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Texas Technology Task Force: Expanding Texas's Innovation Roadmap

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16. Abstract This research report provides an overview of the research team's activities from September 2016 through July 2017. Major activities include continued stakeholder engagement of the Texas Technology Task Force (TTTF). The TTTF's Strategy and Innovation Plan has also been updated, improving upon the roadmap to prepare and inform Texas transportation leaders and policymakers about the strategic and innovative activities of the TxDOT.		
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1 Introduction

This research report provides an overview of the research team's activities from September 2016 through July 2017. Continuing momentum from last year's successes, the Task Force is in a strong place to be a national leader for what a Smart State should do. The report updates progress on the Texas Technology Task Force (TTTF), focusing on the themes of people, portfolio, and plan. Next, five stakeholder engagement meetings are outlined and major outcomes are identified.

This report also updates the TTTF's Strategy and Innovation Plan, which was a major task completed in 2016. The plan, titled the *Improved Mobility Plan for Advancing Connected Transportation (impact)*, is a strategy and innovation roadmap to build a mobility foundation that will enable Texas to become the first Smart State. The purpose of the plan is to prepare and inform Texas transportation leaders and policymakers about the strategic and innovative activities of the Texas Department of Transportation (TxDOT).

Finally, other activities and next steps are described for the upcoming phase of work.

2 Background

Texas's 83rd Legislature passed the General Appropriations Bill, S.B. No. 1, Item 44, VII-31 and charged TxDOT with examining and evaluating innovative transportation technologies to achieve cost savings, reduce traffic congestion, enhance safety, and increase economic productivity. As a result of this charge, a Texas Technology Task Force was formally created in 2013 to develop a vision for the future Texas transportation system that furthers the mission of TxDOT via technology-based solutions. TxDOT's mission is to provide a safe and reliable transportation system for Texas, while addressing congestion, connecting Texas communities, and becoming a best-in-class state agency.

Since its creation, the work of the Task Force has been designed to progress through multiple phases leading to a comprehensive strategy and innovation plan, known as impacTX, to guide technology advancement activities in the state. This document provides and overview of that process and focuses on the current phase of work, which centers on the TTTF's proposed initiative to create an organic framework for demonstrating transformative technologies in a user-focused, open-innovation ecosystem. The TTTF believes that this initiative will help further TxDOT transportation goals and demonstrate that Texas is a leader and supporter of emerging technology testing and deployment.

Over the last year, the Task Force has worked with local organizations and industry to foster relationships with both communities. Many of the conferences and events have been focused on increasing communication at the local level so that TxDOT can better serve these communities. The processes learned from these experiences have been incorporated into impacTX to serve as a guide for building better relationships in the future.

Early Work

The TTTF began with an internal core group of industry thought leaders that sought experts in various transportation technologies to provide direction for the Task Force. The Task Force has regularly engaged outside subject matter experts (SMEs) over the past three years on selected topics at full-day workshops held quarterly in Austin, TX.

Together the Task Force and invited SMEs have discussed emerging transportation technologies, their development stages, evaluation methods, short- and long-term visions, benefits and barriers to adoption, and future deployment scenarios. Over these years, the Task Force has maintained that all activities should relate to three core ideas: that its work should focus on People, a Portfolio, and a Plan. These core ideas are described in more depth.

People

The Task Force currently consists of members from public agencies, industry, and research, all with an interest in transportation. Mike Heiligenstein, Executive Director of CTRMA; Michael Morris, Director of Transportation for NCTCOG; and Tom Lambert, President and CEO of Houston Metro represent public agencies. Shelley Row, President and CEO of Shelley Row Associates, LLC; JD Stanley III, Global Director of Strategy & Integrated Solutions, Cisco; and Harry Voccola, Executive Advisor for HERE represent industry on the Task Force. Finally, Steve Dellenback, Executive Director of R&D at SWRI; and C. Michael Walton, Cockrell Centennial Chair in Engineering, Department of CAEE, UT Austin represent research interests.

Additionally, a number of SMEs attend Task Force meetings as requested and answer technical questions for the Task Force as needed.

Portfolio

The TTTF has also continually monitored industry developments to identify and incorporate new transformational technologies into its Emerging Technology Portfolio. The identified technologies serve as the foundation for planning and research activities by indicating which technologies to focus on. The TTTF regularly evaluates and prioritizes technologies according to market readiness, adoption barriers, alignment with state and national transportation goals, and other relevant criteria.

Plan

The TTTF has developed a Strategy and Innovation Plan to demonstrate the need for public-private partnerships in deploying emerging technologies in the state of Texas. The plan represents a roadmap for enabling Texas to become the first Smart State, launching Texas into a leadership position and signaling to industry that Texas is open for innovation.

3 Stakeholder Engagement Meetings

Operating with these core ideas in mind, the TTTF has developed a work plan to progress activities through phases that will develop a strong community of the right expert people, continually refresh the technology portfolio with the most up-to-date technologies, and see the creation of the critical components needed to develop a full Strategy and Innovation Plan. These meetings focused on specific objectives and are described in more depth below.

Getting Smart: October 20, 2016 (Appendix B)

Objective: Galvanize key leadership and build consensus around the goals of a Smart State Consortium

Agenda: Opening remarks and introductions were provided. Core presentations were given from Austin Transportation Department, Waco MPO, TxDOT's Strategy and Innovation Division, and NCTCOG. Agency and institution introductions were then given, and a discussion was held regarding the vision and goals for the Consortium. Key leaders provided concluding thoughts and described the path ahead.

Speakers: Rob Spillar, Director, Austin Transportation Department; Chris Evilia, Director, Waco MPO and President, TEMPO; Darran Anderson, Director of Strategy & Innovation, TxDOT; Michael Morris, Director of Transportation, NCTCOG

Outcomes: The group agreed to continue to advance the development process of a Smart State Consortium, including the Texas Mobility Summit on December 1–2, a meeting of key leadership in January 2017, and a meeting at the Texas Transportation Forum in February 2017.

Building a Smart State: December 1–2, 2016 (Appendix C)

Objective: Develop an innovation and technology strategy designed to move Texas mobility forward, advance technology, and foster economic development.

Agenda: On day one, the Task Force welcomed members and introduced guest speakers. James Bass, Executive Director of TxDOT, and Steve Adler, Mayor for the City of Austin gave opening remarks. Shelley Row led a discussion on lessons learned from the USDOT Smart City Challenge and an idea exchange was held regarding challenges, goals, and applications. After lunch, participants had time to work on project development, then identified and prioritized critical pillars of activity for the Consortium. Teams then held a report-out to summarize lessons and suggest ways to advance the creation of a Smart State Consortium.

On day two, Tom Lambert and Chairman Joe C. Pickett from the House Committee on Transportation made opening remarks and introductions. Evan Smith, CEO and Co-Founder of the Texas Tribune, led a discussion about moving Texas forward. Then two sets of teams presented their vision for an innovative mobility system. After lunch, breakout sessions were held in four categories: Shared Mobility; Connected & Automated Vehicles; Freight & Logistics; and Energy. Then JD Stanley led a discussion about big data and mobility, and a discussion was held about the path forward.

Speakers: James Bass, Executive Director, TxDOT; Mayor Steve Adler, City of Austin; Mark Dowd, Senior Advisor, Office of Management & Budget; Rob Spillar, Director, City of Austin Transportation Department; Katie Ott Zehnder, Ohio Office Leader, VP, HNTB; Jason Pavluchuk, President, Pavluchuk & Associates; Joseph Kopser, President, moovel Global; Chairman Joe C. Pickett, House Committee on Transportation; Evan Smith, CEO & Co-Founder, Texas Tribune; Mayor Ivy Taylor, City of San Antonio; Mayor Oscar Leeser, City of El Paso; Mayor Jeff Williams, City of Arlington; Mayor Betsy Price, City of Fort Worth; April Mims, Public Policy Manager, Lyft; Jon McBride, Operations Director, Bridj; Paul Steinberg, Chief Business Officer, Carma; Elliott McFadden, Executive Director, Austin B-Cycle; Mike Brown, Institute Engineer, SwRI; Jeff Arch, Transportation Program Manager, Battelle; Peter Sweatman, Co-Founder, CAVita; Rick Warner, CEO, Truck Smart Parking Services; Paula Dowell, Principal &

Director, Economics, Cambridge Systematics; Steve Boyd, Co-Founder/VP External Affairs, Peloton Technology; Karl Popham, Electric Vehicles & Emerging Technologies Manager, Austin Energy; Nicole Zinn, Owner, Rocket Electrics; Alan Westenskow, Director of Business Development, Proterra; Paige Fitzgerald, Manager Connected Citizens Data Exchange Program, Waze; Monali Shah, Director of Global Intelligent Transportation, HERE; Doug Couto, Senior Fellow, Center for Digital Government; Ted Trepanier, Director of Product Management, Traffic, INRIX

Outcomes: Commitment for Texas Cities to work on an Automated Vehicle Proving Grounds (AVPG) joint application, continued focus on development of core pillars and projects, and to provide and empower Team Leads with resources and tools to engage local stakeholders.

Texas Innovation Alliance Workshop: February 8, 2017 (Appendix D)

Objectives: Establish a game plan for 2017, focused on procurement reform and the AVPG roadmap.

Agenda: The Task Force was welcomed and introduced to key speakers. Kristie Chin presented the game plan for 2017, focused on procurement reform, a comprehensive data strategy, industry/stakeholder engagement meetings, strategic/financial planning, and knowledge base/research-as-a-service. Potential funding models and organizational structures for the Alliance were discussed. After a break, a panel was held regarding procurement reform. A second panel provided the roadmap for the Texas AVPG, and discussion of next steps was held.

Speakers: Joe Willhite, WSP | Parsons Brinckerhoff, Jason JonMichael, HNTB

Outcomes: Rob Spillar offered to lead a subset of Team Leads in a discussion regarding future coordination. The Alliance will reach out to each Core Working Group for assistance in accomplishing their tasks. The Alliance will explore three tracks for streamlining the procurement process. Team Leads and Research Institutions will provide Chris Poe with one slide each for their AVPG applications; he will compile and distribute the slides.

On the Horizon: March 22, 2017 (Appendix E)

Objectives: Develop industry engagement for the Texas AV Proving Grounds Partnership

Agenda: The Task Force was welcomed and introduced to key speakers. Chris Poe led a discussion about developing a roadmap for deploying and marketing pilot projects, attracting industry, and developing a public communications strategy. After lunch, Mike Brown, Institute Engineer at SwRI, presented on the transformative topic of artificial intelligence. Then, Jim Misener, Director of Technical Standards for Qualcomm presented on the transformative topic of 5G connected transportation. Darran Anderson closed out the meeting with discussion of next steps for the Task Force.

Speakers: Mike Brown, Institute Engineer, Intelligent Systems Division, SwRI; Jim Misener, Director of Technical Standards, Qualcomm

Outcomes: Identified key use cases for AVPG, then seek out the companies who would benefit the most. Reached out to industry to be sure Texas is providing what they need to test these technologies. The Task Force has been good at breaking down silos within TxDOT.

Smart Cities Data Challenge: June 27, 2017 (Appendix F)

Objectives: Verify interest in developing a data initiative and confirm public agency data priorities, define expectations and desired outcomes of the September Launch Event, and discuss long-term needs and activities to support civic innovation.

Agenda: After opening remarks and introductions, Kristie Chin presented on the background of the September Data Challenge Event. There were presentations from a variety of researchers regarding the role of research in building data partnerships, followed by presentations from industry leaders about partnership perspectives in technology and mobility.

Speakers: Meredith Lee, Executive Director, West Big Data Innovation Hub; Elliot Martin, Assistant Research Engineer, TSRC, UC Berkeley; Pascal Van Hentenryck, Professor, RITMO, University of Michigan; Natalia Ruiz, Director Network Modeling Center, CTR, UT Austin; Dan Morgan, Chief Data Officer, USDOT; Sokwoo Rhee, Associate Director of Cyber-Physical Systems Program, NIST; Michael Berube, Director Vehicle Technologies Office, EERE; Ivan Benavides, Mobility as a Service, Ride Austin; Mateo Clarke, Brigade Captain, Open Austin, Code for America

Outcomes: Getting political buy-in from decision makers is a key challenge in the realm of data. Other important takeaways concerned the need to define data standards, protect privacy, not reinvent the wheel, and use data to improve decision making.

4 Improved Mobility Plan for Advancing Connected Transportation (impacTX): A Strategy and Innovation Plan for Moving Texas Forward

The research team, under the guidance of the Task Force, prepared a strategy and innovation plan to help position Texas as a leader in advancing emerging transportation technologies. The plan, which is included in Appendix A, is divided into the following three sections.

1. *Vision*: *Preparing Texas for the Age of Technology*, which explains social, economic, and technology trends that are influencing demand for new transportation services and operations. The vision outlines benefits that could be realized from deploying emerging technologies as well as TxDOT goals and resources for strategy and innovation.
2. *Communications*: *Fostering a Culture of Innovation*, which provides goals, strategies, and tactics in a framework for communicating TxDOT's strategy and innovation activities to key stakeholders. This section also provides snapshots of TxDOT innovation champions who have already promoted forward-thinking practices in the agency along with innovation projects already in the works.
3. *Recommendations*: *Positioning Texas as a Leader*, which provides three critical recommendations for action in order to position TxDOT as a leader in advancing emerging technologies. The critical actions are for Texas to take leadership position

at industry and professional forums and conferences, develop a priority connected and autonomous vehicle pilot strategy, and extend the public-private partnership framework to support smart mobility initiatives.

5 Other Activities

The Task Force has also been involved in a number of other activities, including visiting competitive pilot programs, attending conferences, and presenting the Task Force's work to a broader audience. The research team presented at the following conferences:

- TRB Annual Meeting | Washington, DC | January 8–12, 2017
- Smart Texas Revolution | Dallas, TX | April 20–21, 2017
- ATX Hack for Change | Austin, TX | June 2–4, 2017
- Smart Cities Connect Conference | June 25–28, 2017
- AV Symposium | San Francisco, CA | July 11–13, 2017

The team also attended the following conferences:

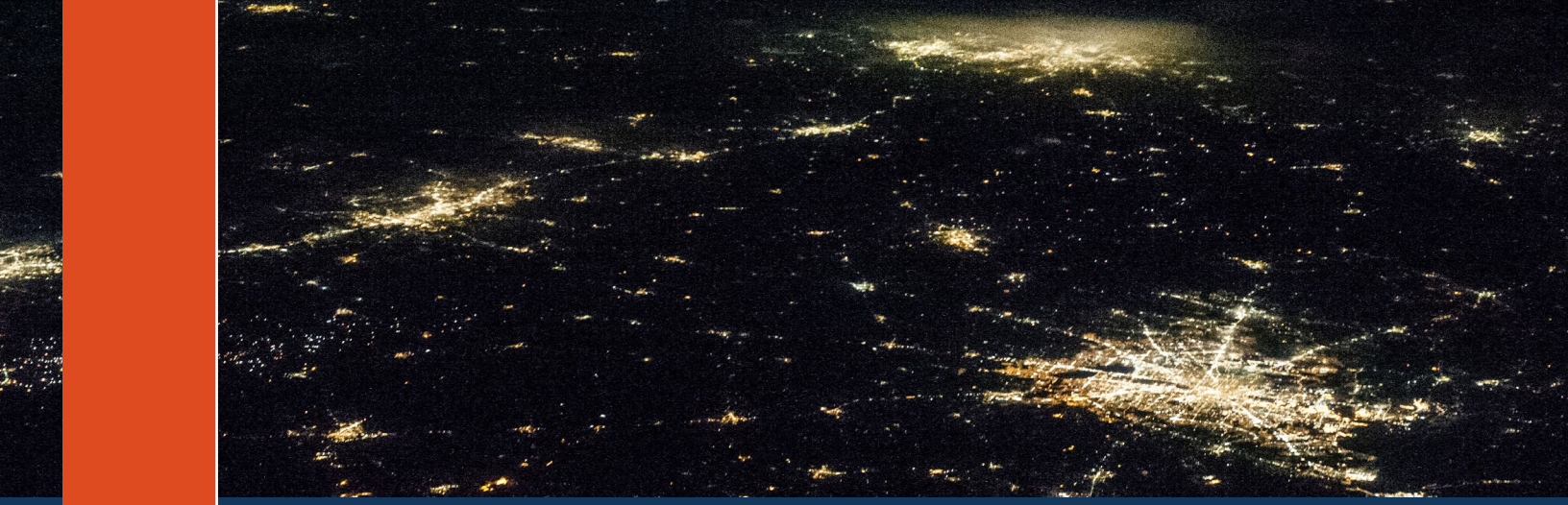
- NACTO | Seattle, WA | September 26–29, 2016
- ITS America Leadership Circle | Columbus, OH | November 2–4, 2016
- AASHTO Annual Meeting | Boston, MA | November 11–14, 2016
- 5G PAWR NSF Information Day | Arlington, VA | April 26–28, 2017
- Second Annual Texas A&M Transportation Technology Conference | College Station, TX | May 4–5, 2017

The combination of the research, communication, and planning activities of the Task Force enable TxDOT to increase its positive visibility on the national stage.

6 Next Steps

The TTTF has proposed impacTX to TxDOT for consideration and refinement. Next steps will require engagement with potential public and private sector partners to better understand their needs and level of interest. Supporting work for the initiative will be required so that TxDOT can make informed decisions on how to best promote the program; such work includes an assessment of TxDOT's leadership position within the state and federal political landscape. Ongoing work will be needed to refresh Task Force membership, prevent burn-out, and continue to discover new technology. Ultimately, the TTTF hopes to continue to work with and support TxDOT by leveraging impacTX as a platform for promoting advanced technology testing and deployment in Texas.

Appendix A: Improved Mobility Plan for Advancing Connected Transportation
A Strategy and Innovation Plan for Moving Texas Forward



impacTx

Improved Mobility Plan for Advancing Connected Transportation

A Strategy and Innovation Plan for Moving Texas Forward

Texas Department of Transportation

This document prepared by the Center for Transportation Research on behalf of the Texas Technology Task Force.

Contents

A Message from the Chief Strategy and Innovation Officer

TxDOT is celebrating its 100-year anniversary, and as we look forward to the next 100 years we are anticipating a paradigm shift in transportation driven by customer and economic demands, technological development, and the need to optimally and efficiently use the infrastructure we already have. And whether that means cars that drive themselves and talk to one another, a smart data ecosystem designed to deliver critical information in real-time, state-of-the-art air traffic management systems, or a one-access pass to all mobility options, we're just on the cusp of a revolution in transportation.

TxDOT has already taken strides to ready itself for the future. With the leadership of the Transportation Commission, TxDOT has realigned its vision, mission, values and goals to respond to the Governor's charge to relieve congestion. TxDOT has recently created the State Transportation Innovation Council in order to advance the deployment of innovative methods and has also joined the I-10 coalition to work collectively on making travel in the cross-country route more safe and efficient. Finally, TxDOT leadership formed the Texas Technology Task Force (TTTF), which has conducted five stakeholder engagement meetings with technology and civic experts, held two TECHtalks in partnership with the Texas House Innovation and Technology Caucus to inform policymakers, and completed five technology white papers. This plan builds on the activities of the TTTF and outlines TxDOT's goals for strategy and innovation.

Our strategy and innovation plan lays out our roadmap for advancing innovative transportation activities. Our strategy is designed generate creative solutions for solving old problems in new ways. TxDOT is prioritizing major efforts in three innovative areas: Enterprise Information Management (EIM), Transportation Management Systems (TMS), and Integrated Corridor Management (ICM). EIM is an agency-wide effort to secure, centrally manage, and analyze transportation data, which will lead to lower costs and provide better insights for timely decision-making. The TMS program captures data from vehicles, sensors, and social platforms to enhance current operations and provide real-time information to users. ICM will focus on addressing highly congested corridors by improving incident management, providing wireless and web-based alerts, and coordinating across multiple local authorities. Together, these three initiatives will kickstart our congestion relief efforts.

To prepare our state for the next 100 years, it is imperative that TxDOT take a leadership position. Opportunities lie ahead for deploying transformative technology pilots, pioneering creative public-private partnerships, and becoming a model for innovative success. Imagine the future of Texas transportation – a mobility paradigm where technology fuels transportation options, equitable access, and a thriving economy.

Regards,

Darran Anderson

Darran Anderson
Chief Strategy & Innovation Officer
Texas Department of Transportation

Strategy & Innovation: Moving Texas Forward

Making the Case for a New Paradigm

We are at a pivotal moment in transportation, where the rate of population growth, infrastructure deterioration, and congestion are outpacing our ability to provide quality service. In an effort to attain affordability, Texas families are being forced to search for housing, ever further away from our major urban cores, thus contributing to congestion. Economic opportunities are being lost to other states and industry will continue to shift investment to other regions, if Texas fails to embrace innovation. Technology offers a sustainable solution—safety benefits, enhanced mobility, and economic growth—ushering in a new paradigm for transportation. The Texas Department of Transportation (TxDOT) recognizes how imperative it is to develop a strategy for innovation, paving the way for Texas to become a leader in advancing emerging technologies. Joining forces with local leaders, policymakers, and technology visionaries, we are committed to realizing our vision for a Smart Texas.

The Improved Mobility Plan for Advancing Connected Transportation (impacTX) is a strategy and innovation roadmap to build a mobility foundation that will enable Texas to become the first Smart State. The purpose of the plan is to prepare and inform Texas transportation leaders and policymakers about TxDOT's strategic and innovative activities . By creating a network of smart communities that use technology to tackle their most pressing challenges, Texas will be united in innovation.

Why Strategy?

Strategy lays out a coherent and substantiated logic for making innovative transportation technology choices. It serves as a guide to make decisions that drive action, further the agency's overall mission, and decide where to allocate state resources.

Why Innovation?

Innovation encourages creative solutions for solving old problems in new ways. And that's because innovation is most important when conventional wisdom and traditional solutions no longer work. When time-tested approaches begin to fail, there is an opportunity to forge new paths. Collaborating with innovators outside of transportation can offer a fresh perspective and much-needed original ideas.

A strategy for innovation and integration of emerging transportation technologies will help Texas move forward in these key areas.

Improve safety. Emerging transportation technologies have the potential to dramatically improve traveler safety. Automated vehicles could greatly reduce injuries and fatalities by eliminating instances of intoxicated, impaired, or distracted driving; these vehicles' quicker reaction times can reduce crashes as well. In-vehicle red light violation warnings, nearby pedestrian alerts, curve speed warnings, and road weather alerts have the potential to prevent a significant number of crashes and fatalities.

Enhance mobility. Innovative technologies can improve mobility by reducing congestion, increasing travel options, and providing relevant information to travelers. Automated vehicles could provide travel opportunities to non-drivers such as the elderly, disabled, and blind. Combinations of connected vehicle technologies could aid in prioritizing signal timing and reducing travel time and overall delay. Traveler information could provide travelers with choices about the time, route, mode, and destination of travel to help avoid congestion, reducing uncertainty and stress.

Anticipate evolving customer needs. Embracing new technologies and processes can help Texas become adaptive and nimble in developing innovative solutions for entering new markets and meeting changing customer needs. Planning for innovation will help maximize creativity of participating stakeholders and ensure the best ideas are implemented.

Leverage public funds by creating partnership opportunities. Partnerships with industry and the research community can help capture the greatest returns on investment. These partnerships can transfer risk to the most suitable partner, give quicker access to financing and capital, and facilitate sharing and leveraging invaluable and intangible knowledge and expertise.

Foster statewide economic development. Emerging transportation technologies can help optimize roadway utilization and transportation services, potentially creating substantial savings in future infrastructure expansion. These technologies could also generate societal economic benefits through avoided medical costs and damages from crashes as well as reducing productivity losses. Jobs will be created in areas such as automobile manufacturing, and workforce training programs could be developed in technology installation and management.

TxDOT Goals

TxDOT has established a variety of agency goals and objectives to drive progress toward key outcomes.

Deliver the Right Projects. Implement effective planning and forecasting processes that deliver the right projects on time and on budget. Align plans and programs with strategic goals.

Focus on the Customer. Place people at the center of everything we do. Incorporate customer feedback and comments into agency practices, project development, and policies.

Foster Stewardship. Ensure efficient use of state resources. Operate efficiently and manage risk.

Optimize System Performance. Develop and operate an integrated transportation system that provides reliable and accessible mobility and enables economic growth. Enhance connectivity and mobility.

Preserve Our Assets. Deliver preventive maintenance for TxDOT's system and capital assets to protect our investments. Procure, secure, and maintain equipment, technology, and buildings to achieve a state of good repair and prolong life cycle and utilization.

Promote Safety. Champion a culture of safety. Reduce crashes and fatalities by continuously improving guidelines and innovations along with increased targeted awareness and education.

Value Our Employees. Respect and care for the well-being and development of our employees. Support and facilitate the development of a successful and skilled workforce through recruitment, training and mentoring programs, succession planning, trust, and empowerment.

Strategy & Innovation Goals

Building on the momentum and success of existing strategic activities, three goals have been defined to position Texas as the nexus of technological innovation and economic development. The following priorities reflect the evolving customer needs and define a path for TxDOT to meet the demands for increased safety, enhanced mobility, and enriched quality of life. By advancing connected transportation, Texas will align itself with the pace of technology development, deployment, and adoption that is required to remain economically competitive and meet customer needs.

