rhino and GoogleEarth data. Central to the study is the identification of key driveways in the gore region. The study has produced key findings to permit an assessment of safety effects for both X ramps and diamond interchanges, the development of a self calculating spreadsheet for assessment, and the demonstration of site characteristic sensitivity.

Texas A&M Transportation Institute

DESIGN AND ACCESS MANAGEMENT FOR TRUCKS

Ingrid Potts

NCHRP 15-62

Access management techniques and design considerations for transportation networks and sites served by trucks have been developed over the years, but have not been specifically compiled or consolidated into guidelines useable by transportation practitioners. It is difficult for practitioners to incorporate these techniques and considerations, or to identify gaps in the knowledge base. The objective of this research is to provide guidelines for transportation practitioners on (1) access management and design for truck routes and site layout to facilitate truck movement that can be directly incorporated into planning processes, and (2) design specifications for local governments and state transportation agencies to improve truck safety and operations.

Various safety and operational issues may occur in relation to ingress versus egress and require different solutions. From an operational perspective, there appears to be a critical point at which a small increase in trucks can create a major failure in operations. Research is needed to provide state transportation agencies and local governments with a single resource for state-of-the-practice access management and design strategies for truck freight routes (e.g., turn-lane design, access location, access spacing, driveway and site circulation design, parking, and corridor issues), and to identify where additional guidance is needed.

ADVANCING COMMUNITY VITALITY WITH 21ST-CENTURY MOBILITY

SESSION 1250

THE SUBSTITUTION OF RIDE-HAILING SERVICES FOR MORE SUSTAINABLE TRAVEL OPTIONS IN THE GREATER BOSTON AREA

Steve Gehrke

The recent and dramatic growth in ride-hailing activity is a bellwether of a coming transportation revolution driven by on-demand services. The impacts of ride-hailing services on the transportation system have been immediate and major. Yet, public agencies are only beginning to understand their magnitude because the private ride-hailing industry has provided limited amounts of meaningful data. Consequently, public agencies responsible for managing congestion and providing transit services are unable to clearly determine who uses ride-hailing services and how their adoption influences established travel modes, or forecast the potential growth of this emergent mode in the future. To address these pressing questions, an intercept survey of ride-hailing passengers was conducted in the Boston metropolitan region in fall 2017. Ten ride-hailing drivers, recruited and trained by the authors, asked passengers to complete surveys during their ride-hailing trip. The tablet-based survey instrument recorded nearly 1,000 passenger responses regarding socioeconomic background, mobility options, and trip context. These responses, which enabled a robust description of ride-hailing passengers for the region, were used to analyze how new on-demand mobility services such as Uber and Lyft may be substituting travel by other modes. Our study substantiates previous findings and advances knowledge of who is utilizing this new mobility option and what factors influence its adoption over public and active transportation modes. Our results are intended to inform public policies ensuring that shared mobility technologies will complement existing multimodal landscapes and not worsen existing environmental concerns or equity gaps related to individual mobility.

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY (SFCTA)

Tilly Chang

New technologies are rapidly enabling innovations in transportation modes and services. These technologies include ride hailing services such as Lyft and Uber; microtransit services such as Chariot; courier network services such as Postmates; and autonomous vehicle technologies. In some cases, these new services complement San Francisco's policies and goals; in other cases, they conflict. In July 2018, SFCTA published a report that takes the first comprehensive look at the rapidly evolving emerging mobility sector in San Francisco. This report's recommended policies, pilots and research will enable San Francisco to partner actively with emerging mobility providers toward jointly improving the region's transportation system. This report establishes an inventory of services operating in San Francisco, a set of Guiding Principles for emerging mobility services and technologies, and evaluates how these services and technologies align with the city's long-range transportation goals in relation to a healthy environment, livability, economic competitiveness, and world-class infrastructure, and through transportation lenses such as equity and affordability. This report provides a framework allowing the city to strike a balance between the emerging mobility sector and the city's Guiding Principles. Numerous recommended policies, pilots and research contained in this report will enable San Francisco to partner actively with emerging mobility providers toward jointly improving the region's transportation system. The results of this report provide a roadmap for guiding future Transportation Authority policies and initiatives in the emerging mobility sector, including the SFMTA Emerging Mobility Strategy Report. In addition, the report will inform ConnectSF (the city's long-range transportation plan) and the San Francisco Transportation Plan (SFTP) update.

