2019 Research and Technology Transfer Annual Report

Massachusetts Department
of Transportation
Office of Transportation
Planning

massDOT
Massachusetts Department of Transportation

Executive Summary

The Massachusetts Department of Transportation (MassDOT) prides itself on delivering innovative and efficient transportation programs and initiatives that support the Commonwealth's current and future transportation needs. To maintain these programs and initiatives, research and technology transfer are used as key elements to create, improve, enhance, and disseminate critical knowledge, processes, and practices.

The main purpose of this annual report is to provide a comprehensive summary of the research and technology transfer activities taking place during federal fiscal year (FFY) 2019 through the Research and Technology Transfer (RTT) Program at the Office of Transportation Planning at MassDOT. Through these activities, the RTT Program aims to enhance MassDOT's ability to fulfill its' mission statement to deliver excellent customer service to travelers by providing safe, reliable, robust, and resilient transportation infrastructure. This includes providing a transportation system that strives to strengthen the state's economic vitality and improve quality of life throughout the Commonwealth.

MassDOT is committed to maintain and improve the effectiveness and impacts of its applied transportation research and training programs. Noteworthy progress of the RTT Program were made in FFY2019 by broadening stakeholder engagement; by improving and streamlining existing processes; by utilizing and updating both new and existing communication tools; and by tracking and measuring the impacts of completed research projects and training activities. This report not only highlights research and training milestones, but also showcases the collaborative techniques used to create and share transportation research and trainings throughout Massachusetts.

A look back at FFY2019 showcases many achievements including:

- Implemented an agency-need-driven research solicitation process
- Won AASHTO 2019 "Sweet-Sixteen" High Value Research Award
- Completed 9 research projects
- Funded 11 of 32 new problem statements
- Facilitated agency participation in national research activities, including over 40 Transportation Research Board (TRB) project panels and 7 Transportation Pooled Funded projects
- Hosted 2 annual statewide conferences with a total registration of 2,260
- Delivered 14,395 training hours through the Local Technical Assistance Program (LTAP) across the state
- Established routine and focused surveys to solicit municipal training needs and measured the effects of training
- Hosted 6 states from varying regions across the country in a Peer Exchange Program to discuss managing and delivering effective transportation research programs