Goal 1

Take a Leadership Position

Articulating a vision for integrating emerging technologies and executing action plans will signal to industry, policymakers, and the USDOT that Texas is proactively serving its customers. Defining priorities, focusing resources, and aligning efforts with organizational and stakeholder goals provides direction in a changing environment. If Texas fails to anticipate the evolving needs of its customers, the state will continue to forgo economic growth opportunities, disregard safety improvements, and sacrifice customer experience.

Goal 2

Partner to Advance Innovation

Creating an open-innovation environment will attract public and private partners willing to contribute resources to creative projects. A willingness to work with partners in the early stages of development demonstrates that Texas is the best place for incubating emerging technologies. A public-private partnership framework will provide TxDOT a mechanism to leverage public funds, share risk, and promote economic growth.

Goal 3

Evaluate and Share

Developing performance measures and a communications plan will promote the transparency, accountability, and visibility of the agency. Tools are needed to drive decision-making and enable TxDOT to build on successes, learn from failures, and cultivate a culture of continuous improvement. By synthesizing lessons learned and disseminating best practices, TxDOT will become recognized as a model in knowledge and technology transfer.

Key Players

Although ultimately the entire agency will contribute to bringing to life the Strategy and Innovation Plan, three TxDOT Divisions in particular will each play a critical role in furthering the agency's mission. These divisions guide the agency's direction, enable communications, and advance the state of the practice. Together, they provide a structure from which to approach research, development, and adoption of emerging technologies.

Strategic Planning (STR)

The Strategic Planning Division (STR) is an innovative team driving thoughtful, well-coordinated, and unified strategy solutions. STR establishes and maintains TxDOT's strategic vision, while providing future transportation planning and services for Texas. It anticipates, plans, and implements strategies to facilitate and build transportation infrastructure, make strategic investments, integrate modes, promote environmental stewardship, increase organizational strength, support community engagement, and plan for smart technology deployment.

Information Management (IM)

TxDOT's Information Management Division (IM) is responsible for the planning, development, and maintenance of all TxDOT's information technology (IT) to make the agency more robust and modern. IM is in charge of implementing agency IT planning and management procedures, guidelines, and standards and advises senior management on IT resource planning and management needs for all of TxDOT.

Research and Technology Implementation (RTI)

TxDOT's Research and Technology Implementation Division (RTI) sets direction, coordinates, and provides oversight of TxDOT's technical research program, technology implementation program, and new product evaluation program. Products created from these programs include devices, analytical tools, new materials, new or improved specifications, improved testing methods, as well as less tangible concepts such as knowledge or guidance.

Strategic Planning (STR)

STR establishes and maintains TxDOT's strategic vision, while providing future transportation planning and services for Texas. STR recently led the effort to realign TxDOT's vision, mission, goals, and values with customer and state needs, and is also defining performance measurements to correspond with the agency goals. Altogether, the vision, mission, values, and goals, combined with performance measures and strategic planning, promote department-wide accountability and transparency.

STR also oversees the activities of TxDOT's Texas Technology Task Force (TTTF), which is an external advisory group originally created by a directive from the State Legislature. The TTTF's major objectives are to discover and assess emerging transportation technologies and make recommendations on how to prioritize and transition them to deployment programs.

Texas Technology Task Force (TTTF)

The TTTF is a collaborative group of subject matter experts from public and private transportation and technology agencies and research institutions. The TTTF has developed and manages the Emerging Technology Portfolio, which includes technologies such as connected and automated vehicles, big data and cloud computing, unmanned aerial vehicles, alternative fuels systems, virtual reality, and mobility-as-a-service. The TTTF has evaluated and prioritized the top technologies, which it believes will provide the most benefit for the state of Texas. The top technologies are connected, automated, and big data. Following involvement with the City of Austin and its application for the USDOT Smart City Challenge and a workshop with innovative transportation leaders across the state, the TTTF is building momentum for a Smart State. The concept of a Smart State calls for an Alliance that generates public-private partnerships to attract the next wave of innovative technology and addresses real community challenges.

Information Management (IM)

Responsible for the planning, development, and maintenance of all TxDOT's information technology (IT), IM also assists with prioritization of the IT resource needs for the agency's legislative budget request. Together, these IM activities are designed to make TxDOT more efficient and thus better serve its employees, customers, and the state of Texas.

A major priority of IM is assisting in the development of strategies for implementing the enter- prise information technology services and developing recommendations for enterprise information technology policy.

Enterprise Information Management (EIM)

The Enterprise Information Management (EIM) program will give TxDOT a unified approach to managing its information across the agency. It will enable TxDOT to better secure, centrally manage, and analyze its data. The data and information will lead to lower costs and provide insights for timely decision-making. An integral part of this effort is creating a Data Lake, an agency-wide data warehouse that will allow the department to operate more efficiently by centralizing data in a single location, from which various applications will draw data.

Research and Technology Information (RTI)

In setting the direction of TxDOT's technical research program, RTI is an integral division in helping TxDOT foster the knowledge discovery and innovation needed to operate, maintain, and improve transportation systems in Texas. The division works closely with the state's universities and research institutions and draws upon the expertise of department personnel from across all of TxDOT.

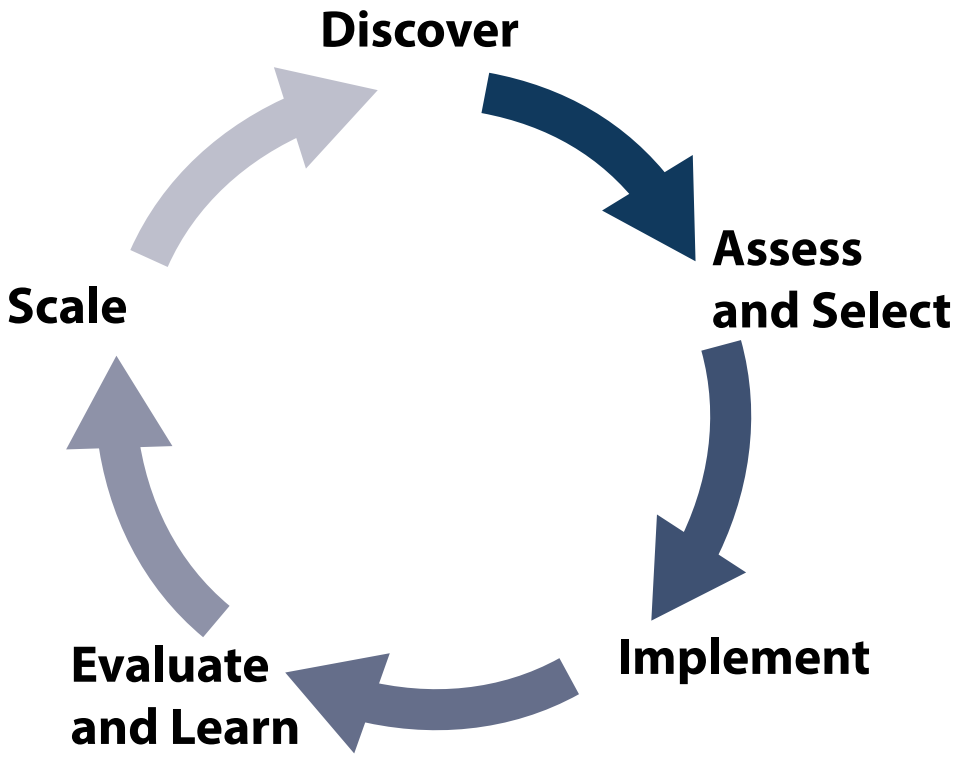
A newly created program under RTI is the State Transportation Innovation Council (STIC), which will help accelerate the implementation of innovative projects. The STIC brings together a group of representatives from public and private transportation and related agencies to consider innovative projects for funding and implementation.

State Transportation Innovation Council (STIC)

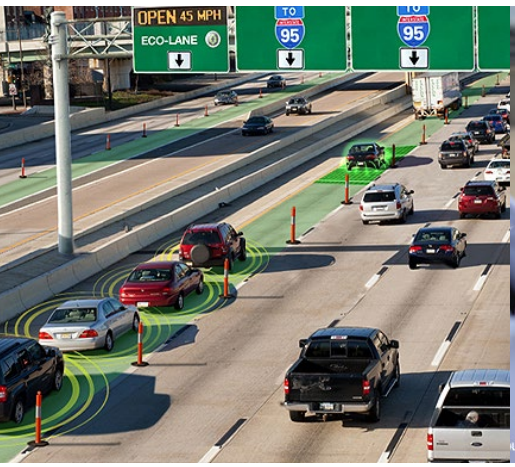
The Federal Highway Administration introduced the State Transportation Innovation Council (STIC) concept to state transportation departments and industry partners to foster ownership and pride in establishing a process in which ideas, innovative techniques and processes can be evaluated and implemented quickly and proficiently. TxDOT's newly created STIC will evaluate well researched and proven innovations that are ready to be implemented in the field. The technologies, tactics, and techniques selected will be employed and promoted to become standard practice within the transportation community at the local, regional, or statewide level. The STIC will convene for its first meeting in the fall of 2016.

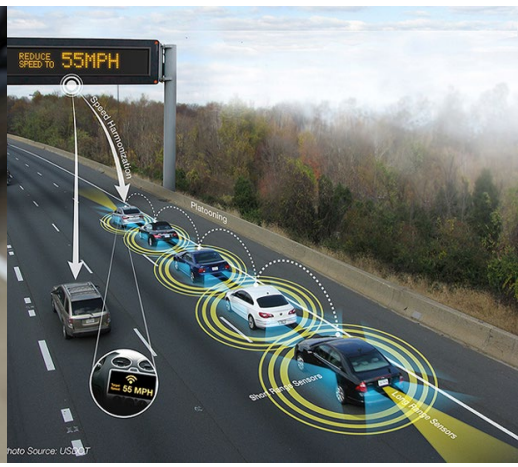
Process: Preparing for the Age of Technology

Strategy & Innovation Process

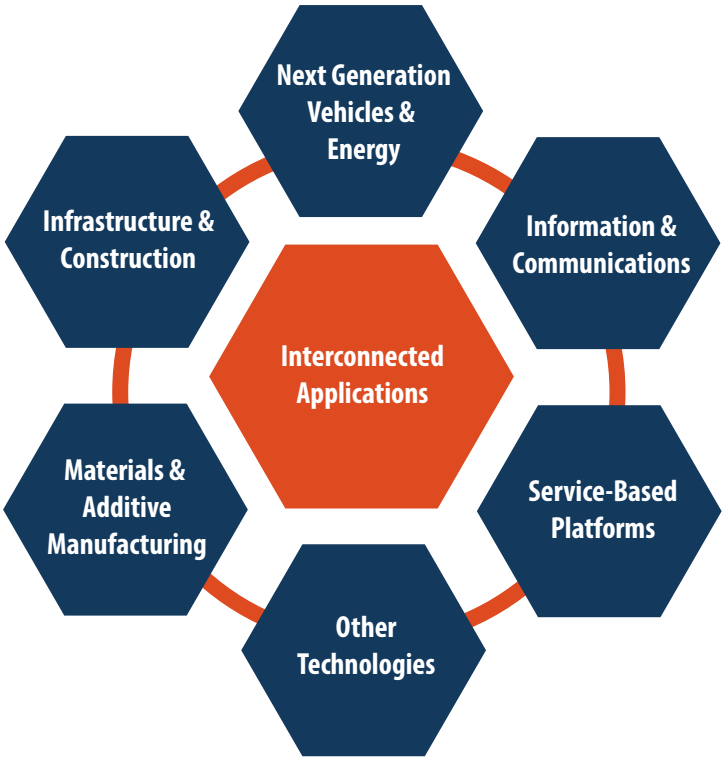


The strategy and innovation process is designed to help TxDOT envision a range of innovative technology solutions, examine and select the most appropriate ones, execute successful small-scale deployments, evaluate outcomes and educate others, and then expand into larger, successful trials in the State. It has five major stages: technology discovery, assessment and selection, implementation, evaluation and learning, and scaling.





Discover



Next Generation Vehicles & Energy
- Automated Vehicles
- Connected Vehicles
- Electric Vehicles
- Unmanned Aerial Vehicles

Infrastructure & Construction
- Infrastructure Enhancements
- Construction Techniques
- Equipment

Materials & Additive Manufacturing
- Self-Healing Pavements
- Nanotechnologies
- 3D Printing

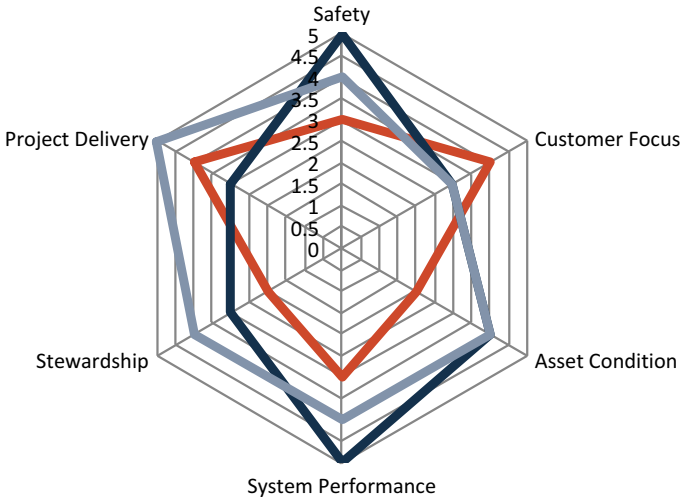
Information & Communications
- Cloud Computing
- Crowdsourcing

Service-Based Platforms
- Location-Based Services
- Transportation Subscription Services

Other Technologies
- Hyperloop
- Google Glass
- Virtual Reality

This is the first step where technical aspects of a new technology, application, or process are investigated. The TTTF manages the emerging technology portfolio, pictured above, and updates it on a continual basis. Characteristics of each technology, such as its position in the technology development cycle, necessary supportive environment, primary industry stakeholders, laboratory and closed testing outcomes, etc., are discovered and shared with TxDOT's key innovation players. During the discovery phase, the benefits to Texans are also demonstrated.

Assess & Select



During this phase new technologies are evaluated along multiple dimensions to understand readiness for deployment in early testing environments. Readiness is determined by assessing technology alignment with TxDOT's agency-wide and other state economic and transportation goals. Evaluation of barriers, such as cost to deploy, public acceptance, regulatory challenges, etc., will also be considered. Technologies are prioritized according to their alignment with goals and ability to overcome implementation challenges. Ultimately the assessment process seeks to find the best opportunities for successful deployment and uncover benefits across all modes.

Implement

The implementation phase includes determining project stakeholders and identifying a lead partner; collaboratively developing project problem statements and experimental design; determining the value of proposed research, developing a funding strategy and schedule of activities and deliverables; and identifying desired outcomes, roles and responsibilities, staff and participant training, and other activities designed to move technology from planning to implementation.

Traditional Approach

- Technology introduced without community context
- Accepts established business boundaries and mental models
- Follows linear business planning models
- Employs a one-size-fits-all organizational model
- Delivers incremental change when time and resources are convenient

Innovative Approach

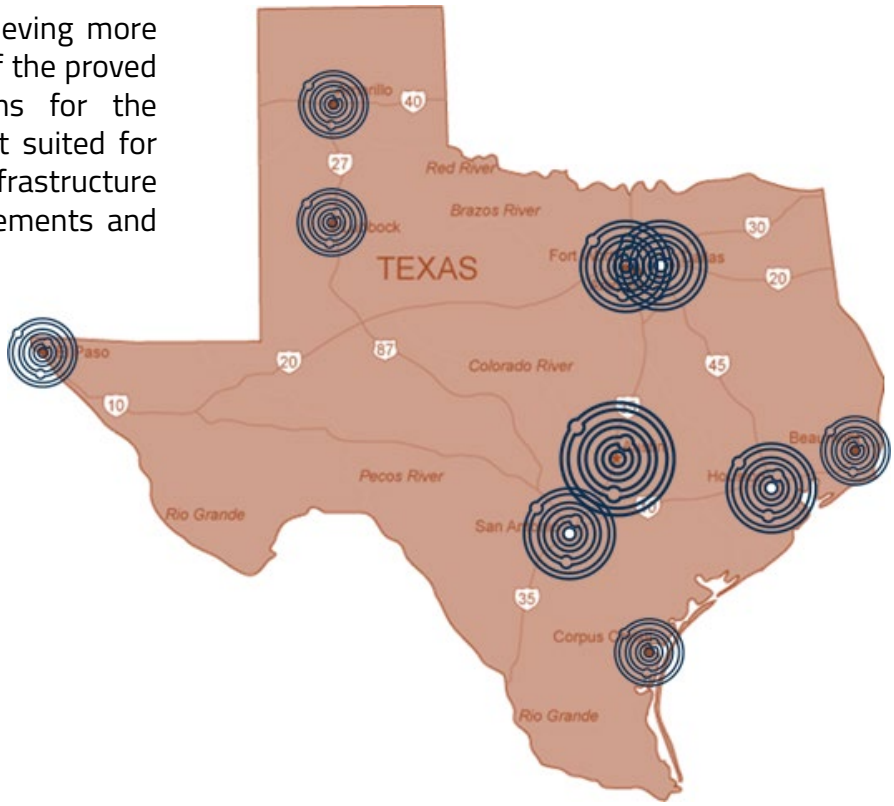
- Solutions inspired by community engagement
- Seeks to create new services, markets, or business models
- Combines disciplined process with creative ingenuity
- Experiments with entrepreneurial organizational models
- Prioritizes time and resources towards breakthrough advancements

Evaluate and Learn

In this fourth stage of the strategy and innovation process, step one is devoted to assessing how the early testing program performed in terms of planned objectives, and step two involves communicating results to stakeholders. If the technology meets the planned project outcomes, the early testing program will transition to the scaling phase. If the technology does not meet those objectives, the testing program should be iterated with program adjustments.

Scale

During this phase the best approach for achieving more efficient, effective, and widespread adoption of the proved technology will be designed. Considerations for the approach include selecting sites that are best suited for scaled deployment, the available capacity and infrastructure to manage scaled programs, technical requirements and funding for scaling, etc.



Communications: Fostering a Culture of Innovation

Communication Plan: Goals, Strategies, and Tactics

Customized communication strategies for each stakeholder are critical to help TxDOT build trust, garner support, and generate investment. The following goals, strategies, and tactics provide a framework for communicating TxDOT's strategy and innovation activities. Using these techniques, customized communication strategies may be developed to build awareness within each stakeholder group and constructively influence the decision-making process. Main messages for key stakeholders are described on the following page.

Goal 1

Foster a Culture of Innovation

- **Empower a Network of Innovation Champions.** Identifying innovative leaders throughout all levels of the agency would encourage the dialogue and exchange of ideas related to strategy and innovation.
- **Build Awareness & Interest in Emerging Technologies & Trends.** Sharing information about emerging technologies and trends would enable TxDOT to support a skilled workforce and maintain a competitive edge.
- **Coordinate Knowledge & Technology Transfer.** Facilitating the transfer of best practices and lessons learned would improve the flow of innovation across organizational silos.

Goal 2

Develop & Strengthen Partnerships

- **Conduct Outreach to Policymakers.** Serving as a resource to policymakers engenders trust, garners support, and ultimately generates investment for the state.
- **Conduct Outreach to Public Agency Partners.** Engaging other public agencies is critical to developing comprehensive solutions and serving customer needs.
- **Conduct Outreach to Private Industry Partners.** Attracting private industry partners capitalizes upon their expertise, leverages public investment, and mitigates risk associated with innovation.

Goal 3

Differentiate Texas as a Leader

- **Promote Examples of Successful Innovations.** Publishing results, synthesizing best practices, and sharing lessons learned contribute to an agency's image for being a leader in advancing technology in the field.
- **Present & Participate in Relevant Conference.** Networking in professional, government, and industry forums creates opportunities to promote the agency, learn about competitors, and develop partnerships.
- **Anticipate Change & Readily Adapt.** Being aware of social trends, technological advancements, economic situations, and political climates enables the agency to take a proactive rather than a reactive approach.

Key Stakeholders & Main Messages

Policymakers

- **New Paradigm.** Traditional transportation projects are no longer meeting the needs of Texans and a new paradigm of technology-enhanced mobility solutions is needed.
- **Responding to Constituent Pain Points.** TxDOT offers a portfolio of technology-enhanced solutions that may be tailored to serve a range of community needs, including addressing congestion, enhancing traveler information, and improving incident management.
- **Fiscally Responsible.** Public-private partnerships offer a way to deliver innovative projects in a fiscally responsible manner by leveraging public funds and allocating risk to the appropriate entity.

Source: CNU

General Public

- **Value.** TxDOT uses innovation to develop solutions that save its customers time and money.
- **Safety.** Technology presents many opportunities as well as challenges; TxDOT is dedicated to protecting its customers' safety, privacy, and security.
- **Convenience and Choice.** TxDOT offers all customers convenience and choice by supporting multiple modes of transportation.

Public Partners

- **Collaboration.** TxDOT facilitates collaboration in order to break down organizational silos and encourage exchange of best practices.
- **Flexible.** TxDOT relies upon public partners to be nimble in their procurement and project delivery processes to deploy innovations in a timely and efficient manner.
- **Context-Sensitive.** TxDOT depends upon regional and local leadership to customize solutions to fit the community context.

Private Partners

- **Open for Business.** Texas offers a business-friendly environment that promotes rather than restricts innovation.
- **Open for Innovation.** TxDOT is interested in developing public-private partnerships in the areas of information management, connected and automated vehicles, and intelligent transportation systems.
- **Access to the Texas Market.** Deploying technologies in Texas offers opportunities to test the technology readiness in controlled environments, understand the customer experience, and perform market research.

Champions of Innovation

TxDOT Champions of Innovation share the inside scoop on forward-thinking practices.

Kelly Selman, P.E. – Dallas District Engineer

Kelly Selman is the District Engineer for TxDOT's Dallas District, where he has spearheaded several innovative initiatives, including the Dallas City Center Master Assessment Process (CityMAP). CityMAP provides a multi-partner decision-making framework that incorporates public input to communicate options for the major highways leading into the core of downtown Dallas. In early 2015, TxDOT initiated an effort to engage community stakeholders, the City of Dallas, and Dallas County in untangling some of North Texas's most congested and aging freeway infrastructure. Developing options through a comprehensive process will minimize public and local partner resistance, avoid costly planning and design delays, and allow TxDOT to test options early for community acceptance, operational performance, funding feasibility, and partnership potential.

"CityMAP is the result of an unprecedented effort by TxDOT to gather public input about the future of the downtown Dallas corridor and to lay out the 'art of the possible' even before any formal studies are started. An effort of this scale and scope has never been attempted before. In particular, I hope that it provides the impetus to reconnect southern Dallas neighborhoods that have been divided by poor transportation decisions in years past. It is time to rectify those divisions."

- Dallas Mayor Mike Rawlings

Matt Sneed, San Antonio District

Matt Sneed is the San Antonio representative on the Statewide ITS Leadership Committee and the TransGuide Operations Manager. TransGuide provides information on roadway conditions and options to the traveling public in and around San Antonio. The San Antonio District in partnership with the Alamo Area MPO created the Traffic Incident Management (TIM) Committee within the Technical Advisory Council to incorporate TIM into the regional planning practices. The San Antonio District has also started a five-year ITS masterplan study that will create an asset inventory and project prioritization plan including equipment expansion, facility upgrades, agency partnering, and staffing needs.

"I get a great deal of satisfaction in making measurable improvements to people's lives with respect to safety and traveling experience. I've had the pleasure of designing and implementing signs/marking projects that nearly eliminated crashes at challenging locations, as well as signal retiming projects that cut travel time in half. I also enjoy the technology transformation happening within traffic operations and the new skills we must learn to keep with the industry."

- Matt Sneed, San Antonio District

Eddie Valtier, El Paso District

Eddie Valtier is the Director of Transportation, Planning and Development for the El Paso District at TxDOT. With more than twenty years of experience, he is a forward thinker who has developed several policies and procedures to move the agency forward. The El Paso District is using virtual reality as a visualization tool to engage the community in the project planning process. Also, in-pavement lighting has been installed in the diverging diamond intersection to assist drivers in navigation. Finally, a pilot program with Metropia in partnership with the El Paso MPO, Camino Real RMA, and the City of El Paso is exploring the use of a travel demand management tool to incentivize changes in travel behavior.

"As transportation folks, we do a design drainage plan; our bridges and pavement last for 50 to 100 years—we design for that. We get traffic numbers, projections, for 20 to 40 years, so why don't we put that much effort into technology? What [El Paso] is going to do is we're going to task our consultant to come up with a technology plan. Maybe every project needs to have a technology plan. Some may be simple ITS applications, but some may need to go farther."

- Eddie Valtier, El Paso District

On the Innovation Horizon

In an effort to relieve congestion and invest in the future Texas transportation system, TxDOT is focusing on several key initiatives. As the severity of congestion in the Lone Star State continues to grow, technologies will play an increasingly important role in improving safety, enhancing mobility, and fostering economic growth. The following project descriptions provide a look ahead into innovations on the nearby horizon.

Enterprise Information Management (EIM) EIM is an agency-focused effort to secure, centrally manage, and analyze transportation data, which will lead to lower costs and provide better insights for timely decision-making. The information will be used internally to prioritize investments in the areas of greatest need—predictive maintenance, enhanced freight movement, and congestion relief. EIM will also enable TxDOT to share information with travelers regarding travel times, corridor reliability, and construction activities to support trip planning and increase customer satisfaction.