PREPARING THE SEATTLE REGION FOR A CHANGING TRANSPORTATION PARADIGM

Kelly McGourty

Puget Sound Regional Council is helping its member jurisdictions to plan and prepare for the changing transportation spectrum – including technologies such as autonomous and electric vehicles but also the shifting paradigm of transportation to include shared mobility models such as ride-hailing, bike-sharing and other formats. Many new mobility options are already operating in the region; we expect they are here to stay, and more will emerge. As with other issues, it will be important to plan ahead – and to plan together – to fully realize the benefits of these shifts and to minimize their negative impacts. In addition, our region is experiencing tremendous growth. As we prepare our 2050 plan, we are considering potential new considerations for local jurisdictions and businesses making land use and development decisions in order to prepare for, and in some cases, advance these mobility technologies. We are researching questions such as "what are the impacts from these technologies on local land use decisions?"

PSRC's role is to help its members prepare for new mobility options by identifying issues and needs, providing assistance and preparing best practices and guidance, as appropriate. The PSRC Regional Transportation Plan includes a recommended action to bring together a diverse stakeholder group for discussions about the issues and needs associated with changing transportation paradigms. Rather than leap to conclusions about what will happen in the future (e.g., no one will drive a car, all vehicles will be autonomous, deliveries will be made by air drones) we want to make sure that we understand all of the questions and the issues that should be addressed, and to help the region develop plans that equip them to design whatever does come in ways that support its goals and policies.

MOBILITY AS A SERVICE: THE END OF CAR OWNERSHIP

Jonna Pollanen

Mobility as a Service (MaaS), which provides aggregated, single account, on-demand multimodal transportation services in a seamless and convenient way, is quickly gaining momentum. MaaS works out the best option for every journey – whether by taxi, public transport, a car service or a bike share. From office commutes to weekend getaways, MaaS manages daily travel in the smartest way possible. For extra convenience, MaaS can include value added services like deliveries for groceries or restaurant meals. It allows people to go places and live their lives with more ease than ever before.

ABI Research forecasts that global MaaS revenues will exceed $1 trillion by 2030. The anticipated disruptive impacts of MaaS on the use of traditional transportation modes such as personally owned cars, buses, trains, aviation, taxis, and rental cars is stirring up not just the automotive industry, but the entire realm of public and private transportation service providers.

MaaS Global LTD is a Finland-based, fast-growing company enthusiastically building the future of mobility. Its award-winning Whim app was launched in Helsinki in 2016, and is growing in cities such as Birmingham, England, Amsterdam, and Antwerp. Drawing upon the firm's experience as the world's first-ever MaaS operator, a MaaS Global representative will discuss the biggest change in transport since affordable cars came to market by the introduction of alternatives to car ownership that are not just equally good, but much better.

INTERNATIONAL PROGRAMS ON ROAD VEHICLE AUTOMATION

SESSION 1337

SIP-ADUS PROJECT, NATIONAL RESEARCH AND DEVELOPMENT INITIATIVE ON AUTOMATED DRIVING IN JAPAN: OUTCOMES AND NEXT ACTIONS

Yasuyuki Koga

Yasuyuki Koga of ITS Japan discussed the Strategic Innovation Program (SIP-adus) for road vehicle automation. The project presentation focused on the four (4) phases of the A-SIP-adus timeline. In Society 5.0, Japan aspires to utilize technology to eliminate the gaps of today's society transforming transportation from being human centered to being mobility centered producing plans for smoother and optimal outputs. In Phase I, A-SIP-adus sought to automate driving for universal use. Much of phase I elements were presented at the 97th Annual TRB Conference. This included the visioning and development of goals for automated driving (AD). The project is currently in Phase II designed to produce a fully automated driving society utilizing both private ownership and mobility service tracts to produce results. The last phase is the A-SIP-adus workshop phase to share project outcomes that can be replicated as standards globally.

THE UNITED KINGDOM'S CONNECTED AND AUTONOMOUS ROAD VEHICLE PROGRAMME; PAST, PRESENT, AND FUTURE

Phil Blythe

Phil Blythe presented the United Kingdom's (UK) findings from the Automated Vehicle Symposium in 2017 highlighting the three (3) pronged approach that has been taken as part of the national Industrial Strategy. As has been evident in the recent news reporting, technology has been leading with regulation attempting to keep up and producing a lagging acceptance of technology. The example Mr. Blythe gave was of a semi-autonomous vehicle crash with no one in the driver seat. Insurance and traffic laws for self-driving vehicles were not on the books at the time. In response to this incident, UK was likely the first in the world to pass legislation and regulations for self driving vehicles.