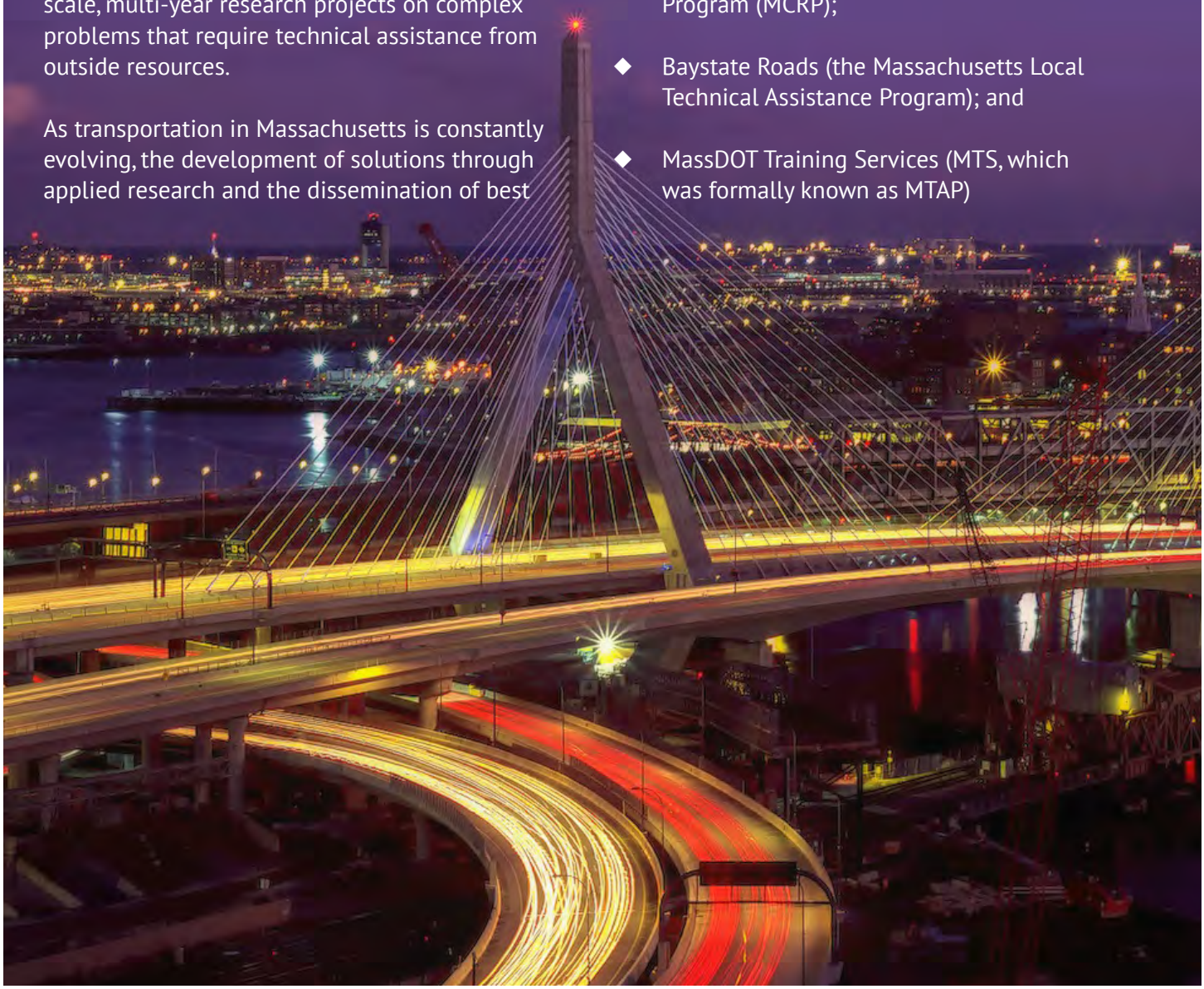
Mission & Vision

MassDOT provides research, training, and technology transfer services to a broad audience of municipal, state, and academic partners in order to support various statewide needs and initiatives. Research activities, mostly driven by internal needs, address key problems and issues in the areas of policy, management, safety, environment, planning, engineering, construction, operations, and maintenance as those areas relate to the Commonwealth's responsibilities for the state highway, public transportation, and inter-modal transportation systems. Activities can range from support services for technology transfer to large-scale, multi-year research projects on complex problems that require technical assistance from outside resources.

As transportation in Massachusetts is constantly evolving, the development of solutions through applied research and the dissemination of best practices and knowledge through training helps shape the changing transportation landscape. Collaborative efforts within these two platforms help the Commonwealth economize resources and funding as we look towards influencing the transportation systems for years to come.

MassDOT partners with the University of Massachusetts Transportation Center (UMTC) to provide services for the following three components:

- Massachusetts Cooperative Research Program (MCRP);
- Baystate Roads (the Massachusetts Local Technical Assistance Program); and
- MassDOT Training Services (MTS, which was formally known as MTAP)



Research

The purpose of the research program is to organize and manage the research program, conduct internal and external outreach activities and administer associated contracts. The Research Section carries out its initiatives by soliciting and prioritizing MassDOT's research needs, facilitating principle investigator identification, conducting research contracts, and tracking project performance and implementation efforts and impacts.

Research activities address key problems and issues in the areas of policy, management, safety, environment, planning, engineering, construction, operations, and maintenance as those areas relate to the Commonwealth's responsibilities for the state highway, public transportation, and inter-modal transportation systems. Activities can range from support services for technology transfer to large-scale, multi-year research projects on complex problems, requiring technical assistance from outside resources.

Short , Medium- and Long-term Research Projects

- Separate ISA/Contract
- Generated through annual research solicitation process
- State universities or other research entities

Synthesis & Quick Turn-around Projects

- UMass ISA
- MassDOT research staff
- Can be outside of the solicitation process