Traffic Management Systems (TMS) TMS is a network-level program that captures data from a number of sources—vehicles, sensors, and social platforms—to enhance current operations and provide real-time information to stakeholders. Increased collaboration with local transportation operations, emergency responders, and transit agencies will support integrated decision making. Benefits include coordinated incident management, improved network efficiency through adaptive signal control, and greater access to information through push notifications/driver alerts regarding disruptive events.

Integrated Corridor Management (ICM) ICM is a subset of TMS that will focus on addressing highly congested corridors by enhancing traffic operations, improving incident management, and coordinating across local authorities. Using wireless and web-based alerts, as well as dynamic message signs, ICM will enable travelers to plan their routes and make adjustments as needed in response to changing conditions. A decision support system will assist operators in selecting the appropriate combination of ICM strategies to apply to different operational conditions.

Recommendations: Positioning Texas as a Leader

Moving Texas Forward

A New Mobility Paradigm is Needed. Texas is falling behind other states in the deployment of emerging technologies such as connected and automated vehicles, intelligent transportation systems, and data management. A strategy and innovation plan enables TxDOT to anticipate evolving customer needs, attract economic growth opportunities, and make significant improvements in safety and mobility where traditional approaches have failed. The following factors contribute towards Texas's success

Key Players. Several TxDOT divisions, advisory groups, and a network of subject matter experts are driving strategy and innovation. Through close collaboration, they work together to identify customer trends, define priorities, and make recommendations to TxDOT administration regarding the strategic direction of the agency. The key players serve as resources to inform the agency's decision-making process to better serve its customers and position Texas as a leader of innovation.

Process. The five steps of the strategy and innovation process enable TxDOT to anticipate evolving customer needs, prioritize its activities, and allocate resources in alignment with agency goals. Partners are critical to the process, providing expertise, mitigating risk, and contributing financial resources. By encouraging open innovation, Texas benefits from economic growth, delivers customer satisfaction, and becomes a national model for advancing innovation.

Plan. The Strategy and Innovation Plan provides the motivation for Texas to reclaim its leadership position in transportation. The Plan outlines three recommendations to guide TxDOT time and resource investment. TxDOT seeks to generate momentum for a new service paradigm and signal to stakeholders that Texas is open for innovation

Texas Innovation Alliance

Open for Innovation. TxDOT encourages the evolution of the Texas Innovation Alliance—an entrepreneurial alliance of public, industry, research, and community partners that plan, test, evaluate, and prove the benefits of connected transportation concepts. The Alliance creates a unique value proposition for public and private partners to engage in research and development activities in a precompetitive environment. By learning from small scale deployments, communities can advance proved technologies on larger scales.

The vision is to create a platform for innovation that enables the partners to leverage resources, co-create solutions, and share results for improving the delivery of government services to all Texas communities. The Alliance is dedicated to improving the lives, safety, and economic prospects of Texans through the innovative improvement of policies, standards, and regulations; industry and stakeholder engagement; partnership development; and knowledge and technology transfer.

The Alliance would promote the following goals:

Goal 1

Integrate & Innovate with Data

Encourage the standard collection within and coordinate the sharing of information between public agencies to support innovation and economic growth. Partners of the Alliance will make a formal commitment to open data principles and pursue collective data-sharing agreements to support mobility-related applications. The Alliance will organize a comprehensive data strategy, architecture, and standards to develop best practices, support interoperability, and inform policy recommendations.

Goal 2

Expand Safe Testing of Automated Vehicles

Building upon the momentum of Texas Automated Vehicle Proving Grounds Partnership, the Alliance will leverage collective resources, expertise, and opportunities to advance automated, electric, shared, and connected vehicle technology. Public agencies will collaborate alongside research institutions and industry partners to advance emerging technologies through pilots programs that solve community challenges.

Goal 3

Develop a Unified Communications Strategy

Craft a clear, compelling narrative to demonstrate the community need and benefit of emerging technologies. Provide consistent and tailored communications across state, regional, and local stakeholders.

Texas Innovation Alliance Projects & Achievements

The Alliance's approach is anchored in four core values: community, collaboration, choice, and a culture of innovation. The projects and achievements below exemplify these values to serve all communities, break down silos through partnerships, and champion an entrepreneurial spirit to provide mobility options in Texas.

Pillars and Projects

Procurement Reform | The Alliance will develop a problem-based framework to support rapid prototyping, technology-as-a-service models, and creative partnerships to enable innovative pilot projects, while ensuring accountability and shared risk.

Comprehensive Data Strategy | Partners of the Alliance will make a formal commitment to open data principles and pursue collective data-sharing agreements. The Alliance will organize a comprehensive data strategy, architecture, and standards to develop best practices and policy recommendations.

Industry & Stakeholder Engagement Meetings | To keep Partners technically current, industry, research, and citizen engagement meetings will be held on a periodic basis to cover specialized topics related to emerging technologies and assist in supporting community inclusion.

Strategic & Financial Planning | The Alliance will assist partners in developing pilot projects through the concept-procurement-implementation-evaluation process. Industry and research partners will be identified with the technical capabilities to meet the pilot project needs.

Knowledge Base | The Alliance will compile lessons learned, best practices, and points of contact related to relevant topics in a central repository. In addition, the Alliance will create a network of subject matter experts to enable Partners to leverage the expertise across the state.

Research-as-a-Service | Leveraging the network of research institutions across the state of Texas and beyond, the Alliance will provide customized research services in support of pilot projects. In particular, the Alliance will help in assessing technology readiness and identifying common performance metrics.

Achievements

Texas Mobility Summit–City and regional teams from across Texas, community partners, and industry leaders gathered for the Texas Mobility Summit in Austin in December 2016. The teams aimed to continue the conversation initiated with USDOT's Smart City Challenge and built the basis for forming the TX Innovation Alliance.

Team Development & Consensus of Organizing Principles–In agreeing upon a common set of organizing principles, the teams represented by transportation leadership in Texas's major cities, regions, and research institutions formed the TX Innovation Alliance. The teams identified their region's challenges and priorities and collaborated to propose a cohesive path forward for Texas mobility.

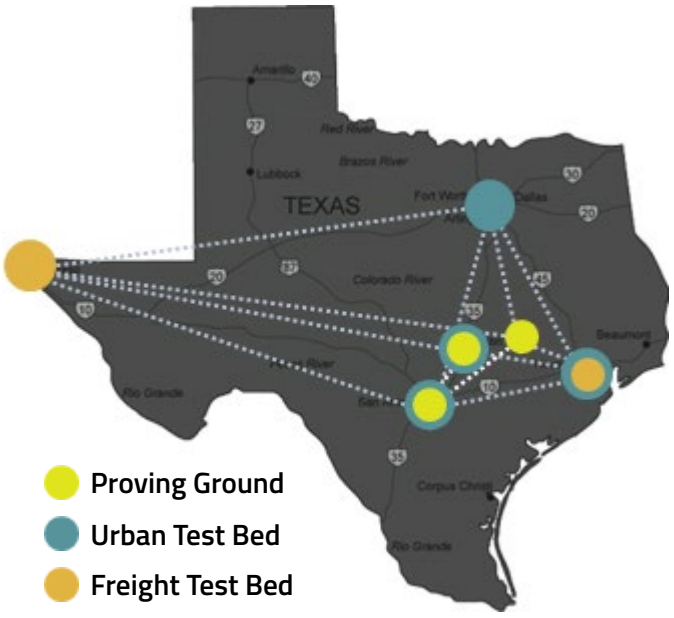
Automated Vehicle Proving Ground (AVPG)–In response to the US Department of Transportation's solicitation for Automated Vehicle Proving Grounds Designation, the Texas Automated Vehicle Proving Ground Partnership submitted a proposal for a network of proving grounds and test sites to advance automated vehicle research, development, testing, and deployment. Texas was one of 10 regions and the only state selected by the US DOT in January 2017 from an applicant pool of more than 60.

Automated Vehicle Proving Grounds Partnership

Community of Practice. Join a network dedicated to sharing and implementing best practices and dedicated to supporting peer projects by sharing lessons learned.

Unified Communications & Marketing. Benefit from continuous and unified promotion of the Partnership, its activities, and the Partnership's mission and objectives.

Make Texas a Leader. Signal that Texas communities will be early adopters of emerging transportation technologies and will advance their development, proving, and deployment.



The Texas Automated Vehicle Proving Grounds Partnership—a network of public and research agencies - is offering a precompetitive environment for automated vehicle (AV) testing. The partners are opening their closed, controlled, and open testing sites across Texas to innovators for complete life-cycle development and assessment of AVs. The Partnership envisions a truly collaborative effort that combines facilities, equipment, and expertise for test-bed development, deployment, and scaling. Each partner brings its own knowledge and expertise together in living lab environments to advance common goals and provide positive visibility to the public.

Proving Grounds

The proving grounds offer controlled and partially-controlled environments on the research campuses where the complete life-cycle development of automated vehicles can be safely tested. The TAMUS RELLIS Campus, the UT Austin and JJ Pickle Campuses, and the SwRI Campus all have facilities that have been used for automated vehicle testing of passenger car, freight, and military applications.

Texas Test Beds

The urban and freight test sites offer real-world testing areas where a variety of environments with different challenges can be explored. These test sites offer scenarios ranging from urban vs. rural, high-speed vs. low speed, passenger cars vs. freight, on-road vs. off-road, freeways vs. arterials and where modal applications can be tested including highways, transit, pedestrian, and bicycle. The specific areas in each region are highlighted below:

- **Austin Area–**Austin-Bergstrom International Airport and Riverside Drive corridor
- **Houston Area–**Texas Medical Center, Houston METRO HOV lanes, and Port of Houston
- **Dallas Fort Worth Arlington Area–**I-30 West Corridor and Managed Lanes
- **San Antonio Area–**Fredericksburg Road/Medical Drive corridor and bus rapid transit system
- **El Paso Area–**Tornillo/Guadalupe Port of Entry

Call to Action

Act or react? Texas must choose between two futures. One is characterized by a transportation system unable to meet the needs of our growing population and economy—where underserved communities struggle to reach their healthcare appointments, families are forced to the suburbs due to lack of affordability, and the next generation have limited access to education and jobs. The second anticipates the future needs of our communities and prepares an innovative way forward—where businesses thrive, the hours of sitting in traffic disappear, and people reach their places of opportunity. Texas must prepare our ecosystem to integrate emerging technologies into the bloodstream of the Texas economy.

Take a Leadership Position. In order to build trust, garner support, and generate investment, TxDOT should earn recognition as a leading transportation agency in the advancement of innovation. Encouraging TxDOT leadership to take an active role in relevant conferences, committees, and forums provides a platform for the agency to influence policymakers, research agendas, and industry market development. Promoting TxDOT accomplishments and continuing to compete for high profile grants will keep Texas on the national radar.

Develop a Priority CAV Pilot Strategy. Prepare connected and automated vehicle pilot programs to compete for the $4 billion that will become available from the USDOT over the next ten years. TxDOT should assemble multidisciplinary teams to define problem statements, identify real-world open test environments, and conceptualize technical approaches. To position Texas for success, TxDOT should focus on demonstrating safety, mobility, and sustainability benefits.

Extend the P3 Framework to Support Smart Mobility Initiatives. Building upon its success with public-private partnerships (P3) for delivery of traditional transportation projects, TxDOT should enlist a community of internal and external experts to expand the P3 mechanism to finance innovative transportation projects. Issues to consider with emerging technologies include licensing and certification for operations, data ownership and acquisition, liability, privacy, and security. The deployment of emerging technologies may be accelerated by leveraging public funds to attract private capital, mitigating risk, and tapping into subject matter expertise.

For more information:

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Appendix B: Texas Innovation Alliance Founding Meeting

TEXAS DEPARTMENT OF TRANSPORTATION

TEXAS TECHNOLOGY TASK FORCE

Smart State Foundation Meeting
TxDOT Greer Building | 125 E 11th Street | Delegation Room, 1st Floor
Thursday, October 20 | 12:30-4:00 PM

Objective: *Galvanize key leadership and build consensus around the goals of a Smart State Consortium*

12:30pm | Lunch

1:00pm | Opening Remarks & Introductions – *C. Michael Walton, UT Austin & J.D. Stanley, Cisco*
Background information regarding the motivation for a smart state initiative is provided. Activities and key milestones are identified that culminate in the creation of a Smart State Consortium.

1:15pm | Core Presentations
Transportation leaders share their perspective and vision for a smart state. Presentations highlight challenges in the current practice of transportation and make the case for a shift in paradigm. Presenters extend an invitation for transportation agencies across the state to work collaboratively to position Texas as a leader in innovation and economic development.

Rob Spillar – *Director, Austin Transportation Department*
Chris Evilia – *Director, Waco MPO and President, TEMPO*
Darran Anderson – *Director of Strategy & Innovation, TxDOT*
Michael Morris – *Director of Transportation, NCTCOG*

2:00pm | Break

2:15pm | Agency & Institution Introductions – *C. Michael Walton, UT Austin*
Representatives provide a brief snapshot of their city/region's top mobility challenges and priorities.

2:45pm | Vision & Goals Discussion – *Joe Willhite, WSP | Parsons Brinckerhoff & Kristie Chin, UT Austin*
Representatives propose critical elements that will guide development of the Consortium's vision, mission, and values. A facilitated discussion occurs around goals in the areas of community, technology, economic development, industry engagement, policy, and research.

3:45pm | Next Steps and Closing Remarks – *Darran Anderson, TxDOT* and *Michael Morris, NCTCOG*
Surveys are administered and a summary of action items is outlined in preparation for the upcoming Texas Mobility Summit on December 1-2 in Austin. Key leaders provide concluding thoughts and describe the path ahead.

4:00pm | Adjourn

Key Representatives

TxDOT

Darran Anderson, Director of Strategy & Innovation, TxDOT
Kent Marquardt, Director, Strategic Planning Division, TxDOT
Stacey Strittmatter, Deputy Director, Strategic Planning Division, TxDOT
Yvette Flores, Analyst, Strategic Planning Division, TxDOT

Texas Technology Task Force

J.D. Stanley, Director of Strategy & Planning, Cisco

Austin

Rob Spillar, Director, Austin Transportation Department
Karla Taylor, Chief of Staff, Austin Transportation Department
John-Michael Cortez, Special Assistant to Mayor Steve Adler, Transportation

DFW

Michael Morris, Director of Transportation, NCTCOG TTTF
Tom Bamonte, Program Manager, Automated Vehicles, NCTCOG

Houston

Tom Lambert, President & CEO, Houston METRO TTTF
Terence Fontaine, Executive Vice President & Chief Innovation Officer, Houston METRO
Laura Cochran, Director of Innovation, Houston METRO
Maureen Crocker, Special Advisor to Mayor Sylvester Turner, Transportation

San Antonio

Hope Andrade, Chair of Board of Trustees, VIA
Leilah Powell, Chief of Policy to Mayor Ivy R. Taylor
Vic Boyer, President & CEO, San Antonio Mobility Coalition, Inc. (SAMCo)

El Paso

Eddie Valtier, Director of Transportation, Planning and Development, El Paso District, TxDOT

Waco

Chris Evilia, Director of Waco MPO, President of TEMPO

Bryan-College Station

Bart Benthul, Transportation Systems Analyst, BCS MPO*

Lubbock

Steve Warren, District Engineer, Lubbock District, TxDOT**

Laredo

Nathan Bratton, Director of Laredo MPO, Planning Director of Planning and Zoning Department*

Tyler

Heather Nick, Executive Director, Tyler MPO*

Corpus Christi

Jeff Pollack, Transportation Planning Director, Corpus Christi MPO W
Gordon Robinson, Director of Planning, CCRTA W

Midland-Odessa

Cameron Walker, Executive Director, Permian Basin MPO*

Research Triangle

Jen Duthie, Director, Network Modeling Center, CTR
Robert Heller, Program Director, Administration Department, Intelligent Systems Division, SwRI
Ginger Goodin, Director, Transportation Policy Research Center, TTI

* Tentative ** Representative to Be Identified W WebEx TTTF Texas Technology Task Force

Texas Innovation Charter Content

A Model for Collaborative Leadership

VISION

A one-stop-shop for strategic and innovative mobility solutions

MISSION

We will achieve our vision by building strategic partnerships, nurturing emerging technologies in living lab environments, and empowering communities to participate in the innovation process.

VALUES

We, Mayors and Leaders, are dedicated to:

Community – Serving all Texans through strategies that foster innovation, promote digital inclusion, and improve the quality of life.

Collaboration – Engaging in stakeholder dialogue, building public-private partnerships, and using an open innovation approach to generate integrated and sustainable solutions.

Choice – Providing all Texas communities with access to a variety of mobility options that meet the diversity of Texans' socioeconomic, comfort, and convenience needs.

GOALS

We, Mayors and Leaders, declare our commitment to:

Serve All Texas Communities – Enhance mobility, create ladders of opportunity, and develop context-sensitive solutions.

Foster Economic Development – Attract and grow businesses, develop business plans for emerging technology applications, and foster workforce development opportunities.

Leverage Resources – Facilitate knowledge and technology transfer, streamline procurement processes through the creation of a State Buy list, and maximize return on investment.

Provide a Unified Voice – Inform state and federal policies, conduct stakeholder outreach, and influence the standards and regulatory environments.

Texas Mobility Summit Planning Tool

Innovate • Develop • Network

Name: _____

Organization: _____

PARTIPATION

I am interested in participating in the following ways (check all that apply):

☐ Leading and organizing a Summit Team

☐ Participating on a Summit Team

☐ Participating in the Summit as an individual

☐ I will not attend, please keep me informed.

AREAS OF FOCUS

I would like to learn more about the following topics (select top three):

☐ Big Data

☐ Freight

☐ Connected & Automated Vehicles

☐ Electric Systems

☐ Sensor-Based Infrastructure

☐ Ladders of Opportunity

MOBILITY CHALLENGES

The primary challenge areas that our city/region faces are (select top three):

☐ Mobility

☐ Freight & Logistics

☐ Safety

☐ Cultural Barriers

☐ Sprawl

☐ Other: _____

KEY MOBILITY COMMUNITIES

Our city/region is focusing on better serving the following communities (select top three):

☐ Bicyclists and Pedestrians

☐ Commuters

☐ Disabled

☐ Freight

☐ Elderly

☐ Other: _____

VALUE PROPOSOTION

I would like to see the Consortium offer the following services (check all that apply):

☐ Create a State Buy List

☐ Inform the standards and regulatory processes

☐ Coordinate grant applications

☐ Engage state and/or federal legislature

☐ Develop business plans for pilot projects

☐ Other: _____

OTHER CONSIDERATIONS

Please provide additional feedback that may guide the development of the Texas smart state initiative going forward.

TEXAS DEPARTMENT OF TRANSPORTATION

TEXAS TECHNOLOGY TASK FORCE

Smart State Foundation Meeting
TxDOT Greer Building | Delegation Room, 1st Floor
Thursday, October 20 | 12:30-4:00 PM

Primary Outcomes

The group agreed to continue to advance the development process of a Smart State Consortium. This will include the Texas Mobility Summit on December 1-2, a meeting of key leadership in January, and a meeting at the Texas Transportation Forum in February.

List of Attendees

Darran Anderson, Director of Strategy & Innovation, TxDOT; **Kent Marquardt**, Director, Strategic Planning Division, TxDOT; **Stacey Strittmatter**, Deputy Director, Strategic Planning Division, TxDOT; **Yvette Flores**, Analyst, Strategic Planning Division, TxDOT; **J.D. Stanley**, Director of Strategy & Planning, Cisco; **Rob Spillar**, Director, Austin Transportation Department; **Karla Taylor**, Chief of Staff, Austin Transportation Department; **John-Michael Cortez**, Special Assistant to Mayor Steve Adler, Transportation; **Donna Tiemann**, Chief of Staff to Council Member Ann Kitchen, District 5 Council Office; **Michael Morris**, Director of Transportation, NCTCOG; **Tom Bamonte**, Program Manager, Automated Vehicles, NCTCOG; **Tom Lambert**, President & CEO, Houston METRO; **Terence Fontaine**, Executive Vice President & Chief Innovation Officer, Houston METRO; **Laura Cochran**, Director of Innovation, Houston METRO; **Maureen Crocker**, Special Advisor to Mayor Sylvester Turner, Transportation; **Suzie Edrington**, Director of Performance Measurement and Innovation, VIA; **Vic Boyer**, President & CEO, San Antonio Mobility Coalition, Inc. (SAMCo); **Eddie Valtier**, Director of Transportation, Planning and Development, El Paso District, TxDOT; **Chris Evilia**, Director of Waco MPO, President of TEMPO; **Jen Duthie**, Director, Network Modeling Center, CTR; **Robert Heller**, Program Director, Administration Department, Intelligent Systems Division, SwRI; **Ginger Goodin**, Director, Transportation Policy Research Center, TTI; **Joe Willhite**, Operations Manager, WSP | Parsons Brinckerhoff; **Mario Medina**, Senior Area Manager in Austin, WSP | Parsons Brinckerhoff; **Andrea Gold**, PhD Research Assistant, Cisco, UT Austin; **Kristie Chin**, PhD Research Assistant, UT Austin; **C. Michael Walton**, Ernest H. Cockrell Centennial Chair in Engineering; UT Austin

WebEx Participants

Jeff Pollack, Transportation Planning Director, Corpus Christi MPO; **Gordon Robinson**, Director of Planning, CCRTA; **Maurice Pearl**, General Manager, Vice-Chair Person, Citibus

Distinguished Guests

Mayor Steve Adler, City of Austin; **Council Member Ann Kitchen**, District 5, City of Austin

Opening Remarks – C. Michael Walton

C. Michael Walton welcomed participants and introduced the Texas Technology Task Force (TTTF). He explained the role of TxDOT and the TTTF in supporting the development of a Smart State Consortium.

Distinguished Remarks – Mayor Steve Adler and Council Member Ann Kitchen

Mayor Steve Adler and Council Member Ann Kitchen (District 5) shared their excitement for the Smart City Challenge and offered their support for the development of a Smart State Consortium. They encouraged the development of creative collaborative relationships, community-based solutions, and a willingness of the public sector to embrace innovation.

Introductions – Kristie Chin

Kristie Chin presented the motivation for a Smart State Consortium and shared the three themes that emerged through initial outreach conversations with key transportation leadership. A transportation system of the 21st century requires an approach that is built on community, collaboration, and choice. Milestones include the Texas Mobility Summit on December 1-2, a meeting of key leadership in January, and a meeting at the Texas Transportation Forum in February.

Core Presentations

Rob Spillar, Director, Austin Transportation Department

- A background and overview of the City of Austin's Smart Cities Challenge grant application process was discussed, including key projects, partners, and lessons learned.
- In order to prepare for the transformations that technology will bring, workforce development is a key area of focus to position Texas as a leader in economic growth.
- A Smart State Consortium would offer opportunities to transfer technology; create a living laboratory; entice CAV research, empower big bata, create ladders of opportunity, establish a jobs pipeline, and market the Texas Research Triangle (UT Austin CTR, Texas A&M TTI, and SwRI).

Chris Evilia, Director of Waco MPO, President of TEMPO

- The diversity of Texas was highlighted, including the spectrum of scale and variation in mobility challenges between large and small MPOs.
- Key factors of consideration include staffing, funding, and complexity of community needs. Automation implementation challenges include labor agreements, limited funding, and legal/statutory concerns.
- Waco is faced with a spatial disconnect between residences and centers of employment. Innovative ways to reinvent and extend the public transit system are being explored. Houston METRO recently extended its bus network and offered to share lessons learned with the group.

Darran Anderson, Director of Strategy and Innovation, TxDOT

- A need for greater coordination between state, regional, and local agencies was identified as a way to test emerging technologies and develop integrated solutions.
- TxDOT is broadening its focus to include multimodal as well as ladders of opportunity initiatives and asked for local agencies to offer their direction and guidance.
- TxDOT is open to supporting opportunities that align with the state, regional, and local visions.

Michael Morris, Director of Transportation, NCTCOG

- State, regional, and local agencies need a mechanism with an entrepreneurial capability that can nurture and advance technologies through public-private partnerships.
- Multiple levels of decision makers and leadership will need to be involved in order to support and champion the development of a Smart State Consortium.
- NCTCOG and the City of Austin have indicated financial commitments up to $50k for seed money.

Open Discussion

- Based on the open discussion, the following eight pillars were identified for further consideration and prioritization: 1) Mobility Incubator; 2) Policy, Standards, and Regulations; 3) Knowledge and Technology Transfer; 4) Research and Development; 5) Strategic Planning, 6) Communication and Stakeholder Engagement; 7) Education and Workforce Development; 8) Coordinated Grant Applications.
- It was suggested that no more than 4 pillars be selected at the initial stages, with two being top priority.
- Each city/region was asked to identify their top challenges and priorities, focusing on areas that are transferable and applicable to communities across Texas.
- Technology and innovation are tools to solving real community problems, not ends in and of themselves.
- Rapid deployment should be a goal to ensure that the Consortium is not burdened with bureaucracy.
- Branding should be developed to reflect the values of the Consortium and position Texas as a leader in mobility and innovation. A positive image should be crafted to attract business and increase national visibility.
- A culture of innovation should be instilled to celebrate failures as a means to success through iterative learning.
- The meeting concluded with the agreement to advance the development process of a Smart State Consortium. This will include the Texas Mobility Summit on December 1-2, a meeting of key leadership in January, and a meeting at the Texas Transportation Forum in February.