The three (3) pronged approach the UK has adopted is (1) to define a clear pathway for regulation utilizing trialing, vehicles safety approaches, and producing regulations on use; (2) to develop a joint investment in research and development (R&D) utilizing sequentially dependent programs in waves building upon previous successes to produce full autonomous vehicles; and (3) to produce an integrated test bed ecosystem where all locations are capable of communicating with all modes and all models producing a safer, cleaner and greener UK.

AUTOMATED PILOTS; A PROGRESS REPORT FROM SWEDEN

Jan Hellaker

Drive Sweden is a new approach to mobility acknowledging a radical shift in the way people utilize the transportation systems to achieve their mobility needs. This outlook has been developed to show what is desired jointly for Sweden. In order to reach the vision for a connected, autonomous and shared mobility future, a number of intermediate steps are necessary. Mobility as a Service (MaaS) or Mobility on Demand (MOD) system research will need to be pursued in an integrated manner to guarantee Sweden's mobility of the future will be sustainable, safe, efficient, while also attractive in use.

Drive Sweden is a 12 year strategic innovation program built on a collaborative platform. The program began with MaaS apps deployed in Goteborg and Stockholm as part of a subscription model that included public transportation, shared vehicles (cars, bikes) and taxi services. The program also includes utilizing and informing the public of the use of self-driving vehicles, tools for assessing the societal and environmental effects of AVs, the development of planning tools for facilitating the transition from private car dependency to shared sustainable transport, adaptive regulations for AV, their sharing and procurement, ultimately producing a commercial MaaS service available everywhere in Sweden.

PEGASUS PROJEKT

Adrian Zlocki

PEGASUS delivers the standards for the automation of the future. With the PEGASUS joint project, promoted by the Federal Ministry for Economic Affairs and Energy (BMWi), key gaps in the field of testing of highly-automated driving functions will be concluded by the middle of 2019 via four (4) subprojects utilizing a six layered model (road geometry, physical barriers, temporary barriers, dynamic traffic participation, environment, and data and communication). Subproject 1 is the scenario analysis and quality measurement through the development of methods and tools for highly automated driving functions, demonstrating methods and tools, and deriving functional requirements that can be transferred to subprojects 2 and 3. Subproject 2 is the implementation process that analyzes existent processes, which have already been established in the automotive industry, regarding the safeguarding theme and prepares the actual testing in the form of modified deployment processes leading to a newly extended process methodology. Subproject 3, Testing prepares methods and tools for carrying out tests in the laboratory, at the testing sites, as well as in real traffic situations and then demonstrates these in practical manner. And in subproject 4, result reflection and embedding, results and procedures are verified to be transferred to further applications and higher automation levels, and the tools and processes developed within PEGASUS can be integrated into the company.

THE EUROPEAN UNION PROJECT INTERACT; DESIGNING COOPERATIVE INTERACTION OF AUTONOMOUS VEHICLES

Angelos Amditis

interACT is an H2020 project implemented by 8 partners from 4 countries that runs from May 2017 to April 2020. interACT project will develop novel, holistic interaction concepts for automated vehicles, that will enable their integration in mixed traffic environments, in a safe and intuitive way.

Automated Vehicles (AVs) are expected to start being deployed in mixed traffic and for this they will need to interact safely and efficiently with other (non equipped) users, including drivers of manually driven vehicles, cyclists and pedestrians. Currently, these vehicles cannot communicate their intentions to other road users and this limitation reduces the intuitive and cooperative interaction between the Automated Vehicles (AVs) and others, and the smooth flow of all traffic. Moreover other transport network users are currently unfamiliar with the presence of AVs and need to incrementally adapt to this new reality in an efficient and effective way that will ensure safety, especially in the transition period to full automation.

interACT will tackle the above-mentioned challenges, as it will study and substantially improve this communication and cooperation strategy between Automated Vehicles (AVs) and other transport stakeholders. interACT will provide an overview of current human machine interactions in mixed traffic, and increase chances of safe deployment of AVs by developing novel software and HMI hardware components for reliable and user-centric communication between an Automated Vehicle (AV) with its users.