National & Regional Cooperation

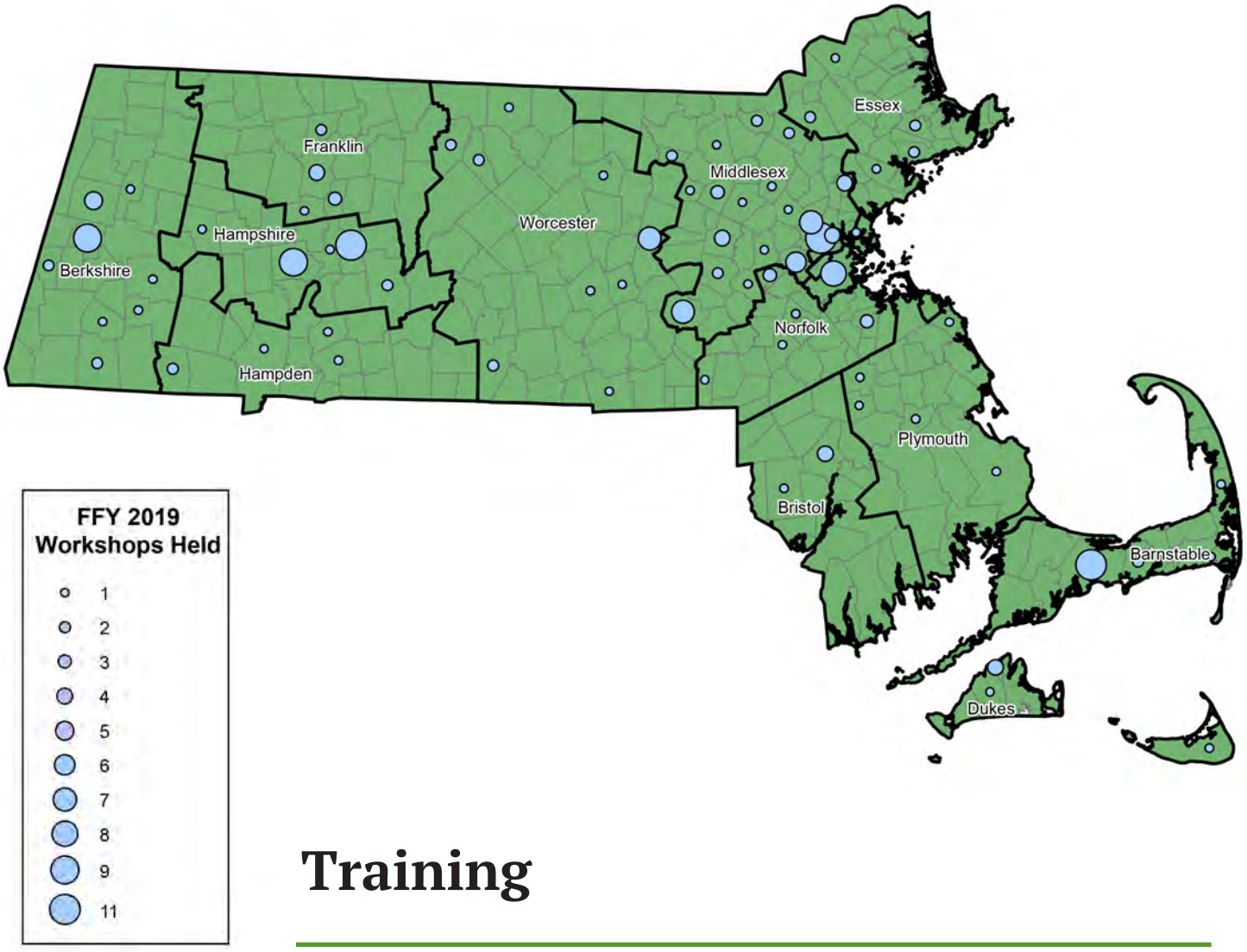
- NCHRP
- NETC
- Other TPFs

Additional Research Services

- Literature search through UMTC
- RAC survey

Interdepartmental Service Agreement (ISA); National Cooperative Highway Research Program (NCHRP); New England Transportation Consortium (NETC); Transportation Pooled Funds (TPF); Research Advisory Committee (RAC)

Through the MCRP component, MassDOT directs, coordinates, and oversees the UMTC research staff, which provide requested research support (e.g. statement solicitation, principal investigator searches; research task management and administration assistance; support in national and regional collaboration; literature searches and reviews; and on-demand access to experts in transportation engineering, planning, policy, etc.).