Next Steps

- Fill out survey to offer feedback on the Smart State Consortium process: https://www.surveymonkey.com/r/NQMTXHP
- Smart State Charter Development
    - October 24-October 28: Prioritize pillars of interest for further consideration
    - October 24-October 28: Propose action items for top-three priority pillars
    - October 31-November 4: Down select based on interest levels and refine action items
    - November 7-November 18: Draft initial charter in preparation for the Texas Mobility Summit
- Texas Mobility Summit Preparation
    - October 24-November 4: Organize and register a team of up to eight participants
    - October 31-November 10: Hold an initial brainstorming meeting where participants identify at least one of each type of challenge:
        1) Low-hanging-fruit that could be used as a quick win to demonstrate success
        2) Longer-term problem that requires more in-depth planning
    - November 7-November 18: Hold a secondary workshop/conference call where participants review outcomes of first meeting and prepare for the Texas Mobility Summit

Smart Austin Mobility

'Smart cities': using technology and data to improve people's lives.

Robert Spillar, P.E.
Director, Austin Transportation Department

Oct. 20, 2016

Background

- **US DOT Smart Cities Challenge competition**
  - **Transportation focused** – prepare for future of automation, big data
  - Designed to propel US cities' technological capabilities
  - Stressed "**Ladders of Opportunity**" for underserved
  - Invited Private sector to collaborate with Public sector
  - Austin one of 7 city finalists from 78 entrants
  - With no award, Austin is creatively designing pilots to move forward

Smart Austin Mobility Programs

Data Rodeo and Urban Analytics
Share open data for live transportation operations, citizen info

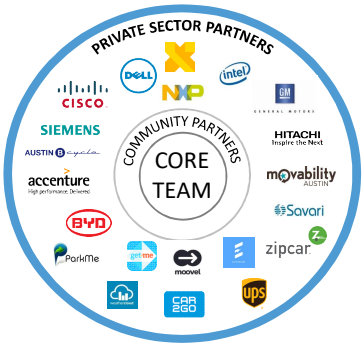
Connected & Automated Vehicles	Packaged Mobility Services	Electric Vehicles
Test CV/AV technologies to increase health, safety and people movement	Seamless Door to door services, payment, alt. to SOV; Ladders of Opportunity	Mobility solution for better air quality, lower TCO

Started with a Regional Core Team

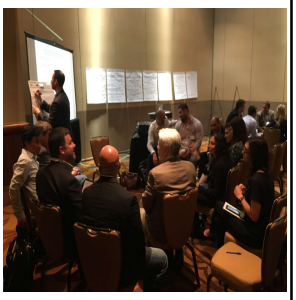
4

Added Community Partners

Invited Private Sector Partners



Public-Private Partner Workshop



Smart City Partnering Workshop - Austin, TX April 27, 2016

Lessons Learned

- Start with a cross functional, inclusive team
  - Seek out talent you don't have
- Identify common vision and goals
- Get leadership behind you early
- Embed community goals and leaders
- Be open to new ideas, ways of doing things
- Focus on adoption and measurable outcomes
- Be clear on your principles
- Dedicate staff

Smart Mobility Big Picture

National:

Funding opportunities:
- USDOT/DOE/NSF/NIST/NHTSA/FAA/FCC…
- Vulcan
- Foundations
- Private Business : Every Telecon, Automotive, technology business in the world – **many with privatization goal**

Cities working collectively:
- Transportation 4 America -
- Metro Labs
- US DOT led effort forming

Think tanks/Associations:
- TRB - Transportation Research Board
- ENO Center for Transportation
- ITS America (Intelligent Transportation Systems)
- ITE – Institute of Transportation Engineers
- RMI – Rocky Mountain Institute
- Vulcan/Electrification Coalition
- Foundations – social good
- Smart Cities Council – industry led

State:
- Smart Mobility Coalition (goals)
  - Cities, private sector, Texas Research Triangle – UT, TTI, SWRI, etc.
  - Clearinghouse for cities and business
  - Eco Development & jobs training
  - Knowledge and Resource Sharing
  - Ladders of Opportunity
  - Influence State, Natl standards

City:
- Regional Austin Smart Mobility **(transportation focused)**
- Key programs:
  - Data Rodeo and Urban Analytics
    - I-35 Corridor
  - Connected & Automated Vehicles
    - Connected Corridor Pilot
  - Packaged Mobility Services
  - Electric Vehicles (Fleets)
- Austin City Up – private non-profit
- SmartAustin.org –startup focus-CapFactory
- Austin Technology Incubator – UT

Smart Texas Opportunity

- **Transfer Technology** : Share knowledge to improve mobility, safety, sustainability and affordability through pilots that are replicable, scalable, and transferable
- **Living Laboratory**: Cities provide testing ground for new services through public/private partnerships
- **Entice AV/CV Research, Technology Dev & Manufacturing:** Attract new business to Texas to match growing population by offering research experts, incentives, regulatory policies, standards and strategies.
  What's our Value Prop? Cut time to market by 50%?
- **Empower Big Data**: Improve operations, public information, investment decisions; layered data provides new opportunities
- **Ladders of Opportunity**: Identify/share what connects people, jobs
- **Jobs Pipeline**: Grow tech skills needed in state with companies, schools
- **Market Texas Research Triangle**: Combine data analytics, applied research and testing expertise of UT, Texas A&M TTI and SWRI

Texas Technology Task Force

Smart State Foundation Meeting
October 20, 2016

Texas Association of MPOs

Texas is a Very Diverse State

- 25 MPO regions
  - Represents 32 census urbanized areas
  - Largest: DFW – 7 million
  - Smallest: Sherman-Denison – 60,000
- Large variation in mobility challenges
  - DFW / Houston / Austin – Congestion
  - Waco / Rio Grande Valley – Poverty / Employment
  - Beaumont / Wichita Falls – Flat Population Growth

Texas Association of MPOs

Texas is a Very Diverse State

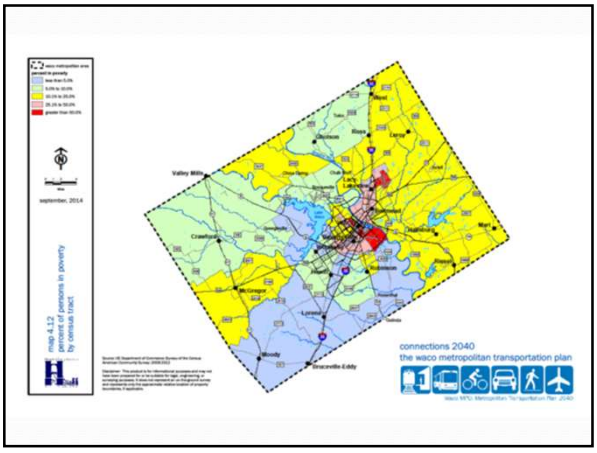
- Transportation Management Areas (TMAs)
  - Urbanized Population > 200,000
  - Access to STP suballocations for large mobility projects
  - More complex mobility challenges
  - Larger staffs
- Non-TMAs (Small MPOs)
  - Limited access to resources
  - Staff < 4
  - Some long range plans focus on maintaining existing services and infrastructure
  - Innovation is a priority as time, money or resources become available

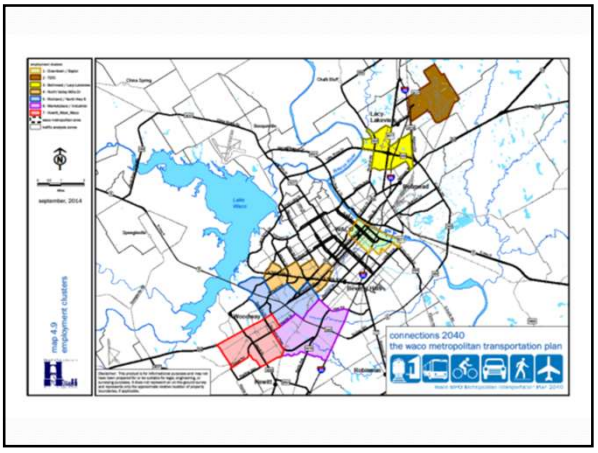
Texas Association of MPOs

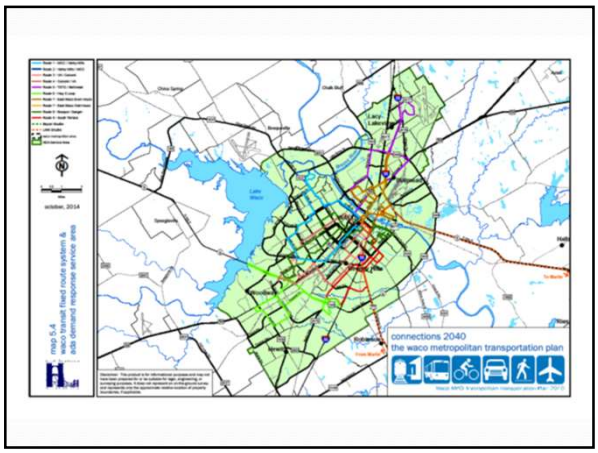
Waco MPO – An example

- One County MPO - McLennan
  - Planning Area – 250,000
  - Urbanized Population – 172,000
  - Staff = 4
- Poverty / Access to Employment major challenge
  - 30% of population below census poverty level
  - Spatial disconnect between low-income census tracts & employment
  - Transit system poorly equipped to address challenge

Texas Association of MPOs



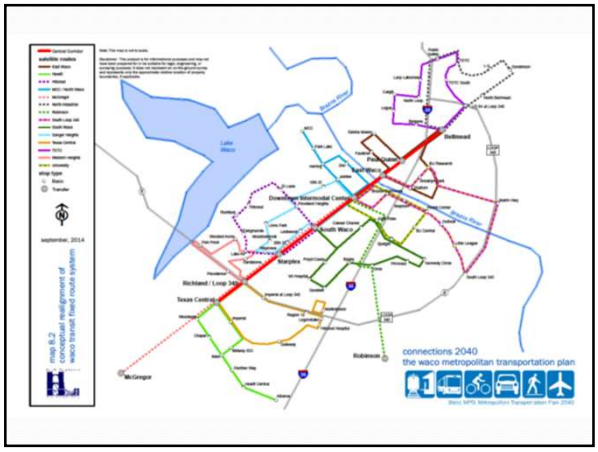




Waco MPO – An example

- Desparate need to reinvent public transportation
  - Federal / State resources have declined each biennium
  - Local resources limited by poor tax base
  - Any additional services must operate using other resources or as result of cost savings elsewhere
- New Concept
  - BRT Core
  - Satellite routes that circulate on 20 minute loops
  - Frequent transfers outside of Downtown
  - Use existing rolling stock to the extent practicable

Texas Association of MPOs



Waco MPO – An example

- New Concept requires significant additional resources
  - $150 to $200 million new capital
  - 30% increase in operational costs
  - Any additional services must operate using other resources or as result of cost savings elsewhere
- Automation?
  - Early implementation should be relatively easy for fixed route transit
  - Generally same routes with same destinations
  - 20 to 30 destinations instead of universe of all possible

Texas Association of MPOs

Waco MPO – An example

- Automation?
  - Implementation Challenges:
    - Labor agreements
    - Limited funding
    - Legal / Statutory
- Next Steps?

Texas Association of MPOs

TEXAS DEPARTMENT OF TRANSPORTATION

TXDOT STRATEGY

Technology and Innovation

20 October 2016

Vision

In the face of rapid growth, changing demographics, congestion and maintenance challenges, and new technology…

How will innovation support delivering mobility, enabling economic opportunity and enhancing quality of life?
How will connected and automated vehicles impact our mission, change how we live, improve safety?
What do we do with internal and external data?
How do we protect privacy and security?
What is our role in smart tech, IoT?
How do we maximize and modernize the current system?
What's going to change in tech and in daily life in the next 20+ years?

…innovation fuels creative and sustainable solutions to customer challenges.

2

Big Picture

- Develop shared innovation and coordination external to TxDOT, we must collaborate to meet our vision, we recognize the growing demands for choice, and it's about customer experience…quality of life for our people
- Develop culture in the department
- Budget development
- Support cities and all other transportation agencies, coordinate efforts, enable with resources where able
- TxDOT technology and innovation strategy
  - Traffic Management Systems and Intelligent Transportation Systems
  - Enterprise Information Management and Data sharing, Enterprise architecture, and coordination with Directorate of Information Resources
  - Setting conditions for connected and automated vehicles (CAV), data analytics, attracting economic, academic and technology development
  - Comprehensive approach: challenge to concept to research/test to implementation approach
    - Texas Technology Task Force
    - Mobility Summit / Smart State Consortium
    - Research and Technology Implementation Division / Federal or other states' research
    - Testing through university triangle, other universities, Rellis campus, or on TxDOT or other state transportation elements infrastructure
    - Implementation through State Transportation Innovation Council (ex: 9 CAV research projects in TxDOT, + 4 related)
  - Communications strategy: TechTalks, SXSW Dell lounge, ITS-America, Interviews,TTTF, engagement with Legislature and Governor's office, STIC inclusion, Mobility summit, Forum,…not as vocal at conferences and national association level
  - Longer range preparedness for multi-modal solutions, changing mobility, changing life and work styles

3

Overview

September	Early October	December 1-2	Forum Early 2017
Organize Key Stakeholders	**Foundation Meeting**	**Texas Mobility Summit**	**Smart State Consortium**
• Public Agencies • Industry Partners • Research Institutions • Political Leadership	• Develop a unified path forward • Organize Team Leads • Prepare for Summit	• Connect and exchange ideas • Build consensus on challenges, goals, and action items • Engage private sector	• Build a network with a unified voice • Leverage resources • Facilitate knowledge and tech transfer

4

2) Foundation Meeting – Early October

Objective: Unite key leadership and develop a clear path forward

Agenda

- Presentations by key leadership
- Discussion on vision, mission, goals, and values
- Development of roadmap

Outcomes: Organization of core leadership around a unified purpose

5

3) Texas Mobility Summit – December 1-2

Objective: Build consensus around common challenges, shared goals, and collaborative action items

Agenda

- Day 1 (Public Sector Focused): Lessons Learned, Idea Exchange, **Leadership Circle**
- Day 2 (Public-Private): 10x10 Presentations, Industry Presentations, **Closing Remarks**

Outcomes: Identify key priorities for the state to approach collectively,
Generate the momentum needed to launch the Smart State Consortium

6

4) Smart State Consortium – Early 2017 (before Forum)

Objective: Serve Texans by creating a platform for tackling mobility challenges through innovative solutions

Goals

- **Unified Voice**: Develop a Texas innovation and technology strategy
- **Leverage Resources**: Maximize return on investment and drive economic development
- **Facilitate Knowledge and Technology Transfer:** Synthesize best practices

Outcomes: Economies of scale
Economies of process
Economies of information

SMART TRANSPORTATION STATE

Michael Morris, P.E.
Tom Bamonte
North Central Texas Council of Governments

October 20, 2016

Vision for "Smart" State

Innovation at all levels and regions

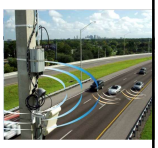
Open communication among members

Mutual support - everyone wins when any one succeeds

Shared accomplishments - build on an early success

Private sector engagement key (e.g., jobs, analytics, technology)

At stake is long-term economic success of State



2

Who's Involved? Quilt of Modes/Levels

Major transportation modes
- Ports
- Freight
- Highways
- Rail
- Air

Multiple levels
- State - e.g., TxDOT
- Regional - e.g., MPOs
- Local - e.g., cities, transit, ports, authorities
- Private sector

3

Funding/Organization

Funding
- Seed money from each participant
- NCTCOG pledging $50K

Organization
- Informal Intergovernmental cooperation initially with Austin as foundation
- More formal arrangement if necessary in future
- Activities drive organizational structure not vice-versa
- Likely sold as IPO

Outreach/Inclusion Initial Member
- Private sector
- Research institutions
- Other

4

Start With A Statewide Success Story (Example)

Project: Texas joins Waze's Connected Citizens Program

What: Transportation data sharing b/w Waze and public sector
- Public sector: Contributes its road closure info.
- Waze: Contributes its roadway incident and traffic jam info.

How: TxDOT covers state highways; MPOs cover local roads

Purpose: Shared data improves travel navigation services; helps roadway/incident management

Benefits: Public safety; improved efficiency; favorable publicity

Opportunity: TX = first full state commitment to CCP/data sharing

5

Build On Early Success To Lay Foundation For Automated Vehicles

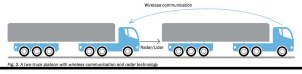
Work together on early deployments and pilots

Build data sharing alliances w/other 3d parties—e.g., mapping firms

Attract automated vehicle test deployments
- High speed/low speed environments
- Platooning

Highlight Texas AV innovation
- SWRI (military)
- TTI (freight shuttle)
- TxDOT (truck platooning)

Shared message: Texas open for testing/deployment



6

Appendix C: Texas Mobility Summit Program

PROGRAM

Hilton Austin Hotel | Austin, TX | December 1-2

OPEN FOR INNOVATION | INNOVATE · DEVELOP · NETWORK

TABLE OF CONTENTS

TEXAS MOBILITY SUMMIT

As the Chair of the Texas Department of Transportation's Texas Technology Task Force, I want to invite you to join the conversation initiated with the USDOT's Smart City Challenge. Your leadership will contribute to the development of an innovation and technology strategy designed to move Texas mobility forward. In the spirit of collaboration, you are invited to participate in the organization and foundation of the Texas Mobility Consortium for advancing technology and fostering economic development. You will join other city/regional teams from across Texas, community partners, and industry leaders in the planning process leading up to the Texas Mobility Summit in Austin on December 1 & 2, 2016.

Centered on community, innovation, and serving Texans, the creation of the Consortium will signal to industry and constituents that Texas is not only open for business but also open for innovation. By coordinating investments for the state, the Consortium will offer public agencies a mechanism for deploying innovative pilot solutions across jurisdictional silos and leveraging funds through public/private partnerships. Furthermore, industry partners will have the opportunity to develop precompetitive technologies in a living laboratory environment. Ultimately, Texas communities will benefit from a higher value of mobility, connectivity, and economic advantages in return for investing in innovation. Key outcomes of the Consortium will include:

- **Building a Network** – Interdisciplinary leadership collaborate to create an agenda for action, broker shared challenges with outcome-driven solutions, and strengthen the ability for Texas to compete for federal funding.
- **Leveraging Resources** – Maximize return on investment by providing collective purchasing, building vendor relationships, and mitigating risk.
- **Facilitating Knowledge and Technology Transfer** – Partners work together to ensure that pilots are replicable, scalable, and transferable to other communities.

Your team will have the opportunity to exchange ideas with other transportation leaders, connect with industry, and create a unique value proposition for the State of Texas. Please respond to this letter with your interest to participate or another representative who will lead your team. Thank you and we look forward to this opportunity for Texas communities to unite in innovation!

Regards,

C. Michael Walton, P.E.
Cockrell Centennial Chair of Engineering
The University of Texas at Austin
Chair, Texas Technology Task Force

Darran Anderson
Director of Strategy & Innovation
Texas Department of Transportation

SCHEDULE OF EVENTS

Hilton Austin Hotel | Austin, TX | December 1-2

DAY 1: MOVING TEXAS FORWARD

8:00AM BREAKFAST

9:00AM Welcome & Introductions Opening Remarks
- C. Michael Walton – Cockrell Centennial Chair in Engineering, University of Texas at Austin
  Shelley Row – President & CEO, Shelley Row Associates
  Darran Anderson – Director of Strategy & Innovation, TxDOT

9:30AM Opening Remarks
- James Bass – Executive Director, TxDOT
  Mayor Steve Adler, City of Austin (by video)

9:45AM BREAK

10:00AM Lessons Learned from the USDOT Smart City Challenge
- **Moderator:** Shelley Row – President & CEO, Shelley Row Associates
  Mark Dowd – Senior Advisor, Office of Management & Budget
  Rob Spillar – Director, City of Austin Transportation Department
  Katie Ott Zehnder – Ohio Office Leader, Vice President, HNTB
  Jason Pavluchuk – President, Pavluchuk & Associates

11:15AM BREAK

11:30PM Idea Exchange: Challenges, Goals, & Applications
- Participants interact with each other – discussing short - and long - term challenges; aligning local, regional, and state goals; and identifying technology applications, including user groups and outcomes..

12:45PM LUNCH
- Keynote: Joseph Kopser – President, moovel Global

1:30PM Team Time: Project Development
- Participants either a) brainstorm and prioritize a list of innovative pilot projects, or b) perform a deep - dive on one particular project – discussing user groups, technological needs, major milestones, and timeline of implementation.

2:30PM BREAK

2:45PM Team Time: Consortium Priority Activities
- Participants identify and prioritize the critical pillars of activity for the Smart State Consortium, including recommendations for initial projects.

3:45PM Report Out
- Teams summarize lessons learned from Day 1 and suggest ways to advance the creation of a Smart State Consortium.

4:00PM Closing Remarks
- Michael Morris – Director of Transportation, NCTCOG
  Darran Anderson – Director of Strategy & Innovation, TxDOT

4:15PM BREAK

4:30PM Leadership Team Meeting
- **Facilitator:** Shelley Row – President & CEO, Shelley Row Associates
  Team leads and selected representatives work together to build consensus around common challenges, shared goals, and collaborative action items that will form the basis of the Texas Innovation Charter used to guide the activities of the Smart State Consortium.

6:00PM Networking Event – Open to All
- Participants have the opportunity to connect with one another.

DAY 2: INTERACTIVE

7:00AM BREAKFAST

8:00AM Opening Remarks
- Tom Lambert – President & CEO, Houston METRO
  Chairman Joe C. Pickett – Chairman of the House Committee on Transportation

8:30AM Open for Innovation: Moving Texas Forward
- **Moderator:** Evan Smith – CEO & Co-Founder, The Texas Tribune
  Mayor Ivy Taylor, City of San Antonio
  Mayor Oscar Leeser, City of El Paso
  Mayor Jeff Williams, City of Arlington
  Mayor Betsy Price, City of Fort Worth

9:30AM BREAK

9:45AM Call for Ideas: Team Presentations Part I
- The first set of teams present their vision for an innovative mobility system with Q&A to follow.

10:45AM BREAK

11:00AM Call for Ideas: Team Presentations Part II
- The second set of teams present their vision for an innovative mobility system with Q&A to follow.

12:00PM LUNCH

1:00PM Breakouts Sessions
- Panels of thought leaders share their insights into a transformative topic. Following, participants work in small groups to define problem statements or policy areas that will be used to inform the direction of the Leadership Team.
  Group 1: Shared Mobility
  Group 2: Connected & Automated Vehicles
  Group 3: Freight & Logistics
  Group 4: Energy

2:30PM BREAK

2:45PM What Can Big Data Do for Texas Mobility?
- Moderator: JD Stanley – Director, Analytics, Strategy, & Incubation, Cisco
  Paige Fitzgerald – Program Manager, Connected Citizen Program, Waze
  Monali Shah – Director of Global Intelligent Transportation, HERE
  Ted Trepanier – Director Product Management, Traffic, INRIX
  Doug Couto – Senior Fellow, Center for Digital Government

3:45PM BREAK

4:00PM The Path Forward: Identifying Common Challenges, Shared Goals, and Collaborative Action Items
- **Facilitators:** Joe Willhite – Operations MGR, WSP | Parsons Brinckerhoff, Jason JonMichael – NTL Tech Leader, HNTB Based on the activities from the Summit, participants coalesce around a common set of themes and priorities. Initiatives for the leadership team are identified to advance the creation of the Smart State Consortium.

4:45PM Closing Remarks
- Darran Anderson – Director of Strategy & Innovation, TxDOT

5:00PM ADJOURN

SCHEDULE OF EVENTS

DAY 1: MOVING TEXAS FORWARD

8:00 AM Breakfast – *Ballroom F*

9:00 AM Welcome & Introductions – *Ballroom G*

C. Michael Walton – Cockrell Centennial Chair in Engineering, University of Texas at Austin
Shelley Row – President & CEO, Shelley Row Associates, former Director of the USDOT ITS JPO
Darran Anderson – Director of Strategy & Innovation, TxDOT

9:30 AM Opening Remarks – *Ballroom G*

James Bass – Executive Director, TxDOT
Mayor Steve Adler, City of Austin (by video)

9:45 AM Break

10:00 AM Lessons Learned from the USDOT Smart City Challenge – *Ballroom G*

Moderator: Shelley Row – President & CEO, Shelley Row Associates, former Director of the USDOT ITS JPO

This panel will discuss the lessons learned from the Smart Cities Challenge as well as share insights from other Smart Cities initiatives. Key topics will include industry engagement, funding challenges, and community inclusion. Panelists will offer their thoughts on critical success factors for starting new programs and sustaining momentum.

Mark Dowd – Senior Advisor, Office of Management & Budget
Rob Spillar – Director, City of Austin Transportation Department
Katie Ott Zehnder – Ohio Office Leader, Vice President, HNTB
Jason Pavluchuk – President, Pavluchuk & Associates

11:15 AM Break

11:30 AM Idea Exchange: Challenges, Goals, & Applications – *Ballroom G*

Teams interact with other teams – discussing short- and long-term challenges; aligning local regional, and state goals; and identifying technology applications, including user groups and outcomes.