CONNECTED VEHICLE PILOTS:

LESSONS LEARNED

SESSION 1380

WYDOT PILOT PERFORMANCE MEASUREMENT

Deepak Gopalakrishma

In 2015 the USDOT selected Wyoming's Interstate 80 (I-80) as one of three pilot locations to test and deploy advanced dedicated short-range communications (DSRC technology to improve mobility and safety. This roadway runs 402 miles along Wyoming's southern border carrying an average of more than 32 million tons of freight deliveries each year. Wyoming's extreme weather—including blowing snow in winter and fog and high winds in summer—create dangerous conditions for drivers on I-80. In the Connected Vehicle Pilot (CVP), WYDOT will use vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and infrastructure-to-vehicle (I2V) connectivity to improve monitoring and reporting of road conditions to vehicles on I-80 through the use of 75 roadside units, 400 instrumented fleet vehicles, and the WYDOT traveler information application. The V2V, V2I, and I2V applications support forward collision warning, I2V situation awareness, work zone warnings, spot weather impact warnings, and distress notifications. Core principles WYDOT has gained from the Pilot include, learn early and often, make immediate adjustments, minimize the disruptions to drivers and fleets, and be open with data. Daily challenges WDOT has resolved have been identifying efficient ways to log event data, provide for constant monitoring of equipment, developing optimal data flows and analysis, and the application of available modeling and analysis tools.

THEA
PILOT PERFORMANCE MEASUREMENT

Robert Frey

The Tampa Hillsborough Expressway Authority (THEA) and its partners are bringing innovative connected vehicle technology to Tampa's downtown. A car or truck equipped with connected vehicle technology "talks" wirelessly to other vehicles, traffic signals, crosswalks and more. This wireless communication can help prevent crashes, keep traffic moving and even improve fuel efficiency. THEA is equipping 10 buses, 10 streetcars and the cars of 1,600 individual volunteers with this exciting new technology to make downtown Tampa a safer, smarter place to walk, ride and drive. The THEA connected vehicle pilot is a 4-year, three phase effort that began in September 2015 with the implementing of the proposal. Phase 2 included design, testing and deployment. And phase 3 included the full-scale operations of the connected vehicle technology the deployment area. THEA's V2V and V2I communicating technology advises of traffic congestion and incidents, detect and advise of wrong-way entries, monitor and advise of pedestrians in crosswalks, provide transit signal priority, monitor connected vehicles to reduce the risk of collision, and communicate with traffic signals to improve real time traffic flows by utilizing roadside units that communicate with connected vehicles and with the city's Transportation Management Center via dedicated short range communications, or DSRC and systems integration of onboard units that display safety messages on an enhanced rearview mirror, as the primary interface between drivers and the connected vehicle environment.

NEW YORK CITY DOT PILOT PERFORMANCE MEASUREMENT

Keir
Opie

The New York City Connected Vehicle Pilot aims to improve the safety of travelers and pedestrians in the city through the deployment of connected vehicle technologies. This objective directly aligns with the city's Vision Zero initiative, which began in 2014 to reduce the number of fatalities and injuries resulting from traffic crashes. Led by the New York City Department of Transportation (NYCDOT), the pilot aims to reduce crash frequency and severity, manage vehicle speeds (to the regulatory limit), and evaluate the benefits of deploying connected vehicle technology in a dense urban environment with frequent interactions among the up to 8,00 participating fleet vehicles.

The NYCDOT Pilot seeks to deploy connected vehicle technology in large fleets that operate in the same area, provide system capabilities to manage the large fleets and their safety applications, measure the system's performance while preserving privacy for fleet owners' and participants' personally identifiable information, focus on the stability and robustness of the 353 roadside unit (RSU) and onboard unit (OBU) "platforms" to support Over-the-Air (OTA) software updates and data collection, and require that the operation of the applications can be adjusted and "tuned" for the characteristics of the dense urban environment and variety of driving conditions within New York City. V2V applications include forward crash warning, emergency electronic brake lights, blind spot warning, lane change warning, intersection movement assist and vehicle turning right in front of bus warning. V2I applications include speed compliance, curve speed compliance, speed compliance in work zone, red light violation warning, oversize vehicle compliance, and emergency communications and evacuation information.

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