Industry Representatives interact with teams – listening to the team members discuss their challenges and needs, offering solutions and knowledge of case studies as appropriate.

Individual Participants work in small groups – discussing their short- and long-term challenges; aligning local, regional, and state goals; and identifying technology applications, including user groups and outcomes.

Each team reports out the discussion highlights and all group results are captured.

12:45 PM Lunch Keynote: Joseph Kopser – President, moovel Global

This keynote presentation will discuss how public agencies can anticipate and prepare for technological transformations. Entrepreneurial experience will demonstrate how principles from startup culture can be applied to public agency processes. The talk will conclude with recommendations for operating in a multistakeholder environment in order to collaborate in a way that best serves community needs.

SCHEDULE OF EVENTS

DAY 1: MOVING TEXAS FORWARD

1:30 PM Team Time: Project Development – *Ballroom G*

Teams work independently – either a) brainstorming and prioritizing a list of innovative pilot projects, or b) performing a deep-dive on one particular project – discussing user groups, technological needs, major milestones, and timeline of implementation.

Industry Representatives are paired to work with a team – assisting in the development of pilot projects, including user groups, technological needs, major milestones, and timeline of implementation.

Individual Participants work in small groups – brainstorming and prioritizing a list of innovative pilot projects for Texas.

Each team and industry group report out the discussion highlights. All group results are captured.

2:30 PM Break

2:45 PM Team Time: Consortium Priority Activities – *Ballroom G*

Teams work independently – identifying and prioritizing the critical pillars of activity for the Smart State Consortium, including recommendations for pilot projects.

Industry Representatives work in industry groups – discussing barriers to doing business with the public sector, prioritizing activities for the Smart State Consortium, and identifying opportunities for partnering with Texas.

Individual Participants work in small groups – brainstorming and prioritizing pillars of activity for the Smart State Consortium, including recommendations for pilot projects.

Each team reports out the discussion highlights and all group results are captured.

3:45 PM Report Out – *Ballroom G*

Teams summarize lessons learned from Day 1 and suggest ways to advance the creation of a Smart State Consortium.

4:00 PM Closing Remarks – *Ballroom G*

Michael Morris – Director of Transportation, NCTCOG
Darran Anderson – Director of Strategy & Innovation, TxDOT

4:15 PM Break

4:30 PM Leadership Team Meeting – *Room 602*

Moderator: Shelley Row – President & CEO, Shelley Row Associates, former Director of the USDOT ITS JPO

Team leads and selected representatives will work together to build consensus around common challenges, shared goals, and collaborative action items that will form the basis of the Texas Innovation Charter used to guide the activities of the Smart State Consortium.

6:00 PM Networking Event – Open to All

Participants have the opportunity to connect with one another.

SCHEDULE OF EVENTS

DAY 2: INTERACTIVE

7:00 AM Breakfast – *Ballroom F*

8:00 AM Opening Remarks – *Ballroom G*

Tom Lambert – President & CEO, Houston METRO
Chairman Joe C. Pickett – Texas Representative District 79, Chairman of the House Committee on Transportation

8:30 AM Open for Innovation: Moving Texas Forward – *Ballroom G*

Moderator: Evan Smith – CEO & Co-Founder, The Texas Tribune

This panel will discuss how public agencies can take a leadership role in embracing innovation. Key topics will include local mobility challenges, community needs, and opportunities for technology to drive economic development. Panelists will share their visions for an integrated statewide mobility system and encourage collaboration among public agencies, industry, and research institutions.

Mayor Ivy Taylor, City of San Antonio
Mayor Oscar Leeser, City of El Paso
Mayor Jeff Williams, City of Arlington
Mayor Betsy Price, City of Fort Worth

9:30 AM Break

9:45 AM Call for Ideas: Team Presentations Part I – *Ballroom G*

The first set of teams present their vision for an innovative mobility system with Q&A to follow.

10:45 AM Break

11:00 AM Call for Ideas: Team Presentations Part II – *Ballroom G*

The second set of teams present their vision for an innovative mobility system with Q&A to follow.

12:00 PM Lunch

SCHEDULE OF EVENTS
DAY 2: INTERACTIVE

1:00 PM Breakout Sessions

Panels of thought leaders share their insights into a transformative topic. Following, participants work in small groups to define problem statements and/or policy areas that will be used to inform the direction of the Leadership Team.

Breakout Session 1: Shared Mobility – *Ballroom G*

Moderator: Tom Lambert – President & CEO, Houston METRO

This panel will discuss how to introduce alternative travel options to users in a shared economy to provide convenience and choice. Topics include policy and regulatory challenges, evolving cultural trends, and first-and last-mile solutions to complement public transit services. Speakers will highlight benefits these services can and discuss application for urban contexts.

April Mims – Public Policy Manager, Lyft
Jon McBride – Operations Director, Bridj
Paul Steinberg – Chief Business Officer, Carma
Elliott McFadden – Executive Director, Austin B-Cycle

Breakout Session 2: Connected and Automated Vehicles – *Room 602*

Moderator: Jason JonMichael – National Technology Leader, HNTB

This panel will present benefits and barriers to deploying connected and automated vehicles. Key topics include technology maturity, public readiness, and vehicle-to-infrastructure and vehicle-to-vehicle applications. It will address how public agencies can prepare for these technologies and anticipate privacy, security, and liability concerns.

Mike Brown – Institute Engineer, SwRI
Peter Sweatman – Co-Founder, CAVita
Jeff Arch – Transportation Program Manager, Battelle

Breakout Session 3: Freight and Logistics – *Room 616A*

Moderator: Harry Voccola – Execurive Advisor, HERE

This panel will discuss how emerging technologies can support economic growth and development of the state. Key topics include long-haul freight technologies, international trade and port operations, and parking. Speakers will help public agencies anticipate the increase in commercial freight traffic from e-commerce and other influences.

Rick Warner – Chief Executive Officer, Truck Smart Parking Services
Paula Dowell – Principal & Director, Economics, Cambridge Systematics
Steve Boyd – Co-Founder/VP External Affairs, Peloton Technology

Breakout Session 4: Energy – *Room 616B*

Moderator: Joe Willhite – Operations Manager, WSP | Parsons Brinckerhoff

This panel will discuss how alternative energies can support efficiencies and sustainability goals. Key topics include electric vehicle charging infrastructure, multimodal applications, and consumer adoption. Speakers will address how local priorities can align with federal programs to support more energy efficient transportation system.

Karl Popham – Electric Vehicles & Emerging Technologies Manager, Austin Energy
Nicole Zinn – Owner, Rocket Electrics
Alan Westenskow – Director of Business Development, Proterra

SCHEDULE OF EVENTS
DAY 2: INTERACTIVE

2:45 PM What Can Big Data Do for Texas Mobility? – *Ballroom G*

Moderator: JD Stanley – Global Director of Strategy & Integrated Solutions, Data & Analytics Business Unit, Cisco

This panel will focus on the challenges and opportunities that big data presents to mobility. Key topics include data solutions for freight and logistics, application from connected and autonomous vehicles, crowdsourcing and navigation, and policies and outlook on civic open data. Speakers will discuss how public agencies and industry can collaborate to establish a data ecosystem that provides real-time traveler information and benefits to users.

Paige Fitzgerald – Manager of the Connected Citizens Data Exchange Program, Waze
Monali Shah – Director of Global Intelligent Transportation, HERE
Doug Couto – Senior Fellow, Center for Digital Government
Ted Trepanier – Director of Product Management, Traffic, INRIX

3:45 PM Break

4:00 PM The Path Forward: Common Challenges, Shared Goals, and Collaborative Action Items – *Ballroom G*

Facilitators: Joe Willhite – Operations MGR, WSP | Parsons Brinckerhoff, Jason JonMichael – NTL Tech Leader, HNTB
Based on the activities from the Summit, participants coalesce around a common set of themes and priorities. Initiatives for the leadership team are identified to advance the creation of the Smart State Consortium.

4:45 PM Closing Remarks – *Ballroom G*

Darran Anderson – Director of Strategy & Innovation, TxDOT

5:00 PM Adjourn

KEY SPEAKERS
DAY 1: MOVING TEXAS FORWARD

9:30 AM Opening Remarks – *Ballroom G*

JAMES BASS – Executive Director, TxDOT
James M. Bass serves as executive director of the Texas Department of Transportation. Previously he oversaw TxDOT's Financial Management Division, Toll Operations Division, and Project Finance and Debt Management Division. Bass began his TxDOT career in 1985 working summers in the Fort Worth District. He worked part-time as an engineering aide in the Austin District's South Travis/Hays County Area Office while earning his bachelor's degree in accounting at the University of Texas at Austin. After graduation, Bass began full-time as an accounting clerk in the Finance Division's Revenue Accounting Section, and later was promoted to budget analyst in the Budget and Forecasting Section. Since then, Bass has worked extensively on preparation of TxDOT's Legislative Appropriations Requests, Operating Budgets and Cash Forecasting System. He also works on the agency's public-private partnerships and corresponds with the Legislative Budget Board, State Auditor's Office and the Office of the Texas Comptroller. Bass was selected as finance division director in November 1999, and became chief financial officer in 2005. He became executive director in 2016. He and his wife, Patty, have a son and a daughter.

MAYOR STEVE ADLER – City of Austin (by video)
Steve Adler was elected Austin's 52nd Mayor in December 2014, and looks forward to doing big things to improve the quality of life for everyone in Austin. As the Mayor of this historic first new 10-1 Council, Mayor Adler plans to lead Austin's government to a new level of inclusive civic engagement between residents and their elected officials. Mayor Adler, along with his brother, were the first in their family to graduate from college. After completing his undergraduate studies at Princeton, Mayor Adler moved to Austin to work his way through law school at The University of Texas. Like many others, he fell in love with Austin and has made it his home for nearly four decades. Mayor Adler practiced civil rights law for many years, and later founded a successful eminent domain law practice representing landowners. Mayor Adler also served nearly ten years as Chief of Staff and General Counsel for Texas State Senator Eliot Shapleigh, working primarily on school finance, equity and access issues. Mayor Adler has been deeply involved with, and has chaired, many Austin civic and non-profit institutions over the past twenty years. Together with his wife, Diane Land, Mayor Adler is the proud parent of three wonderful daughters.

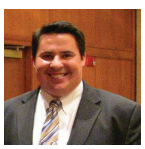
KEY SPEAKERS
DAY 1: MOVING TEXAS FORWARD

10:00 AM Lessons Learned from the USDOT Smart City Challenge – *Ballroom G*

MARK DOWD – Senior Advisor, Office of Management & Budget
Broad experience in policy development and implementation related to technology, transportation, smart cities, public-private partnerships, energy, and environmental issues. Responsible for creating and executing the groundbreaking Smart City Challenge, that changed the way cities use technology and innovation to drive change and solve problems related to mobility, and demonstrated the power of public-private partnerships by raising close to $500 million in additional funding from the private sector. Strong understanding of cities and the way they view technology as way to change outcomes. Legal experience in transactions, restructuring, litigation and regulatory matters as it relates to transportation, environmental, and energy issues. Excels in understanding the impacts of science and technology on business and policy.

ROB SPILLAR – Director, City of Austin Transportation Department
Currently serves as the City of Austin Transportation Director and is responsible for the City's multi-modal transportation portfolio, including rail planning, traffic engineering and operations, parking enterprise, right-of-way permitting, and special events management. Prior to the City of Austin, Spillar served as Vice President with Parsons Brinckerhoff and as the Director of Traffic Management for the City of Seattle. Robert holds a Bachelor and Master's of Civil Engineering from the Universities of Texas and Washington respectively. In 1995 he was named as a William Barclay Parsons Fellow publishing a national guideline on Park-and-Ride Planning and Design, a publication that has been adopted by the American Association of Highway and Transportation Officials (AASHTO) as part of their current park-and-ride planning and design guidelines.

KATIE OTT ZEHNDER – Ohio Office Leader, Vice President, HNTB
Katherine Zehnder leads HNTB's Ohio practice and oversees staff in their Cleveland, Columbus and Cincinnati offices. Katie moved to Ohio to join HNTB after graduating with honors in civil engineering from Union College, Schenectady, NY in 1998. She received an MBA in Management Information Systems from Case Western Reserve University and has since managed successively larger office teams and projects across Ohio and the Midwest. She was recognized as a 2015 Rising Star in Civil + Structural Engineering. Katie lives in Westerville, Ohio with her husband Don, a synthetic organic chemist with Battelle, and her feisty 4-year old Ashley Marie.



JASON PAVLUCHUK – President, Pavluchuk & Associates
Jason Pavluchuk is the founder of Pavluchuk & Associates, a Washington DC based Transportation Policy & Government Affairs firm. Mr. Pavluchuk is a political tactician renowned for developing successful legislative strategies for both funding and policy issues and has published numerous studies on the tactics of interest groups in legislative politics. Mr. Pavluchuk has spent over fifteen years working in a variety of transportation fields including transit, TDM, ITS, and mobility on demand. In addition to direct advocacy services, Pavluchuk & Associates offers its clients assistance developing & understanding policy initiatives, conducting research, and general business development. Jason is a proud graduate of The George Washington University.

KEY SPEAKERS
DAY 1: MOVING TEXAS FORWARD

12:45 PM Lunch Keynote – *Ballroom G*

JOSEPH KOPSER – President, moovel Global
As global president, Joseph is responsible for shaping and communicating moovel's vision, mission and overall strategy on a global level. moovel Group GmbH was founded by Daimler AG, the maker of Mercedes-Benz, with the global mission to find solutions for the disconnected and ever-changing state of urban transportation and to discover how new technologies will affect the way we'll move tomorrow. Prior to moovel, Joseph co-founded RideScout, an Austin-based technology company that enabled seamless multimodal experiences and connected transit commerce to app users worldwide, where he served as CEO. Through his work at RideScout, Joseph earned the 2014 U.S. DOT Data Innovation Award as well as recognition as a White House Champion of Change as a Veteran in Clean Energy. Before his move to transportation technology, Joseph served in the Army for 20 years earning the Combat Action Badge, Army Ranger Tab and Bronze Star. Joseph is a graduate of West Point with a BS in Aerospace Engineering and also received a Masters from the Harvard Kennedy School in 2002. In his free time, he works closely with The Bunker Labs in Austin, an organization dedicated to supporting veteran entrepreneurs. In addition, he volunteers as Chairman of NSTXL working to improve U.S. Energy Security policy. He lives in Austin with his wife and three daughters.

KEY SPEAKERS
DAY 2: INTERACTIVE

8:00 AM Opening Remarks – *Ballroom G*

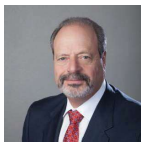
CHAIRMAN JOE C. PICKETT – Chairman, House Committee on Transportation
Joe C. Pickett is a member of the Texas House of Representatives, where he is presently serving his eleventh term. Rep. Pickett is serving as Chairman of the House Committee on Transportation. Representative Pickett served on the National Board of Directors of the American Metropolitan Planning Organization (AMPO). He has served several terms as Chairman of the El Paso Metropolitan Planning Organization (MPO). In addition, he served between the 81st and 82nd sessions on the Texas Transportation Council in Austin, a non-partisan and independent forum to research, organize, and promote a new direction for transportation that is based upon transparency, accountability and efficiency in order to improve mobility and restore public faith in the management of our state's transportation infrastructure. Representative Pickett is a proud father of four children, three girls and a boy.

8:30 AM Open for Innovation: Moving Texas Forward – *Ballroom G*

EVAN SMITH – CEO & Co-Founder, The Texas Tribune
Evan Smith is the CEO and co-founder of The Texas Tribune, a nonprofit, nonpartisan digital news organization recently called "one of the nonprofit news sector's runaway success stories." The Tribune's deep coverage of Texas politics and public policy can be found at its website, texastribune.org, in newspapers and on TV and radio stations across the state, and in the print and online editions of the Washington Post. Since its launch in 2009, the Tribune has won international acclaim and numerous honors, including nine national Edward R. Murrow Awards from the Radio Television Digital News Association and three general excellence awards from the Online News Association. Previously Evan spent nearly 18 years at Texas Monthly, including eight years as Editor and a year as President and Editor-in-Chief.

MAYOR IVY TAYLOR – City of San Antonio
Ivy R. Taylor was elected Mayor of San Antonio on June 13, 2015. Prior to her election, she earned an appointment to the seat from her City Council colleagues in July 2014, making her the first African American woman to serve as mayor of a city with more than one million people and only the second female mayor of San Antonio. Before becoming mayor, she served on City Council for five years. Mayor Taylor is focused on making San Antonio a globally competitive city where all residents are connected to opportunities for prosperity. To achieve this, some of the mayor's initiatives include developing a sustainable city budget, implementing the Comprehensive Master Plan, creating a job-friendly environment, growing the workforce, investing in human capital, establishing affordable and livable communities and building and maintaining basic infrastructure.

KEY SPEAKERS
DAY 2: INTERACTIVE



MAYOR OSCAR LEESER – City of El Paso
Oscar Leeser is the 53rd Mayor of the great City of El Paso. He was born in Chihuahua, Mexico, where later his family relocated to the Sun City when Oscar was nine years old. In 1979, Oscar began his career in the auto industry, working with several dealerships in El Paso. His most notable career opportunity came in 2001, when Oscar became president and dealer operator of Hyundai of El Paso. Oscar currently serves as a member of the UMC El Paso Children's Hospital Foundation Board and also holds several professional positions as well. He is the President of the Hyundai South Central Region, a member of the National Dealer Council, serves on the National Parts and Service Committee, and the Hyundai Advertising Committee. In addition, Oscar actively supports many local charities and youth organizations. Oscar has been married for over 30 years to his childhood sweetheart, Lisa; they have four children and five grandchildren.

MAYOR JEFF WILLIAMS – City of Arlington
Jeff Williams was elected to the office of Mayor of the City of Arlington in May 2015 after decades of public service in Arlington. Mayor Williams is president of Arlington based Graham Associates, Inc. He has worked on a host of Arlington-based projects, including: AT&T Stadium and the I.H. 30 Three Bridges Project. In 2009, Williams was presented with the State of Texas Outstanding Civil Engineering Achievement Award. During his 30 years in Arlington, Williams has been heavily involved in the community. His approach to leadership is inclusive and built on a foundation of finding consensus. In 2014, Williams served on the City of Arlington's Comprehensive Planning Committee. Mayor Williams has held leadership and volunteer roles in a variety of Arlington organizations including the Chamber of Commerce, YMCA, PTA, Salvation Army, Mission Arlington and River Legacy Foundation. His community service has been recognized with the Vandergriff Community Leadership Award. A graduate of Texas Tech University with a degree in civil engineering, Williams was inducted into the university's Civil Engineering Academy for Engineering Excellence.

MAYOR BETSY PRICE – City of Fort Worth
Betsy Price, a Fort Worth native, was elected in 2011 as the 44th mayor of the City of Fort Worth. In 2015, Price ran unopposed and was re-elected to a third two-year term. As the 16th largest city in the United States, Fort Worth remains one of the fastest growing large cities in the country. Along with her focus on promoting jobs, strengthening education, fighting crime and improving mobility, Price has made significant strides along the path toward her vision of a healthy, engaged and fiscally responsible city. Instead of sitting in cars, on the couch or in the office, Price believes in a community that naturally promotes physical activity throughout the day. During her first term, Price led a community effort to build a city that's more fit, happy and productive. The result was FitWorth, a citywide initiative focused on promoting active lifestyles and healthy habits in both kids and adults. She has been married to Tom, an insurance agent, for more than 40 years and has three children, Kathryn, Phillip and Paul. In her spare time, Price is an avid cyclist and enjoys spending quality time with her three grandsons.

KEY SPEAKERS
DAY 2: INTERACTIVE

1:00 PM Breakout Session 1: Shared Mobility – *Ballroom G*

APRIL MIMS – Public Policy Manager, Lyft
April is a Senior Public Policy Manager at Lyft who has managed successful campaigns on behalf of the company in Texas, Oklahoma, Florida and Virginia. April's background is in the non-profit sector, and she was attracted to Lyft because of its strong corporate values and its mission to build a national movement for ridesharing. She began her career as the first Allstate fellow for a transportation policy organization, and has built her career supporting smart growth initiatives, including improving mobility options for communities of color. April has participated in various shared economy panels and public hearings throughout the United States. She is a licensed New York attorney with a J.D. from the Georgetown University Law Center.

JON MCBRIDE – Operations Director, Bridj
Jon McBride has been with Bridj since the company was founded. He is currently focused on developing strategic partnerships and leading expansion projects. Previously, he worked in Los Angeles as the Operations Manager for Three18, a leading provider of technology consulting services and in multiple capacities managing film & television music production.

PAUL STEINBERG – Chief Business Officer, Carma
As Chief Business Officer for Carma, Paul Steinberg is responsible for Government Relations, Sales and Business Development. Paul is nationally recognized thought leader for shared mobility known as "Captain Carpool" and seen on leading media channels. Paul is a native Texas educated at the University of Texas in Austin (Computer Science), and Stanford University (Marketing) in Palo Alto.

ELLIOTT MCFADDEN – Executive Director, Austin B-Cycle
Elliott McFadden has been the Executive Director of Austin B-cycle, the popular bike share system, since it launched in downtown Austin in December 2013, growing the system from 11 stations with 100 bikes to 50 stations and 400 bikes. He is a bike share industry leader, serving on the board of the North American Bike Share Association and as an inaugural member of BCycle's Operator Advisory Group. Elliott is a 24 year resident of Austin and social entrepreneur who has working in both business startup and non-profit ventures to make Austin a better place to live. He was the founder of Austin CarShare, the first carshare service in Texas and a precursor to Car2Go and Zipcar, and managed the successful campaigns to create the Travis County Hospital District in 2004 and pass $65 million in bond funding for affordable housing in 2013. Under Elliott's leadership, Austin B-cycle doubled first year projected rider usage and sales, won the Downtown Austin Neighborhood Association's "Urban Light" Award, and set a national bike share system record for most checkouts per bike/day during the 2014 SXSW Festival.

KEY SPEAKERS
DAY 2: INTERACTIVE

1:00 PM Breakout Session 2: Connected & Automated Vehicles – *Room 602*

MIKE BROWN – Institute Engineer, SwRI
Mike Brown is a Staff Engineer with Southwest Research Institute and has been a leader in the research and development of intelligent systems for over eighteen years. He has served various federal, state, and commercial clients in projects spanning the areas of Advanced Traffic Management and Traveler Information Systems, Commercial Vehicles, Connected Vehicles, and Vehicle Automation. Mike recently led the development of a fully automated vehicle, which assumes the most dangerous roles in stationary or rolling work zones, while using connected-vehicle technology to allow maintenance vehicles to communicate with each other, other vehicles, the work crew, and the roadside infrastructure.

JEFF ARCH – Transportation Program Manager, Battelle
Jeffrey Arch (M.S.C., P.E.) joined Battelle in 2016 and currently serves as a Transportation Program Manager. He brings more than 30 years of traffic and transportation systems engineering and management experience to his position. Prior to joining Battelle, he served as an Associate Vice President and Regional Manager for TransCore ITS, where he led large-scale projects for the ITS Solutions and ITS Construction business line segments in the mid-Atlantic and northeastern regions. In this position, he was the principal-in-charge for the City of Pittsburgh Traffic Signal Systems Upgrade, the NYC Connected Vehicle Pilot Deployment Project, and numerous other projects for large municipalities in the eastern U.S. and Canada. He has also held a variety of transportation management and engineering positions for Open Road Consulting, Intelligent Infrastructure Systems and Telvent Farradyne. He has extensive experience in project management, traffic engineering and transportation planning for large projects including connected vehicle applications.

PETER SWEATMAN – Co-Founder, CAVita
Peter Sweatman is a cofounding principal of CAVita and has over 30 years of experience in transportation research and innovation, and the application of R&D. That experience encompasses vehicles, drivers, and infrastructure and impinges on technology, policy, and strategic planning. He is a trusted national voice on safety, ITS, transportation research and education, connected and automated vehicles, and freight technology and policy. His professional experience covers private industry, academia, and government. He has worked extensively in Europe and Asia-Pacific as well as the United States. Dr. Sweatman is a past chairman of the board of ITS America, and also served as founding chair of the ITS America Leadership Circle. He served on the U.S. Department of Transport's ITS Advisory Committee, as well as a number of roles with the Society of Automotive Engineers. At Transportation Research Board, he chaired the recent EU-US Symposium Towards Road Transport Automation, and served on the Committee on National Research Frameworks: Application to Transportation. He is currently working with the industrial consortium Together for Safer Roads. He served as director of the University of Michigan Transportation Research Institute (UMTRI) from 2004 to 2015, and founded the Michigan Mobility Transformation Center (MTC) in 2013 and was the director of the MTC until January 2016.

KEY SPEAKERS
DAY 2: INTERACTIVE

1:00 PM Breakout Session 3: Freight & Logistics – *Room 616A*

RICK WARNER – Chief Executive Officer, Truck Smart Parking Services
Rick has successfully founded and grown several business. As a founder of Action Engine, where he raised capital and pioneered development of the innovative wireless technology he and his co-founders were named Computer World Smithsonian Laureates. Rick has extensive experience in transportation, wireless communications, information technologies and network development. Rick serves on several National Academies of Science Transportation Research Board committees. Rick holds degrees in Logistics and Computer Science from Michigan State University and an MBA from the University of Washington.

PAULA DOWELL– Principal & Director, Economics, Cambridge Systematics
Paula Dowell has more than 18 years of experience in economic analysis and planning, including 15 years of experience focused on transportation economics and freight transportation planning. Since joining CS, Ms. Dowell has served as Project Manager/senior consultant on a project examining the economic benefits of freight investments for the National Academies of Science, the Central Florida Regional Freight Mobility Study, the Arizona Multimodal Logistics Center Feasibility Study, the I-95 Economic Assessment Study, the Georgia Statewide Freight, The Economic Role of Freight Rail in Texas, the Economic Role of Freight Rail and Inland Ports in Mississippi and the Houston-Galveston Regional Freight Plan. In all of these efforts, Dr. Dowell focused on the linkages between freight transportation, land use and economic development opportunities. She is currently managing the NC State Freight Plan and a 5 year contract for the implementation of the Texas State Freight Plan. Prior to joining Cambridge Systematics, she served as the National Practice Leader for Freight and Economics at Wilbur Smith Associates. Dr. Dowell has worked in over 40 states and 7 countries and is an active member of National Academies of Science, Transportation Research Board, International Transport Economists Association and the Council of Supply Chain Management Professionals. She received a B.B.A in Economics from East Tennessee State University and a M.A. and Ph.D. In Economics from the University of Tennessee.

STEVE BOYD – Co-Founder/VP External Affairs, Peloton Technology
Steve has built and managed organizations and initiatives in the private and public sectors for more than 20 years. He has served as an Assistant Press Secretary in the White House, a Producer at the PBS NewsHour, and in a range of roles in the technology sector, national political campaigns, and federal agencies. Steve was a co-founder of the Clean Economy Network and is an active member of the Transportation Research Board, Society of Automotive Engineers, American Trucking Association, and the Commercial Vehicle Safety Alliance. Steve holds a Biology/Environmental Science degree from Pennsylvania State University with minors in Economics and Political Science and studied International Business and Finance at the University of Manchester (UK).

KEY SPEAKERS
DAY 2: INTERACTIVE

1:00 PM Breakout Session 4: Energy – *Room 616B*

KARL POPHAM – Electric Vehicles & Emerging Technologies Mgr, Austin Energy
Karl Popham is the Manager of Emerging Technologies & Electric Vehicles at Austin Energy, the 8th largest public power utility in the nation. He is also a Principal Investigator for several US Department of Energy funded projects that include smart-grid innovation, renewable energy, energy storage, distributed energy resources, and sustainable transportation. Popham has published several articles, given talks, and contributed research in energy emerging technologies and trends. Karl has led Austin Energy's transportation electrification strategy and operations since 2011 to include its award-winning Plug-In EVerywhere™ program. Karl has served as the chair of the Central Texas Fuel Independence Task Force and as a board advisor to SXSW Eco, Austin Forum on Technology & Society, The University of Texas Electric Vehicle Transportation and Electricity Convergence Center, and is a "legacy thought leader" for the Energy Thought Summit. Previously, Popham was the interim Chief Information Officer and Division Manager of the Program Management Office at Austin Energy, Director with Cap Gemini Ernst & Young, Outsourcing Executive with HP, and a Captain in the U.S. Army Corps of Engineers. Karl graduated from The University of Texas McCombs School of Business.

NICOLE ZINN – Owner, Rocket Electrics
After 25+ years of marketing and marcom experience gained while working for Fortune 500 corporations in the hi-tech industry, Nicole Zinn chose to go on a wild ride by opening an all-electric bike store in Austin, Texas in December of 2011. Her last traditional job was at Wirestone LLC, assisting clients in many capacities. Her primary client at Wirestone was Hewlett Packard. Preceding Wirestone, Zinn was the Manager of the Worldwide Events Program for 3Com Corporation's Strategic Marketing group, where she designed and implemented varied strategies to convey the company's global messaging while integrating the efforts of the individual business units. She has been responsible for budgets well over $1M, executing 14 large-scale events per year on five continents. Prior to her role at 3Com, Nicole was a Marketing Manager, Media Buyer, and Events Manager during the late 1980's and 1990's dot-com boom in the Bay Area. After swearing in 1988 to never return to retail, in July of 2011, Nicole rode an electric bike for the first time. Recognizing an opportunity, in just 4 month's time, Rocket Electrics was an operating small business. The store has since been featured in The Austin American Statesman, The New York Times, Fast Company, the London Times, Austin Monthly, and on CNN's series "Start Small, Think Big". Nicole has held other marketing and advertising sales positions in various industries.

ALAN WESTENSKOW – Director of Business Development, Proterra
Alan Westenskow is the Director of Business Development for Proterra where he identifies and develops financing options and procurement solutions for Proterra electric buses. Prior to Proterra, Alan spent 16 years as a public finance investment banker providing financing solutions for energy, transportation and other public infrastructure projects. Alan serves on ACORE's Electric Vehicle Working Group steering committee and the board of Utah Clean Energy. Alan attended BYU and Wharton.

KEY SPEAKERS
DAY 2: INTERACTIVE

2:45 PM What Can Big Data Do for Texas Mobility? – *Ballroom G*

PAIGE FITZGERALD – Mgr Connected Citizens Data Exchange Program, Waze
Paige Fitzgerald is the Manager of the Waze Connected Citizens Data Exchange Program, which connects cities and citizens to outsmart traffic together. The program launched in October 2014 in New York with 10 inaugural partners and has since expanded to over 23 participating DOTs and international municipalities. Before joining the Waze team at Google, Paige earned a joint MBA and Masters in Public Policy from Harvard Business School and Harvard Kennedy School. During graduate school Paige spent time both consulting with McKinsey & Company and growing a start-up social enterprise in New Delhi, India. Prior to graduate school, Paige spent six years working in the public sector in Washington, D.C., most recently helping to develop the US' international nuclear policy as a Special Assistant to the Deputy Secretary of Energy.

MONALI SHAH – Director of Global Intelligent Transportation, HERE
Monali Shah is the Director of Global Intelligent Transportation at HERE. HERE, the location cloud company, enables rich, real-time location applications and experiences for consumers, vehicles, enterprises and cities. During her fourteen years at HERE, Ms. Shah has spearheaded product innovation and management in digital maps, real-time data, and other location based products. She currently leads the company's work with transportation agencies in the areas of connected and automated driving, smart cities, traffic operations, planning and performance management. Ms. Shah has a degree in civil and environmental engineering from the University of Michigan and holds an MBA from the University of Chicago.

DOUG COUTO – Senior Fellow, Center for Digital Government
Doug Couto has more than 35 years in public sector executive leadership roles that includes the US Air Force, State of Iowa (CIO), and the State of Michigan (Information Officer and DOT CIO). When he moved to the private sector (Citrix and Dell), he continued working with state/local governments and education to maximize the benefits of technologies such as virtual desktops, mobility solutions and cloud computing.

TED TREPANIER – Director of Product Management, Traffic, INRIX
Ted Trepanier is the Director of Product Management with INRIX, Inc. Prior to joining INRIX, Ted was the Director of Traffic Operations for the Washington State Department of Transportation. In addition to his extensive background in traffic operations, he has experience in design, planning, project management and toll operations. Ted earned his Bachelor's Degree in Civil Engineering from Washington State University and Masters in Civil Engineering from the University of Washington.

KEY SPEAKERS

TxDOT & TEXAS TECHNOLOGY TASK FORCE

TxDOT & TTTF Members

Darran Anderson – Director of Strategy & Innovation, TxDOT
Darran Anderson serves as Director of Strategy and Innovation. His duties include leadership and strategic direction for the innovation and continuous improvement of people, processes and technology of the agency. He oversees the Strategic Planning, Information Management, and Research and Technology Implementation divisions. He is responsible for directing TxDOT's strategies and performance analytics to support its mission, vision, goals and objectives.

C. Michael Walton - Cockrell Centennial Chair, University of Texas at Austin
Dr. C. Michael Walton is the Chair of the Texas Technology Task Force. He is also a Professor of Civil Engineering and holds the Ernest H. Cockrell Centennial Chair in Engineering at The University of Texas at Austin (UT). In addition, he holds a joint academic appointment in the Lyndon B. Johnson School of Public Affairs. For more than 40 years he has pursued a career in transport systems engineering and policy analysis.

Shelley Row – President & CEO, Shelley Row Associates
A professional engineer and former executive, Shelley Row, P.E. is a leadership decision-making expert and member of the Texas Technology Task Force. Today, she speaks and writes on infotuition® the intersection of business pragmatics and gut feel. Shelley's work combines results from interviews with 77 executives, and neuroscience to bring this powerful skill to you. She is the author of *Think Less, Live More: Lessons from a Recovering Over-Thinker.*

Mike Heiligenstein
Executive Director
CTRMA

Michael Morris
Director of Transportation
NCTCOG

JD Stanley III
Data & Analytics
Cisco

Harry Voccola
Executive Advisor
HERE

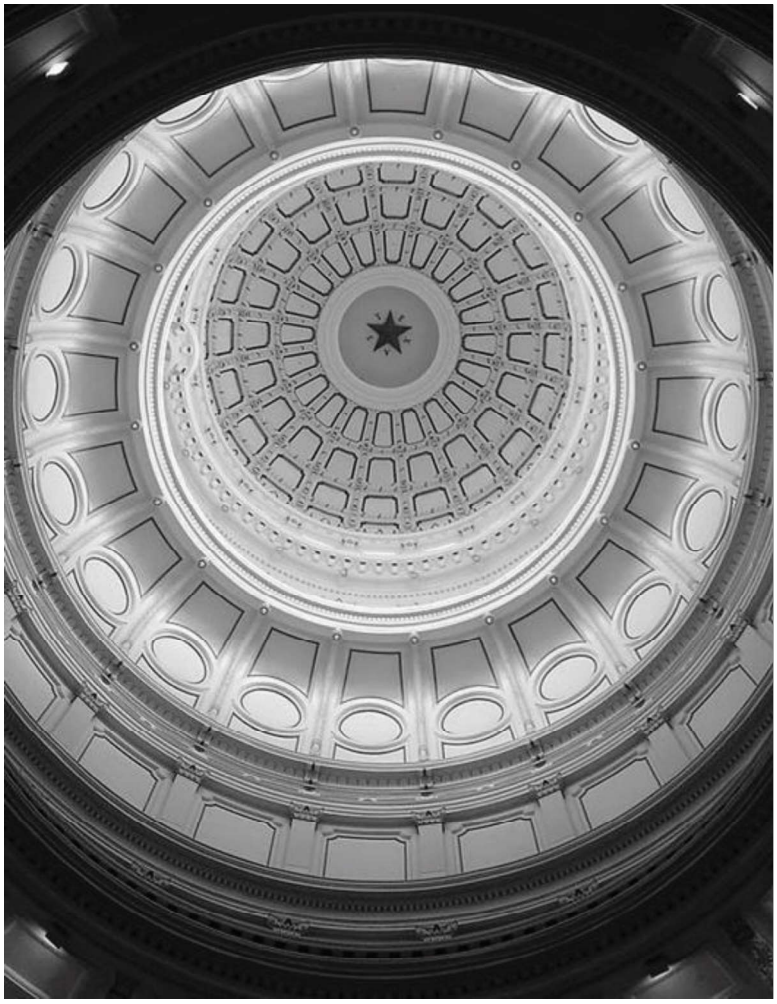
Steve Dellenback
Executive Director of R&D
SwRI

Tom Lambert
President & CEO
Houston METRO

SPONSORS

THANK YOU

Thank you to all of our sponsors for your commitment and leadership for the Texas Mobility Summit. We greatly appreciate your support and contributions to the success of the event. We look forward to continuing to foster public-private partnerships in order to drive economic development and enhance mobility for all Texas communities.



ACKNOWLEDGMENTS

THANK YOU

Thank you to all of those who have contributed to the success of the inaugural Texas Mobility Summit. The leadership and support from the Texas Department of Transportation (TxDOT) has been instrumental in developing the process, engaging stakeholders, and facilitating partnership opportunities. A special thanks to Darran Anderson, Director of Strategy and Innovation, for his exemplary leadership and guidance. We appreciate the support of TxDOT's Division of Strategic Planning.

We would like to thank Mayor Steve Adler and the tremendous support from the City of Austin for leading our community in the Smart Cities Challenge and for sustaining the momentum. We appreciate Dr. C. Michael Walton, Chair of the Texas Technology Task Force (TTTF), and the TTTF members for contributing their expertise to the conceptualization and development of this groundbreaking effort. Thank you to the Organization Committee, including Joe Willhite, Jason JonMichael, and Housman & Associates, for sharing your time, dedication, and insights. To the Team Leads, we recognize your leadership and collaboration for the benefit of all Texas communities.

Thank you to the team members, industry representatives, distinguished speakers, and many others for continuing Texas' leadership in mobility and innovation. Through our collective efforts, we will advance the creation of a Smart State Consortium, encourage public-private dialogue, and galvanize key leadership in developing innovative solutions to the state's mobility challenges.

INAUGURAL TEAMS

Team Arlington	Team Austin	Team Bryan-College Station
Team Corpus Christi	Team Dallas-Fort Worth	Team El Paso
Team Houston	Team San Antonio	Team Texas R&D

CONTACT INFORMATION

Email: tttf.mail@gmail.com

TEXAS MOBILITY SUMMIT

125 East 11th Street
Austin, Texas 78701-2483
www.txdot.gov

Appendix D: February Alliance Meeting

TEXAS DEPARTMENT OF TRANSPORTATION

TEXAS TECHNOLOGY TASK FORCE

TX Innovation Alliance
February 8, 2017
TxDOT Greer Building | Ric Williamson Room | 125 E 11th Street | Austin, TX

Agenda

8:30 AM | Welcome & Introductions – Darran Anderson, TxDOT & C. Michael Walton, UT Austin
The TX Innovation Alliance is introduced and progress updates are shared.

8:45 AM | TX Innovation Alliance Game Plan for 2017 – Kristie Chin, UT Austin
Core Working Groups are formed in the following areas:

1) Procurement Reform
2) Comprehensive Data Strategy
3) Industry & Stakeholder Engagement Meetings
4) Strategic & Financial Planning
5) Knowledge Base & Research-as-a-Service.

Potential funding models and organizational structures for the Alliance are discussed.

10:00 AM | Break

10:15 AM | Procurement Reform Panel Discussion
Moderators: Joe Willhite, WSP | Parsons Brinckerhoff & Jason JonMichael, HNTB
A panel of subject matter experts in the area of procurement reform present best practices and recommended applications for the TX Innovation Alliance.

10:45 AM | Texas Automated Vehicle Proving Grounds Roadmap
A path forward for the Texas Automated Vehicle Proving Grounds Partnership is discussed, including an overview, update from the lead research institutions, communications plan, support for the teams, and next steps.

11:15 | Discussion & Next Steps
Team Leads have the opportunity to share work from their respective teams and upcoming opportunities to collaborate, including information on a 5G NSF grant for advanced wireless research.

11:30 AM | Adjourn

Date: February 8, 2017
Time: 8:30am – 11:30am
Location: TxDOT Greer Building | Ric Williamson Room | 125 E 11th Street | Austin, TX

In Attendance: Darran Anderson, TxDOT; C. Michael Walton, UT Austin; Alicia Winkelblech, City of Arlington; Rob Spillar, City of Austin; Karla Taylor, City of Austin; Robert Turner, City of Austin; Austin Energy; Bart Benthul, BCS MPO; Troy Rother, City of College Station; Jason JonMichael, HNTB; Kent Marquardt, TxDOT; Stacey Strittmatter, TxDOT; Michael Morris, NCTCOG; Tom Bamonte, NCTCOG; Jennifer Wright (by phone), TxDOT El Paso District; Lauren Cochran, Houston METRO; Terence Fontaine (by phone), Houston METRO; Joe Willhite, WSP | Parsons Brinckerhoff; Michael Kyme, Houston METRO; Ronnie Barnes, HGAC; Amanda Thorin, HGAC; Jen Duthie, UT Austin CTR; Heidi Westerfield Ross, UT Austin CTR; Robert Heller, SwRI; Mike Brown, SwRI; Chris Poe, TTI; Ginger Goodin, TTI; Andrea Gold, UT Austin CTR; Kristie Chin, UT Austin CTR; Yvette Flores, TxDOT; Sonya Badgley, TxDOT; Rocio Perez, TxDOT; Dana Glover, TxDOT; Kevin Pete, TxDOT; Jorge Garcia, City of San Antonio; Jim Padilla, TxDOT

8:30 AM | Welcome & Introductions – Darran Anderson, TxDOT & C. Michael Walton, UT Austin
Walton welcomed attendees and introduced the topic of the meeting as an opportunity to discuss a path forward for the Alliance. Anderson congratulated the Teams on receiving the USDOT Designation of the Automated Vehicle Proving Grounds and encouraged the Teams to build upon their success. Self-introductions were made.

8:45 AM | TX Innovation Alliance Game Plan for 2017 – Kristie Chin, UT Austin
While the Partners of the Alliance typically discuss "change" as something that is happening to Texas, Chin encouraged the Partners to be the agents of change.

Chin presented the proposed organizational structures and funding models to enable the Alliance to be entrepreneurial, flexible, and fiscally sustainable. The three stages consist of 1) Stabilization, 2) Start Up, and 3) Ramp Up. The Stabilization Phase will continue the loose confederation of teams while focusing on outcomes, achieving quick wins, solidifying participation through the signing of an initial Memorandum of Understanding (MOU), and building out Core Working Groups. Once the Alliance has developed a strong foundation, Team Leads will consider evolving into a more formal entity as part of the Start Up Phase. The formal entity would provide centralized staff and resources to coordinate activities across Teams, engage industry and stakeholders, support grant applications, develop a communications strategy, and organize meetings and events. Also during this phase, Teams would advance deployment of pilot projects working in conjunction with the research institutions. The Ramp Up phase would include increased activity of the Alliance to support the Teams in evaluation, scaling, and deployment of additional pilot projects.

One funding model under consideration is a "Tiered Team with State Match" model. "Tiered" would take into account contributions of large, medium, and small entities; "Team" would incentivize interagency collaboration; and "State Match" would demonstrate partnership between the teams and TxDOT. Additional discussion is still needed to better understand the financial and legal considerations of formal interagency collaboration.

Discussion: There is an interest from the Teams to focus on the outcomes and secure quick wins before transitioning to a more formal entity with funding. Options under consideration include the formation of a neutral and independent organization or housing the Alliance within an existing institution. Industry engagement was discussed and the opportunity to create a one-stop-shop would enable Texas to have a competitive advantage in the marketplace. The Alliance will carry out activities in two complementary tracks: 1) Core Activities led by centralized staff and 2) Deployment Activities led by Teams. More discussion is needed and the loose confederation of teams will continue to focus its attention on achieving outcomes. The Teams agreed that there needs to be a plan for centralized staff and organization in place to ensure continuity. TxDOT continues to support the Alliance and is exploring ways to sustain momentum.

>> Action Item: Rob Spillar offered to lead a subset of the Team Leads in a discussion regarding the future coordination plans of the Alliance. TxDOT, NCTCOG, Houston METRO, CTR, TTI, and SwRI offered to collaborate as part of the subset.

Core Working Groups are formed in the following areas:

1) Procurement Reform
    - Outline the limitations and challenges of public-private partnerships in a white paper.
    - Develop a Procurement Wishlist that categorizes items that the Alliance would like to procure.
    - Improve speed to implementation by identifying best procurement mechanisms that agencies are using in Texas and across the country.
2) Comprehensive Data Strategy
    - Engage the private sector.
    - Create a framework for the Data Challenge that enables it to be an ongoing activity.
    - Create informational materials to generate statewide situational awareness for open data.
3) Industry & Stakeholder Engagement Meetings
    - Identify stakeholder channels and developed appropriate messages for each.
    - Create a website for the Alliance with shareable content.
    - Create a short video highlighting the value of the Alliance.
    - Create shareable slide decks and marketing materials to be used by the Team Leads.
4) Strategic & Financial Planning
    - Monitor federal grant opportunities and inform Alliance.
    - Develop one-pagers about pilot/deployment opportunities.
    - Engage industry through the Data Challenge and Texas Mobility Summit.
5) Knowledge Base & Research-as-a-Service.
    - Document ongoing and relevant research.
    - Create a network of researchers who can provide on-demand expertise.
    - Organizer subject matter experts.

>> Action Items: The Alliance will reach out to each Core Working Group for assistance in accomplishing the identified tasks.

10:00 AM | Break

10:15 AM | Procurement Reform Panel Discussion
Moderators: Joe Willhite, WSP | Parsons Brinckerhoff & Jason JonMichael, HNTB
Panelists: Michael Kyme, Houston METRO; Ronnie Barnes, HGAC; Amanda Thorin, HGAC

Kyme shared information regarding Houston METRO's recent open-RFI forum. He also discussed how METRO is modeling Unsolicited Proposal Portal after that of Los Angeles Metro Office of Extraordinary Innovation. Overall, the open-RFI forum is a successful model for engaging industry when problems are known and solutions are unknown.

Barnes shared information regarding the HGAC Buy List. It is a successful mechanism for procuring known items and additional work needs to be done to extend it to other smart city applications. Information regarding the technology specifications and desired qualifications is needed. There is a willingness for HGAC to work with the Alliance to explore group purchasing opportunities.

Thorin shared information regarding HGAC Plan Source. It is a useful tool for pre-qualifying vendors that offer planning services, including feasibility studies and renderings. There is a willingness to work with the Alliance to expand the list of pre-qualified vendors for smart city applications.

Discussion: There are many procurement tools in the toolbox that enable agencies to work within the existing system to streamline the process. It is important to distinguish between those that are most useful for "known" and "unknown" technologies/applications. Also, there are different degrees of flexibility at the local, county, and state levels. It was encouraged that the Alliance could assist in the coordination of procurement processes to make agencies aware of who is pursuing a procurement and enable other Teams to partner with the most appropriate lead agency.

>> Action Item: The Alliance will explore the following three tracks as it relates to streamlining procurement processes: 1) Further study the sole source provision for pilot applications, 2) Explore the local government corporation as a proof of concept for rapid procurement 3) Consider an open-RFI forum for emerging applications such as shared mobility services, 4) Evaluate the extension of HGAC Buy List and Plan Source for known applications, and 5) Restructure local government code.

10:45 AM | Texas Automated Vehicle Proving Grounds Roadmap – Chris Poe, TTI
Poe provided an update on the AV Proving Grounds Partnership. The three research institutions – TTI, CTR, and SwRI – met earlier to discuss first steps. The research institutions are in the process of developing a blueprint to engage teams and industry, create marketing materials, and collaborate through a Memorandum of Understanding. The next meeting of the research institutions will likely coincide with a meeting with Michigan and the other Proving Ground Sites towards the end of February.

>> Action Item: Team Leads and Research Institutions are to provide one slide for their respective proving ground sites to Chris Poe. Poe will compile two slide decks (short and long versions) to distribute to the Alliance for informational purposes. (Example slides attached.)

11:15 | Discussion & Next Steps

Bamonte shared information regarding a NSF 5G Wireless Communications Grant and asked for Team interest in collaboratively developing a grant proposal. City of Austin, Houston METRO, CTR, TTI, and SwRI offered to lead the effort in collaboration with NCTCOG. (Slide deck attached.)

Team Austin | Continuing development around Connected Corridor projects. Austin selected as a winner of for Smart Cities Council Readiness Challenge Grant: http://na.smartcitiescouncil.com/article/smart-cities-council-announces-winners-smart-cities-readiness-challenge-grants.

Team Bryan-College Station | Pursuing a Summit to engage the BCS community in evaluating the acceptable congestion level.

Team Dallas-Arlington-Fort Worth | NCTCOG will reveal to its Board a solution for testing a next generation people mover system. Self-driving cars were tested in Arlington: http://www.wbap.com/2017/02/02/self-driving-cars-tested-in-arlington-today/.

Team Houston | Advancing with its ConnectSmart program, focusing on integrating data to develop an app that influences travel behavior decisions. Short-term pilots include the development of an AroundTown App that crowdsources amenity information.

Team San Antonio | Hosting a Data Hackathon in April and considering testing on-board technology that alerts operators to pedestrians and imminent collisions.

Team Texas R&D | Additional work is being done to support AV Proving Grounds Partnership. CTR is hosting a Data Hackathon on March 4: https://www.facebook.com/events/1422783344433006/.

>> Action Item: Team Leads are to prioritize use cases for the Data Challenge in preparation for the next Team Lead conference call on February 22.

11:30 AM | Adjourn

TX Innovation Alliance

Innovate Texas Together

MOTIVATION

The traditional approach to transportation is unable to keep pace with the rapid changes in population, technology, economic competition, and community needs.

This calls for a new paradigm of mobility and innovation.

TX INNOVATION ALLIANCE

- **Leverage regional resources** to minimize duplication of efforts
- **Access a network** of peers, researchers, and industry leaders
- **Invest in our communities** by developing, implementing, and scaling solutions

AGENDA & DISCUSSION ITEMS

AGENDA

I. Organizational Structures & Funding Models Discussion

I. Core Working Groups

II. Procurement Panel

III. AV Proving Grounds

I. Next Steps

DISCUSSION ITEMS

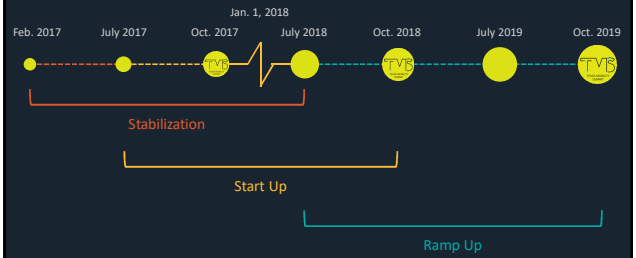
Timeline of Evolution
>> Does a phased development approach meet the needs of the Alliance?

Organizational Structure
>> Is there agreement that a formal entity with centralized staff and governance will be needed to ultimately sustain the activities of the Alliance?

Funding Model
>> Are Teams willing to contribute funding to support the core activities of the Alliance?

Priority Projects with Quick Wins
>> How can we leverage our collective talent in the Core Working Groups to achieve quick wins?

PHASED DEVELOPMENT



Discussion Items

Timeline of Evolution | Organizational Structure | Funding Model | Priority Projects & Quick Wins

CORE WORKING GROUPS

Q: What are the top 1-3 QUICK WINS that your Core Working Group would like to help the Alliance achieve by October 2017?

CWG A
Procurement Reform

CWG B
Comprehensive Data Strategy

CWG C
Industry & Stakeholder Engagement Meetings

CWG D
Strategic & Financial Planning

CWG E
Knowledge Base

CWG E
Research-as-a-Service

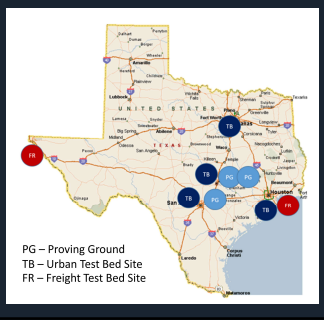
Procurement Panel

Michael Kyme
Houston METRO

Ronnie Barnes
HGAC Buy

Amanda Thorin
HGAC Plan Source

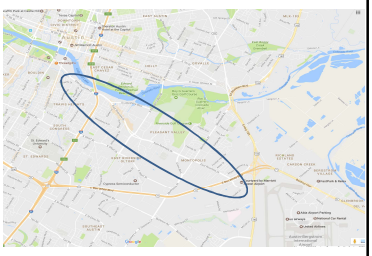
AV Proving Grounds



PG – Proving Ground
TB – Urban Test Bed Site
FR – Freight Test Bed Site

Austin

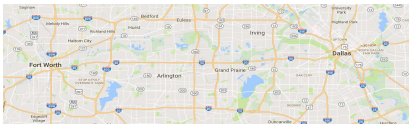
- Riverside Drive
  - Connects to CBD
  - Low-speed arterial
  - Transit/ped/bike
- Austin-Bergstrom Airport



Texas A&M Transportation Institute | CTR THE UNIVERSITY OF TEXAS AT AUSTIN CENTER FOR TRANSPORTATION RESEARCH | SwRI 9

Dallas-Fort Worth-Arlington

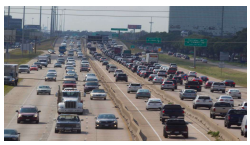
- I-30 Freeway / managed lanes between Dallas and Fort Worth
- Arlington arterials connecting to I-30
- UT Arlington Campus

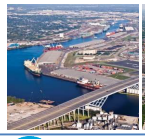


Texas A&M Transportation Institute | CTR THE UNIVERSITY OF TEXAS AT AUSTIN CENTER FOR TRANSPORTATION RESEARCH | SwRI 10

Houston

- HOV Lanes
- Texas Medical Center
- Energy Corridor
- Port of Houston

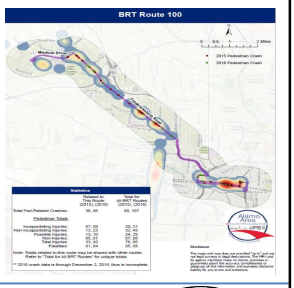




Texas A&M Transportation Institute | CTR THE UNIVERSITY OF TEXAS AT AUSTIN CENTER FOR TRANSPORTATION RESEARCH | SwRI 11

San Antonio

- Fredericksburg Road
  - Arterial street
  - Bus Rapid Transit Route



Texas A&M Transportation Institute | CTR THE UNIVERSITY OF TEXAS AT AUSTIN CENTER FOR TRANSPORTATION RESEARCH | SwRI

El Paso

- AV technologies for freight and passenger border crossings
- Model for other border crossings in Texas and U.S.

Texas A&M Transportation Institute | THE UNIVERSITY OF TEXAS AT AUSTIN CENTER FOR TRANSPORTATION RESEARCH | SwRI

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5G and Transportation: Advanced Wireless Research Initiative Opportunity

Texas Innovation Alliance

Thomas J. Bamonte
North Central Texas Council of Governments

February 8, 2017

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Advanced Wireless Research Initiative

$400 million to advance next generation wireless (5G)

National Science Foundation administers

25 industry partners

Includes four city test platforms--$10M/city plus private sector help

Remainder (~$350M) funds basic research

15

City Test Platforms

Each platform will deploy a network of software-defined radio antennas city-wide, allowing academic researchers, entrepreneurs, and wireless companies to test, prove, and refine their technologies and software algorithms in a real-world setting.

These platforms will allow four American cities, chosen based on open competition, to establish themselves as global destinations for wireless research and development.

16

Cellular V-2X

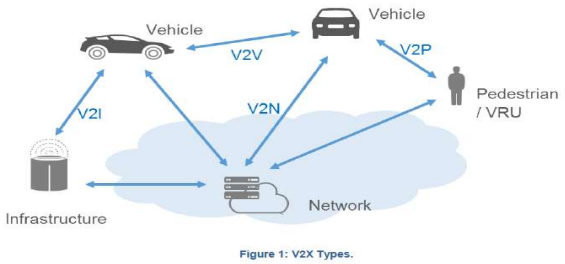

Figure 1: V2X Types.

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Cellular-V2X Opportunity for Texas

C-V2X installed base growing rapidly--250M vehicles by 2021

Strong private sector commitment to C-V2X

C-VSX will support many in-vehicle applications in addition to safety--e.g., mobile commerce, infotainment, navigation, mapping

Texas has strong telecommunications industry

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Pursuing 5G City Grant Opportunity

Replicate university/metro model used for AV proving ground

Work with industry partners to identify city with best prospects to win

Prepare application that gets statewide support--call for applications coming end of March

Emphasize C-V2X elements in application

Position Texas as a leader in 5G and transportation

Ancillary benefits of 5G leadership--university research funding, attract app developers, bridge digital divide

North Central Texas Council of Governments

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TMS
TEXAS MOBILITY SUMMIT

"Coming together is a beginning; keeping together is progress; working together is success."

- Henry Ford

Appendix E: March Task Force Meeting

TEXAS DEPARTMENT OF TRANSPORTATION

TEXAS TECHNOLOGY TASK FORCE

Agenda

TxDOT Greer Building | 125 E 11th St. | Austin, TX

March 22, 2017

9:00 AM | Welcome & Introductions – *Darran Anderson, TxDOT & Dr. Walton, UT Austin*

9:15 AM | Progress Update – *Andrea Gold & Kristie Chin, UT Austin*

9:30 AM | Discussion of the Next Phase of the Task Force – *Andrea Gold & Kristie Chin, UT Austin*

Four-Year Reflection (30 mins): What changes have taken place over the past four years and what changes are coming that TxDOT needs to anticipate?

Feedback on Proposed Game Plan (30 mins): Does the proposed game plan reflect what the Task Force hopes to accomplish in the next year and a half? What role and responsibilities would the Task Force like to have in supporting TxDOT and its other initiatives, including discovery of technologies, influence of the research agenda, guidance on deployment of pilot projects, development of business cases, and engagement of stakeholders? How does the Task Force define success?

TX Innovation Alliance Next Steps (30 mins): What is the role of the Task Force in supporting the TX Innovation Alliance? How can we build upon the success of the first Summit to continue industry engagement? What improvements would you like to see in the second Summit?

10:50 AM | Break

11:00 AM | Workshop to Develop an Industry Engagement for the Texas AV Proving Grounds Partnership

Moderator: Chris Poe, Texas A&M Transportation Institute

Task Force members and research institutions meet to develop a roadmap for deploying and marketing pilot projects, attracting industry, and developing a public communications strategy.

12:30 PM | Lunch Break

1:30 PM | Transformative Topic: Artificial Intelligence

Mike Brown, Institute Engineer, Intelligent Systems Division, SwRI

This session will highlight the role of artificial intelligence in the next generation vehicle, including applications for computer vision, pattern recognition, and navigating complex urban environments.

2:30 PM | Transformative Topic: 5G Connected Transportation

Jim Misener, Director of Technical Standards, Qualcomm

This session will present an overview of technologies needed to prepare a connected vehicle environment with considerations of both the 5G and DSRC approaches. Implications for data sharing, the role of public and private infrastructure, and the development of standards will be discussed.

3:30 PM | Next Steps – *Darran Anderson, TxDOT & Dr. Walton, UT Austin*

4:00 PM | Adjourn

Texas Technology Task Force (TTTF) Meeting

March 22, 2017

- Dr. Walton kicked the meeting off by thanking everyone for participating and by introducing their new graduate student.
- Darran mentioned that Senator Nichols is holding a hearing on AVs tomorrow. He has asked the governmental affairs people to get more information about this hearing.
- Michael Morris is encouraged by Senator Nichols' hearing. He thinks TTTF could be a good mechanism to influence the State Legislature in this area.
- Dr. Walton is excited about the progress made by the State Innovation Alliance. He wants to brainstorm ideas for TTTF to support this effort.
- Dr. Walton would like us to focus on the strategic plan for TTTF and the communications plan.
- Kristie covered the dinner they had last night. They discussed complexity. They want to understand the nuances of the transportation system. They want to review and revise the strategic direction of TTTF.
- The task force was started in 2013. The initial portfolio was developed then they did some strategic development and portfolio extensions. They have been engaged with their stakeholders.
- Texas Innovation Alliance
    - They have had a continued dialogue with biweekly conference calls. They have a value proposition document with six priority areas which are continually evolving. Their upcoming events include the Data Challenge (July in Austin) and Summit 2.0 in October in Houston.
- AV Proving Grounds
    - They have had a meeting of the research institutions for some initial discussions. They have a conference call with other designated sites. Their next steps include industry and team engagement.
- Other
    - The presentations at TRB went well. There has been one AV bill filed in the Texas State Legislature. They are pursing the opportunity to prepare TIGER grants. Senator Robert Nichols is the Chair of the Senate Committee on Transportation is having an AV workshop on Thursday, 3/23/17.
    - The TIGER Grants have been scrapped. There might still be opportunities for freight mobility with the clear lanes initiative.
- Michael Morris mentioned that the proposal for the AV proving grounds was put together in one night. He said we should divide and conquer so we can focus on individual deliverables that will cause real change. How do we delegate subcommittee focus?
- It was mentioned that we need to keep up interest and show what is actually capable with AV technology. There was an AV shuttle in Austin last week and it got a lot of media attention. After each study, we should have some kind of demonstration.
- Michael Morris thinks it is important for us to participate in demonstrations done across the state. If there is a demo in Houston, for example, we should have different members of the task force participate. If we show we are a united state that has support from academia and the private sector. Shelley Row mentioned that this should be part of the Smart State effort.
- They discussed if we should participate in Senator Nichols workshop tomorrow. Darran is waiting for more information about whether task force members can participate. Since we did not have a lot of notice for this workshop, it was mentioned that we should have Darran cover this one and tee up for the next one.
- Michael Morris wants to make sure the room is full so they know there is a solid interest in AV technology.
- Vision & Mission
    - Vision – High-performance transportation system
    - Mission – Outline clear, actionable strategies to enhance the delivery and quality of transportation services
    - Objectives –
        - Identify emerging technologies
        - Analyze economic, engineering, and policy impacts
        - Develop key strategies to integrate critical technologies
- Shelley Row mentioned that we may want to add something about how TTTF is a catalyst. It has allowed for a lot of change to occur within the Department. Michael Morris likes the word and thinks it should be used. He also thinks we should include something about the products / services for TxDOT since they are the ones supporting the task force. He thinks at this stage, we should be more focused on deliverables.
- Darran reviewed the language that started the task force. Harry Voccola thinks this language should be added to the vision. He agrees that TTTF should be the catalyst to bring this vision to fruition.
- Shelley thinks the communications part will be very helpful. She was not familiar with the UAS project until last night.
- Kristie wants to have a one pager and an elevator pitch on TTTF. She wants to capture the catalyst, leadership aspect, and foresight of the TTTF.
- Task Force Functional Areas and Activities
    - Technology Discovery and Analysis
        - Emerging Technology Portfolio
            - Initial Portfolio (2013)
            - Updated Portfolio (2015)
        - Panels and Subject Matter Experts
        - Deliverables – Metric Evaluation & Prioritizations; White Papers
    - Strategic Planning and Communications
        - Meetings with CMD
        - Workshops with TxDOT, Task Force, and Stakeholders
        - Deliverable – Strategy and Innovation Paper

- Leadership Positioning
  - Inside Texas
    - techTALKS
  - Outside Texas
    - ITSA – Pittsburgh, Columbus
    - TRB
    - AASHTO
    - Smart City Challenge
  - Outcome – Improved leadership position in state marketplace
- Competitive Analysis
  - Technical Tours
    - MCity
  - Attendance at Conferences
    - AV Symposium
    - AASHTO/NACTO
    - SXSW
  - Deliverable – Competitive Analysis
- Stakeholder Engagement
  - TxDOT Engagement
  - Industry Engagement
  - Public Agency Engagement
  - Research Institution Engagement
  - Outcome: New and strengthened relationships with stakeholders

- They asked about the benefits of TTTF. Kent mentioned the UAS project. He also brought up the I-10 corridor coalition and how that can make Texas a leader in this area.
- Darran brought up the data changes TxDOT has made since TTTF started. As they were looking into big data and opportunities for partnership, they saw that we did not really know where a lot of our data is located so they have been working to create a data mart or data lake.
- He also mentioned that Communications had not covered innovative technologies before TTTF.
- Stacey mentioned how TTTF has encouraged collaboration throughout the Department. At the latest I-10 corridor meeting, Yvette brought up the hackathon we are going to be hosting and we got a lot of interest from many areas within the Department.
- Michael Morris said that we should not wait for others to start new initiatives. I-10 was started by Arizona. He said he thinks this is a good idea but we could also do that for I-35 or I-45 around the state. He thinks we should be organically developing more ideas from within the Department. He thinks this will show that we are dedicated to the pursuits of TTTF. TxDOT has some money but there are also other avenues to get funding.
- Dr. Walton said one of the reasons why Smart State came about was because they were looking to collaborate to get funding that was not going to be provided by the Federal Government. They wanted to do something that was not going to interrupt other state programs.
- Thomas Lambert said we should focus on DEs. DEs have funding and people. If they can understand the benefits of these changes, it will be easier to get them on board.
- Michael Morris talked about their dynamic tolling program. They guarantee 60 mph. They change the toll price every 6 mins to make sure this speed is maintained. If it goes below the 60mph mark, then the fare is free. This is a program they naturally created. He wants to see what would need to happen to make something similar for I-35, I-45, or other parts of the state.
- Kent thinks the Smart State Alliance will be the best place to share these kinds of best practices to see what kinds of ideas can be implemented across the state.
- Kristie asked for new ideas for deliverables. Shelley mentioned that she is not hearing about the work being done by TTTF. She reads lots of industry newsletters and she has not heard about any of the TTTF initiatives. Press releases are nice but they are only useful if they get picked up. We need to have more interactions with the press.
- Three categories of communication –
  - What are the impacts?
  - What is in flight? (The roadmap)
  - What are our aspirations? What can we do locally, across the state, and nationwide?
- There should be three bubbles of information.
  - TxDOT – We need to make sure our employees know what we are doing.
  - Texas – We need to make sure Texans know what we are doing to improve transportation.
  - Transportation Industry – The Industry should know what we are doing to encourage collaboration and improvements.
- It looks like Senator Nichols is interested in regulations. We should make sure we have clear information about the latest regulations. We need to make sure we have more focus on citizen engagement. We need to make sure we are always aware of the most innovative technologies. Then we need an ongoing list of what we have done to improve the department. We need to have a readily available list for people making inquiries.
- All of these elements combined is what is needed in the communications strategy. It will have to be continuously updated. Shelley said this should be our one pager.
- Michael mentioned that this is the perfect time for this kind of paper. Harry said we need to make sure we focus on accomplishments. We need to make sure we are not just focused on cities, but regions.
- Shelley appreciates that the TTTF is always about pushing the boundaries. She thinks this should be included in the one pager. Thomas mentioned that we should think globally but think locally. He thinks we need to make sure that Texans know what we are doing and they support it.
- Darran mentioned that he is very supportive of the efforts of TTTF but he has to be careful with what he says during presentations to make sure he represents the Department well. There have been lots of concerns over funding. Over the last six months, he feels like we have established a foothold and he thinks it will be easier to gain support in the future.
- We need to make sure we engage with the media. There are fewer “beat” reporters. It might be harder to get demos covered because people might just cover crazy stories. We should make

sure we are working with Public Information Officers from several public agencies so we can have a solid message. They have had success with traffic reporters in the past.

- Kristie asked about the industries we should involve. They mentioned auto and insurance.
- Michael is concerned that Google has not reached out to TTTF. We had Toyota involved but we have not had a lot of interest from the private sector. We do not have industry partners for the AV proving ground but we are going to be reaching out to individuals soon.
- Kristie is going to be circulating a list of industries to everyone. She would like their input. She said they are interested in adding hyperloop to the TTTF portfolio. They would like to know if there are any other agencies they should engage.
- JD thinks TxDOT should take on more of a brokering role. We should be able to see what tasks are better suited for TTTF vs the Innovation Alliance. He thinks there is subliminal governance we can use to decide who should cover what.
- Shelley asked about the stakeholders involved with the Innovation Alliance. Kristie mentioned that they have been mostly communicating through email. They are working on acquiring Slack to use as a communication tool. They are going to prepare a monthly newsletter to inform all stakeholders about the activities of the alliance.
- We should work on developing a more formal structure to transfer technologies to the demo or deployment stage. JD suggested a "tech corner" of the newsletter. This may encourage grad students to see what they could combine with what they are researching. It will serve as an information source.

Texas Automated Vehicle Proving Grounds Partnership

- Chris Poe began the discussion of the AV Proving Ground. The AV Proving ground is a partnership between UT, Texas A&M, and SWRI.
- CAV Leadership in Texas includes TTTF, Texas Innovation Alliance, and the Texas AV Proving Ground Partnership.
- USDOT AV Proving Grounds
    - USDOT seeking to:
        - Create a national network of proving grounds
        - Encourage new levels of public safety
        - Establish a Community of Practice on testing and demonstration of best practices
        - Accelerate the pace of safe deployment
    - In January 2017, the USDOT designated 10 sites
- No federal funding came along with the designation. There are actually some requirements for which we will have to pay. It is important because Texas has a seat at the table about this technology.
- The Texas proposal included the three existing proving grounds at A&M, UT, and SWRI. They have controlled campus environments where they can do testing. There is also a network of urban environments that want to participate.
- The USDOT wanted to know what we could have ready in a year. We let them know that these proving grounds are ready to go.
- TTI / Texas A&M
    - RELLIS Campus Proving Grounds
        - 2,000 acre campus
    - Truck Platooning
    - AV roadway infrastructure needs and V2I
    - FAA UAV Center of Excellence
    - Expertise in vehicle controls, robotics, cybersecurity, and UAVs.
- Texas is the only state to have an AV proving ground and a FAA UAV test site.
- UT- Austin / CTR
    - Proving Grounds – Streets and parking lots – JJ Pickly Campus
    - Highway, Intersection, and Rural Road Safety
    - V2X Sensing / Communication
    - Vehicle and non-motorized user interactions
    - Expertise in travel behavior, GPS and wireless sensing, cybersecurity, and policy and regulation
    - Last week they had an AV shuttle running on their campus.
- SWRI
    - 1,200 acre on and off road testing facilities
    - Over 20 fully automated vehicle platforms developed (from golf carts to class 8 trucks) for government and commercial clients
    - Deploying CAV since 2008
    - Specialties include: localization, perception, cybersecurity, connected automation, and UAVs.
- Strengths of the Texas AV Partnership
    - Proving Grounds open for business
        - On-road and off-road environments
    - Match research expertise and proving grounds to testing needs
    - Partnerships are in place for pilots / demos
    - Diverse set of urban test sites
        - High-speed freeway/managed lanes
        - Arterial streets with transit
        - Low speed urban
        - Campus environments
- There are 32 urban test site partners for the proving grounds. They had the support of 18 elected officials.
- Austin – Riverside Drive – This was part of the Smart City Proposal
    - Connects the airport to downtown
    - Low speed arterial
    - Transit/pedestrian/bike

- Dallas – Fort Worth – Arlington
  - I-30 freeway / managed lanes between Dallas and Fort Worth
    - 15 miles on the eastern side of I-30
  - Arlington arterials connecting to I-30
  - UT Arlington Campus
- Houston
  - They have one of the largest HOV systems in the country.
  - They can test safety: autonomous braking; capacity: bus platooning; and first/last mile connection: automated shuttle.
  - They have the Texas Medical Center, the METRO HOV lanes, Energy Corridor, and Universities.
- San Antonio
  - Fredericksburg Road Corridor
    - Arterial street and Bus Rapid Transit Route
- El Paso
  - AV technologies for freight and passenger border crossing
  - Model for other border crossings in Texas and the US
- Next Steps
  - US DOT
    - Meetings with the 10 National Proving Grounds
    - Assist national guidance
      - Define testing needs
      - Testing guidance
      - Best Practices
      - Safety Procedures
    - Texas – We can see how the Texas Innovation Alliance helps deploy AV technologies across the state.
- San Diego Regional Proving Grounds
  - History with AHS Demo in 1997
  - Three testing environments
    - I-15 Express Lanes
    - South Bay Expressway
    - City of Chula Vista – Not fully developed, so they thought they could build in AV technology
  - Collaboration with Caltrans, CalSTA, and DMV
- GoMentum Station
  - GoMentum facility
    - Concord Navy Weapons Station
    - 2 – 1,400 foot tunnels
    - Bunker City – grid network between bunkers
  - Agreements with Otto/Uber, Honda, Bai Du, Easy Mile
    - Working with Apple, Google, Facebook, Uber, Bosch, Denso, Delphi, and Continental
  - Agreements with ITE, ITSA, and TIA
  - Growth in North California region in CAV staff – they had 300 a couple of years ago, now it is several thousand
  - GoMentum Annual Meeting March 30th
- Iowa
  - Led by University of Iowa
    - Iowa DOT, HERE, Iowa City Area Development Group
    - Original human factors for 1997 AHS demo
    - Strong emphasis on consumer education (mycardoeswhat.org)
  - Support from Volvo (donated XC-90 for consumer testing)
  - Iowa DOT makes high-definition roadway data available with licensing back on product development
  - Springfield, USA virtual city simulation environment
- Wisconsin
  - Evolved from their Smart City Challenge proposal
    - Private Sector partners – EPIC, Road America, and MGA Research
    - MGA Research has significant testing facility (old Chrysler facility)
  - UW Madison campus with restricted roadways
  - Case conducting agricultural testing
- Michigan
  - American Center for Mobility at Willow Run
    - Non-profit, public-private partnership
  - MDOT, UM, MEDC, SPARK
  - Phase 1 (2017) - $20M
    - 2.25 mile outer loop track
  - Emphasis on product development, standards, and education
  - They have stripped the whole facility. They have a four lane divided highway. This will then change to a two lane road.
- Pennsylvania
  - Penn State / Larson Institute and City of Pittsburgh
  - Background initiatives were:
    - Traffic 21 institute (foundation funded)
    - METRO 21 (CMU/City of Pittsburgh collaboration)
    - Smart Cities
  - City of Pittsburgh has agreement with CMU
  - Penn State has testing facilities – PSU test track, Altoona bus testing, City of State College, I-99
  - City of Pittsburgh has on-road testing plans
- US Army – Maryland

    - Aberdeen Testing Center
        - 66,000 acres; 100 years of testing
        - 4 separate facilities for testing
            - 3 mile straight away
            - 4.5 mile flat track (2 paved, 1 unpaved)
            - Off site track (hilly off road)
        - Developed data aquistion system (ADMAS)
        - Testing USDOT CACC on 5 Cadillacs for Turner-Fairbank
        - Hardware in the loop simulation (hardware is the vehicle in dyno)
        - Discussing with Maryland DOT (proposer) – Since the Maryland proposal was not chosen, they want to include the best parts of the Maryland proposal to this facility. Mainly, they want UMD to be involved.
- North Carolina
    - Led by North Carolina DOT and North Carolina Turnpike Authority
    - Partners: Regional Transportation Alliance and ITRE
    - Universities: UNC-Chapel Hill, Duke University, UNC – Charlotte, NCA&T State University
- Central Florida Partnership
    - It is centered in Orlando. They are building a new test track with the Florida DOT. It is called Sun Track. They are working with NASA to use some of their facilities.
    - They are going to focus on simulation and testing, controlled environments, and open environments.
- From the USDOT, Turner – Fairbanks is involved. Kate Harpman is the head of the group at USDOT. It will be run from the GOT department. They have not met with the new Secretary so they are not sure how the new administration feels about the program. They are hoping to gain her support. They want to sign a common agreement with all 10 sites. They are in the comment period right now. There were some concerns that it looked more like a contract than an agreement. Since it is a non-funded effort, it may be better to pursue a MOU.
- Darran voiced a concern that other areas used military facilities. He wanted to know if we missed the mark. They do not think we were hurt by that, he thinks others were just using the best facilities available to them. They do think that pulling in the Houston space facilities may be useful. Darran thinks West Fort Hood may be a good place to add. When they reached out to Aberdeen they said that they research there but they do not deploy, but it might be worth reaching out to them again.
- Since Texas is so large, there may be some areas that are not as populated that we may be able to use. We may be able to use some farms as well. Truck platooning could be a big opportunity here. There are lots of roads with little to no traffic. This may pull in some regions who wouldn't normally think they could be involved.
- At this point, they need to attract people to the proving ground. He asked what sets the Texas AV Proving Ground apart from other initiatives. What will bring people here? Michael says we should pull the resources we have collected from the alliance to partner with someone with AVs to start testing. In the Dallas region, they have been trying to find a partner to test truck platooning. The benefits of using an urban corridor are to get more eyes on the deployment.
- Texas was planning on doing something like this with the alliance whether we got the designation or not. The agreement does specifically say connected automation which a lot of technologies could fall within but it may not cover everything we are currently researching.
- We should identify the use cases we are proposing for our corridors. Then we can pursue the specific companies that would benefit the most. We should also highlight the technologies we have been researching the most. We should make a matrix for each site to show that Texas has the most options. This will be useful for the communications plan as well. If we can share the use cases of AV technologies, it will prepare a more holistic story for citizens, legislators, etc.
- He asked about the structure between the proving grounds and the urban test sites. Michael said we should have set guidelines to show that they technology is tested on the proving grounds and is prepared to fight cybersecurity attacks. Once they pass this phase, then they can move to a controlled urban test site, then once they prove themselves there they can test on streets with citizens. There should be a flow chart of which technologies will be tested at which site and then have that flow to certain urban sites as they best fit. This will be very valuable to the private sector. They can make a solid test plan.
- There are efforts made by transportation officials every day to change the network to best suit special needs or weather conditions. We should be able to control the environment to demonstrate technologies. We could build these test sites around events like F1 or SXSW. This will raise interest in the test.
- Shelley came back to the clients. It is important for us to know who we are serving. Before we start planning how to set up these proving grounds, we should make sure we reach out to the people who will use it so we provide things they actually want. Texas has a lot of say with the auto industry. We should be one of the biggest future markets when it comes to AV technologies. We also need to identify the areas of AV that are not being studied somewhere else. It might be data or mapping, etc. We should do a gap analysis. This may be an area where the Innovation Alliance can help.
- There are a lot of big corporations in Texas. We should try to market to them. We want as many private sector players as possible. They will provide funding and they know where the industry is going. Cities can help with automated transit buses and signal tests. Walmart and Amazon are pursuing same day delivery. They would be good partners as well. Harry proposed telling OEMs that they cannot sell AVs until they have tested so many hours at our proving grounds.
- Michael proposed truck platooning between 2am-5am to try to get as many trucks off of the roads during the day. Shelley thinks our niche may be with freight. We have lot of freight and ports.
- Harry said that if we develop certifications then he thinks people will come here. JD said if we work with insurance companies so it is easier to insure these vehicles in Texas then that might bring people here.

Artificial Intelligence (AI)

- Mike Brown provided a presentation on AI.
- Artificial Intelligence – The capacity of a machine to imitate intelligent human behavior
- Machine Learning – The subfield of computer science that gives computers the ability to learn without being explicitly programmed.
- Deep Learning – A subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks.
- The AI term was developed in the 1950s. Our imagination was out in front of the technology. In the 1980s, they came up with the idea of machine learning which formed a lot of advancements like spam filters. The progress was very slow. It was good in constrained environments. If you were looking for defects on parts, it was good for machine learning. It was not able to handle anything with multiple interactions including automated driving. Deep Learning began in the 2000s.
- Deep learning is very good at finding patterns. It can handle an unstructured environment.
- Deep learning to detect methane leaks or oil spill detections have been used. They use visible and satellite data to identify the spills. They have natural language processing. This allows services like Alexa, Siri, Google, or Cortana. Our interactions with social media use the data we provide to make predictions for our behavior. This helps with search engines.
- The sudden explosion of deep learning stems from the explosion of data available. ImageNet, Social Media, YouTube, and Search Engines provide an incredible amount of data. Hardware – GPUs have allowed for deep learning. GPUs were improved by the gaming industry. The improvement of the image processing and mirroring helps with deep learning. YouTube allows researchers to test deep learning by seeing what the computers could detect. Neural Network Architectures also pushed deep learning forward. You can train neural networks with data. It is similar to the way you teach a child. Infants are provided a steady stream of data so they can learn how the world works. A Neural Network learns in a similar fashion, it just formally processes the data so then they can "learn" what makes up a person, a dog, or a place. They can then make a probable guess at what they are "seeing."
- Alex Krizhevsky in 2012 won the ILSVRC challenge. It was meant to reduce the image classification from a 26.2% to a 15.3% error rate. Humans are generally in the 5-10% error range. He trained the machine on 1.3 million images on two GPUs over 6 days. He used 5 convolutional, max-pooling, dropout layers and 3 fully-connected layers. This is the closest a person was able to get AI to a human level of interpretation.
- Since then, there have been continual enhancements. The ZF Net in 2013 got a 11.2% error rate. The VGG Net (2014) had an error rate of 7.3%. GoogLeNet (2015) to 6.7%. Microsoft ResNet (2016) has an error rate of 3.6% which is better than a human. It had 152 layers. R-CNN, Fast R-CNN, Faster R-CNN (CNN variations) are the ways that you can pick out parts of an image.
- This is very good for bicycle detection with an automated vehicle.
- A traditional approach in computer vision has been to use engineered features.
- ConvNet: Every layer transforms a 3D input volume to a 3D output volume of neuron activations.
- A typical picture would be 920,000 pieces of data passed through in a second. You can ask the computer to "look" for something by applying a filter. They will know what indicates the thing they are looking for and they will filter the images they receive to see what matches.
- Image classification – Outputting a class label from an input image
- Filter Size – Size of the portion of the image being examined
- Stride – How far the filter moves in each step
- Rectified Linear Unit Layer Changer – All negative activations to 0
- MaxPool Layers – Helps increase speed and reduce "overfitting"
- Dropout Layers – "Drops Out" random set of activations
- Fully Connected – Takes input volume and produces probability of each class.
- The gaps in this technology have to do with different lighting levels. It can be hard for the computer to identify the image if the lighting is not sufficient. This is where the industry is currently focused. LIDAR, RADAR, and DSRC can assist in these areas.
- Texas has a lot of different environments in which to test. The only thing we don't really have is deep snow.
- Optimizing CNNs involves optimizing parameters, optimize search space, they depend on good data to train them, once trained it is very reliable, but it is still not perfect. The visualization never gets impaired or distracted. Currently, they do not learn on the fly.
- What can Texas do?
    - Data! Think about it from a "Smart State" perspective
        - What kind of data do you have? What quality? What would you like to get out of it? What else could be provided or combined? How to make it available? Conducting research to apply Deep Learning techniques to the data.
    - Spur innovation
- US DOT has started a research data exchange which will be useful with AI. They may be able to add sensors to maintenance vehicles to constantly track pavement qualities and other road quality measurements.
- The data collection we currently do like video logging can be made more sophisticated to "train" AVs on our transportation network.
- Michael Morris asked what we can do to help. Mike Brown said that the proving ground will be helpful and sharing data will help improve the technology.
- Mike Brown is looking for students in this area.
- Kristie mentioned that coming up this July, the Texas Innovation Alliance is partnering with some of the smart city finalists to do a data rodeo. They are looking into freight and logistics, health and safety, mission zero, and mobility as a service.
- Darran said we are providing our public crash data. This is important not only for AI but also for Big Data. Traffic, construction, bike, pedestrian, and water data can be useful. He made a request for people to submit data sets that they think may be helpful to STR and IMD.

5G Connected Transportation

- Jim Misener from Qualcomm offered a presentation on 5G connected transportation.
- The AVs of the future will be safer, greener, and more efficient. They have a wireless charging platform they are preparing to sell. 5G will be a key enabler for our automotive vision. It will provide a unifying connectivity fabric for the AV of the future. It is enhanced mobile broadband, provides mission-critical services, and allows for a massive internet of things (IoT). It will be the convergence of many spectrum types and brands.
- 5G will provide unified connectivity. It will always be available and provide secure cloud access. It will serve V2V communications. It will facilitate 3D mapping and precise positioning. It allows for active ranging, embedded GNSS with DR, VIO lane level accuracy, and cloud based assistance for 3D mapping. It will also provide on-board intelligence. It provides heterogeneous computing, on-board machine learning, computer vision, sensor fusion, and intuitive security.
- They understand DSRC is popular in North America but they think 5G will be the main technology in place in other parts of the world.
- V2X is a critical component for safer autonomous driving. Communicating intent and sensor data even in challenging real world conditions. It provides non-line of sight sensing. It conveys intent by communicating intent and sharing sensor data to provide a higher level of predictability. It allows for situational awareness. It offers increased electronic horizon to enable soft safety alerts and reliable graduated warning.
- For AVs to work we will need a continuous V2X technology solution. The current version R14 is basically done. This level provides enhanced safety. The R15 will provide advanced safety. R15 will provide a higher throughput, higher reliability, and limited latency.
- C-V2X defines two complementary transmission modes. It defines direct communications and network communications.
- C-V2X is designed to work in ITS 5.9 GHz spectrum. This is for vehicles to talk to each other on harmonized, dedicated spectrums.
- C-V2X reuses upper layers defined by the automotive industry. These layers are defined by the automotive standards already in place. This version leads to a longer range and more reliable performance at the same range. This provides for better support for more enhanced safety. It provides more reliability at higher speeds and under varying road conditions.
- C-V2X is gaining support from automotive and telecom leaders. 5GAA is a cross-industry consortia that helps define 5G V2X communications.
- We think there are opportunities for us to partner with Qualcomm on the AV Proving Grounds.
- There are some political issues with 5G vs DSRC. FHWA has been working on setting standards based on DSRC. They are working with FHWA to make that section of the regulations neutral on the type of technology.

Final Thoughts

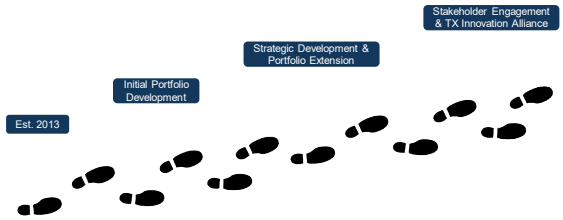
- Darran reviewed the discussion from this morning. Michael Morris is going to have Tom Bamonte attend the Senator Nichols workshop tomorrow. He said we are going to take the information we learned about the AV proving grounds back to the Innovation Alliance to see what we can do about getting participants.
- They are working to get the Strategy and Innovation Plan before the Commission by this summer.
- He appreciated the AI and 5G discussion.
- He thinks the task force is good at breaking down some of the silos within the Department. There are several divisions who have participated in the last four meetings. He wants to share this information with other employees and get back together with the task force members with a plan.
- Dr. Walton thanked the task force members, Kristie and Andie, and TxDOT staff. He believes the task force has accomplished a lot since it began. He is excited for the future of the task force. He is grateful for the people who have reached out to participate in these meetings.

TEXAS DEPARTMENT OF TRANSPORTATION

Texas Technology Task Force

The Future of Transportation

What's Next?



Update from December 2016

- TX Innovation Alliance
  - **Continued Dialogue:** Biweekly Conference Calls
  - **Value Proposition 4.0**: Six Priority Areas, continuously evolving
  - **Upcoming Events**: Data Challenge (July, Austin) & Summit 2.0 (October, Houston)
- AV Proving Grounds
  - **Meeting of the Research Institutions**: Initial discussions
  - **Conference Call with Other Designated Sites**: Poe to provide update
  - **Next Steps**: Industry and team engagement
- Other
  - **TRB:** Presentations went well
  - **Legislative Session**: One AV bill filed
  - **TIGER Grants**: Opportunity to prepare

Agenda

- **Discussion of the Next Phase of the Task Force**
  - Key Questions
  - Feedback & Discussion
  - Next Steps
- **Texas AV Proving Grounds Partnership**
  - Overview
  - Industry & Team Engagement
  - Strategic Recommendations
- **Transformative Topic: Artificial Intelligence** – Mike Brown, SwRI
- **Transformative Topic: 5G Connected Transportation** – Jim Misener, Qualcomm & 5G Automotive Alliance
- **Next Steps**

Overview

4-Year Reflection | Feedback on Game Plan | Next Steps

Key Questions

- **Activities.** Which Task Force activities has TxDOT benefitted from the most?
- **Deliverables.** Which Task Force deliverables have benefitted TxDOT the most?
- **People.** Which subject matter expertise areas should be included in the Task Force composition?
- **Portfolio.** What technologies warrant an update and what other technologies should be explored?
- **Plan.** Does this strategic model still apply? How should it evolve?
- **Competitive Edge**: What other pilots/programs/activities does Texas need to advancing to continue being competitive?
- **Strategic Priorities.** Which functional areas would the Task Force like to prioritize for the next year?

Overview

4-Year Reflection | Feedback on Game Plan | Next Steps

4-Year Reflection

Task Force Functional Areas & Activities

Technology Discovery & Analysis
- Emerging Technology Portfolio
  - Initial Portfolio (2013)
  - Updated Portfolio (2015)
- Panels & Subject Matter Experts

Strategic Planning & Communications
- Meetings with CMD
- Workshops with TxDOT, Task Force, and Stakeholders

Leadership Positioning
- Inside Texas
  - techTALKs
- Outside Texas
  - ITSA – Pittsburgh, Columbus
  - TRB
  - AASHTO
  - Smart City Challenge

Competitive Analysis
- Technical Tours
  - MCity
- Attendance at Conferences
  - AV Symposium
  - AASHTO/NACTO
  - SxSW

Stakeholder Engagement
- TxDOT Engagement
- Industry Engagement
- Public Agency Engagement
- Research Institution Engagement

KEY QUESTION: Which Task Force activities have benefitted TxDOT the most?
Which Task Force activities would the Task Force like to emphasize in the next phase?

4-Year Reflection

Task Force Functional Areas & Activities

Technology Discovery & Analysis
- Emerging Technology Portfolio
  - Initial Portfolio (2013)
  - Updated Portfolio (2015)
- Panels & Subject Matter Experts
- **Deliverable**: Matrix Evaluations & Prioritizations
- **Deliverable**: White Papers

Strategic Planning & Communications
- Meetings with CMD
- Workshops with TxDOT, Task Force, and Stakeholders
- **Deliverable**: Strategy & Innovation Plan

Leadership Positioning
- Inside Texas
  - techTALKs
- Outside Texas
  - ITSA – Pittsburgh, Columbus
  - TRB
  - AASHTO
  - Smart City Challenge
- **Outcome**: Improved leadership position in state marketplace

Competitive Analysis
- Technical Tours
  - MCity
- Attendance at Conferences
  - AV Symposium
  - AASHTO/NACTO
  - SxSW
- **Deliverable**: Competitive Analysis

Stakeholder Engagement
- TxDOT Engagement
- Industry Engagement
- Public Agency Engagement
- Research Institution Engagement
- **Outcome**: New and strengthened relationships with stakeholders

KEY QUESTION: Which Task Force deliverables have benefitted TxDOT the most?
Which Task Force deliverables would the Task Force like to improve upon in the next phase?

4-Year Reflection: PEOPLE

Task Force Membership

TxDOT Texas Technology Task Force | USDOT

Public Agencies	Industry	Research
CTRMA NCTCOG Houston METRO	Cisco Shelley Row Assocs. Nokia/HERE	SWRI University of Texas

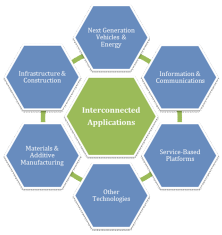
KEY QUESTION: Which subject matter expertise areas should be included in the Task Force composition?

4-Year Reflection: People – PORTFOLIO

Next Generation Vehicles & Energy
Automated Vehicles
Connected Vehicles
Electric Vehicles
Unmanned Aerial Vehicles

Infrastructure & Construction
Infrastructure Enhancements
Construction Techniques
Equipment

Materials & Additive Manufacturing
Self-Healing Pavements
Nanotechnologies
3D Printing



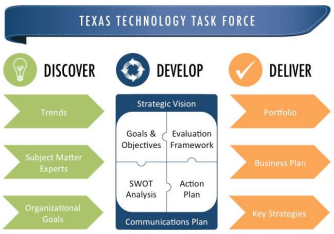
Information & Communications
Cloud Computing
Crowdsourcing

Service-Based Platforms
Location-Based Services
Transportation Subscription Services

Other Technologies
Google Glass
Virtual Reality
Hyperloop

KEY QUESTION: What technologies warrant an update and what other technologies should be explored?

4-Year Reflection: People – Portfolio – PLAN

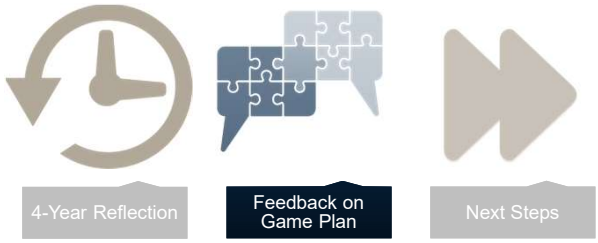


KEY QUESTION: Does this strategic model still apply? How should it evolve?

4-Year Reflection: Competitive Edge

KEY QUESTION: What other pilots/programs/activities does Texas need to advancing to continue being competitive?

Overview



Feedback on Game Plan

Functional Areas & Activities

Technology Discovery & Analysis	Strategic Planning & Communications	Leadership Positioning	Competitive Analysis	Stakeholder Engagement
• Activity 1 • Activity 2 • Activity 3 ➢ Deliverable	• Activity 1 • Activity 2 • Activity 3 ➢ Deliverable	• Activity 1 • Activity 2 • Activity 3 ➢ Outcome	• Activity 1 • Activity 2 • Activity 3 ➢ Deliverable	• Activity 1 • Activity 2 • Activity 3 ➢ Outcome

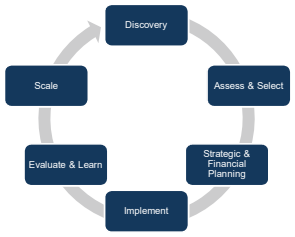
People	Portfolio	Plan
Update membership.	Refresh portfolio.	Adjust plan.

KEY QUESTION: Which functional areas would the Task Force like to prioritize for the next year?

Overview

Next Steps

Innovation Cycle



Next Steps

Innovation Cycle: Key Players

Task Force
Role: Advisor

Discovery
- Continuous monitoring of emerging technologies
- Surveying of national research, pilots, policies, and rulemaking

Assess & Select
- Performing SWOT analyses
- Prioritizing and making recommendations to TxDOT administration

Strategic & Financial Planning
- Macro-level
- Identify funding opportunities
- Engage industry network

Implement
- Advise and offer expertise

Evaluate & Learn
- Synthesizes lessons learned

Scale
- Identify appropriate scaling locations

TxDOT
Role: Administrator & Partner

Discovery
- Elevating champions of innovation
- Building awareness throughout the agency

Assess & Select
- Selecting and developing project funding models and contractual agreements

Strategic & Financial Planning
- Meso-level
- Provide or partner in funding
- Coordinate grant proposals

Implement
- Partner and offer expertise

Evaluate & Learn
- Measure performance

Scale
- Partner and offer resources

Alliance
Role: Coordinator & Broker

Discovery
- Continuous monitoring of application case studies and lessons learned

Assess & Select
- Building consensus around statewide priorities
- Making recommendations to TxDOT administration and Alliance partners

Strategic & Financial Planning
- Meso-level
- Facilitate public-private partnerships and pooled funding
- Coordinate grant proposals

Implement
- Support teams and offer expertise

Evaluate & Learn
- Generate standard performance metrics

Scale
- Facilitate knowledge & technology transfer

Appendix F: Smart Cities Data Challenge

SMART CITIES
LAUNCH
DATA CHALLENGE

A PARTNERSHIP REVOLUTION IN DRIVING NEW MOBILITY OUTCOMES

TEAM LEAD KICKOFF MEETING

> > > > > > > > > June 27, 12:00pm-1:30pm < < < < < < < < <

Galvanize | 119 Nueces St. | Austin, TX 78701

Agenda

Objectives:

- Verify interest in developing a data initiative and confirm public agency data priorities
- Define expectations and desired outcomes of the September Launch Event
- Discuss long-term needs and activities to support civic innovation

11:50 AM | Lunch Served

12:00 PM | Opening Remarks & Introductions – C. Michael Walton, UT Austin & Darran Anderson, TxDOT

12: 10 PM | Background Presentation – Kristie Chin, Texas Innovation Alliance & Mark Dowd, Smart Cities Lab

12:20 PM | Presentations: The Role of Research in Building Data Partnerships

Leadership will discuss the role of research in collaborating with public agencies to create a framework for collecting, analyzing, and managing data in emerging mobility fields.

Meredith Lee – Executive Director, West Big Data Innovation Hub*
Elliot Martin – Assistant Research Engineer, TSRC, University of California at Berkeley*
Pascal Van Hentenryck – Professor, RITMO, University of Michigan*
Natalia Ruiz – Director of the Network Modeling Center, CTR, University of Texas at Austin

12: 35 PM | Open Discussion: Short- & Long-Term Goals

In developing a sustainable partnership, team leads discuss the expectations of the Data Challenge, prioritize needs, and identify short- and long-term goals.

1:00 PM | Presentations: Partnership Perspectives in Tech & Mobility

Leadership from key organizations share ongoing data efforts and provide recommendations for developing an integrated data ecosystem for mobility.

Dan Morgan – Chief Data Officer, USDOT*
Sokwoo Rhee – Associate Director of Cyber-Physical Systems Program, NIST*
Michael Berube – Director of the Vehicle Technologies Office, EERE*
Ivan Benavides – Mobility as a Service, Ride Austin
Mateo Clarke – Brigade Captain, Open Austin, Code for America

1:15 PM | Open Discussion: Use Cases & Collaboration Opportunities

Team leads discuss priority use cases and identify collaboration opportunities related to mobility-as-a-service, freight and logistics, real-time traveler information, and other areas.

1:30 PM | Adjourn

*BY WEB

SMART CITIES
LAUNCH
DATA CHALLENGE

A PARTNERSHIP REVOLUTION IN DRIVING NEW MOBILITY OUTCOMES

Meeting Notes

// QUESTIONS TO CONSIDER

How can we **use data** to **anticipate new technology**, **improve decision making**, **tap into** the **tech** community, and **prepare for new skillsets**?
How can we get **political buy-in** from decision makers?
Are we **reinventing the wheel**? Is there an existing data source that can be leveraged to accomplish this goal?
How can we **protect privacy** while **collaborating** in an **open** manner?
How should we **define data standards** so that they work for everyone?

// SPEAKERS' KEY POINTS

Meredith Lee, West Big Data Innovation Hub

- More strategic coalition building
- Champions in industry and local government are critical to success
- Curate projects to take them to the next level

Elliot Martin, UC Berkeley

- Work directly with industry, as they are the primary data provider
- Understand what data are needed and why: communication is key!
- Acknowledge industry concerns about proprietary data and adjust requirements

Pascal, University of Michigan

- Using data science to change accessibility to jobs, healthcare, and food
- Leveraging progress in connectivity to make transit more dynamic and flexible
- Poorer areas tend to have lower quality data collected, how can we ensure they are included?

Natalia, CTR Network Modeling, UT Austin

- There is a divide between the real-world data analysis and research/modeling communities
- Building a platform to support research and data analysis by bringing the two together
- Solution: annual Data Rodeo

Dan Morgan, USDOT Chief Data Officer

- Cities need policies and procedures to protect citizens and make data available
- A templatized data-sharing policy can help cities share with others who are working on similar projects
- Work with local entities such as universities and industry is the key to success

Sokwoo Rhee, NIST

- Replicable, scalable business models and solutions are needed
- Two key types of data exchange: within a city between departments, and between cities, companies, universities, and other stakeholders

Michael Berube, EERE

- Data standards and catalog are important
- DOE data projects
- Energy impacts of changes in mobility

Ivan Benavides, Ride Austin

- Working on a Mobility as a Service partnership with CapMetro as a first/last mile provider
- Possible integration with B-Cycle
- Dell Medical School, CCC, and a third group, gave a $50,000 grant to transport patients to clinics and hospitals

Mateo Clarke, Open Austin

- Hackathons tend to reinvent the wheel. This data challenge has strong potential to go beyond
- More input from and impact to local government is needed
- Projects with buy-in and strong leadership tend to be more successful