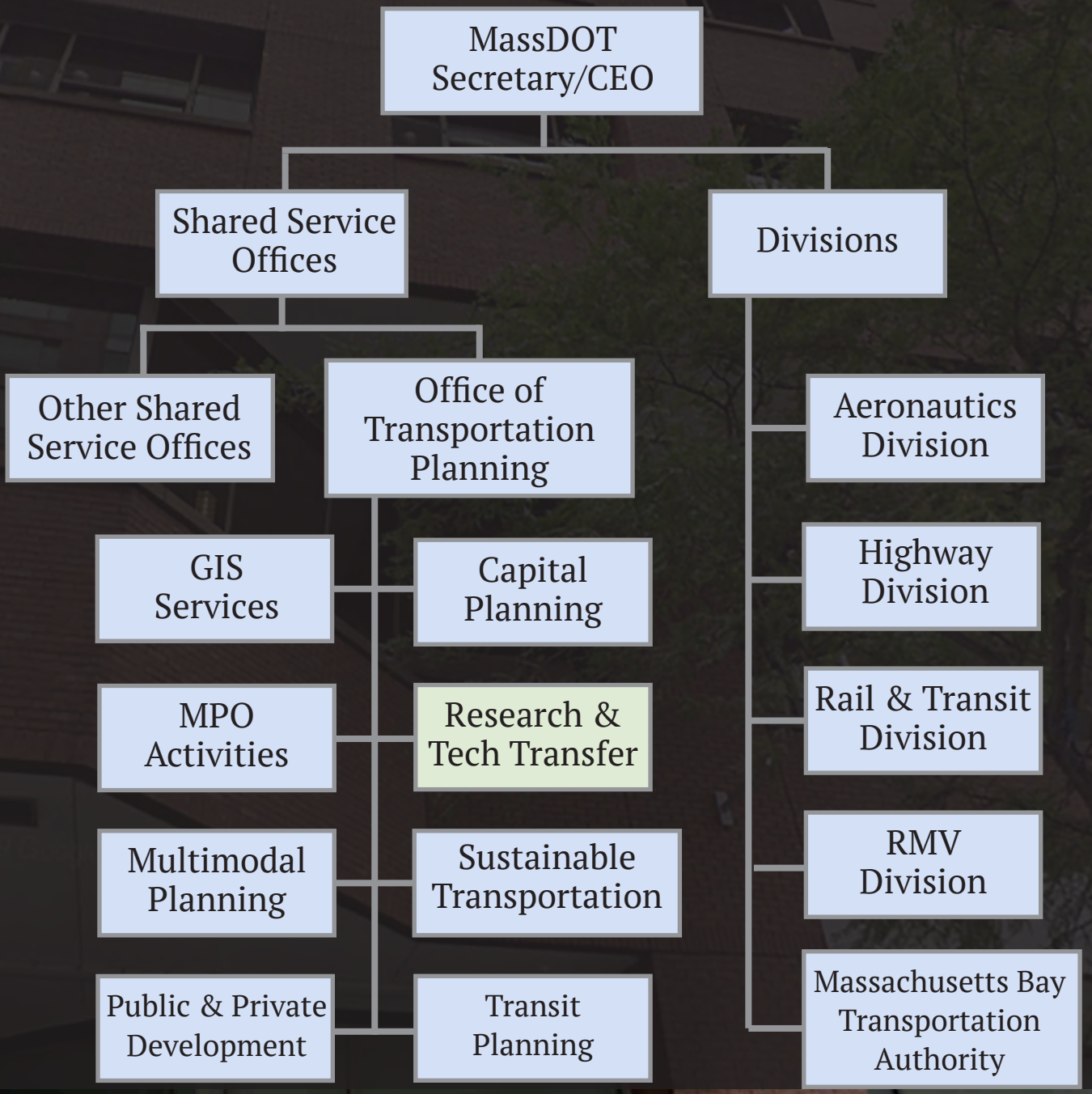
Training

MassDOT contracts with the UMTC to provide training services to both MassDOT and municipal audiences. Through Baystate Roads, our Massachusetts LTAP Center, and MassDOT Training Services, the UMTC assists MassDOT in developing and implementing annual training plans to provide essential and high-quality technical training. These events serve as a conduit for the transfer of new technologies, best practices and methodologies for operating, maintaining, and managing state and municipal highway departments throughout the Commonwealth. These programs also serve as communication platforms through which MassDOT shares new initiatives and changes related to policies, programs, engineering directives, and other essential developments.

Our Team

The state Planning and Research Program is run out of the Massachusetts Department of Transportation's (MassDOT) Office of Transportation Planning. The team consists of a Manager of Research and four Transportation Planners who are responsible for the management of transportation research and the transfer of technology information that will help to further the agency's mission.

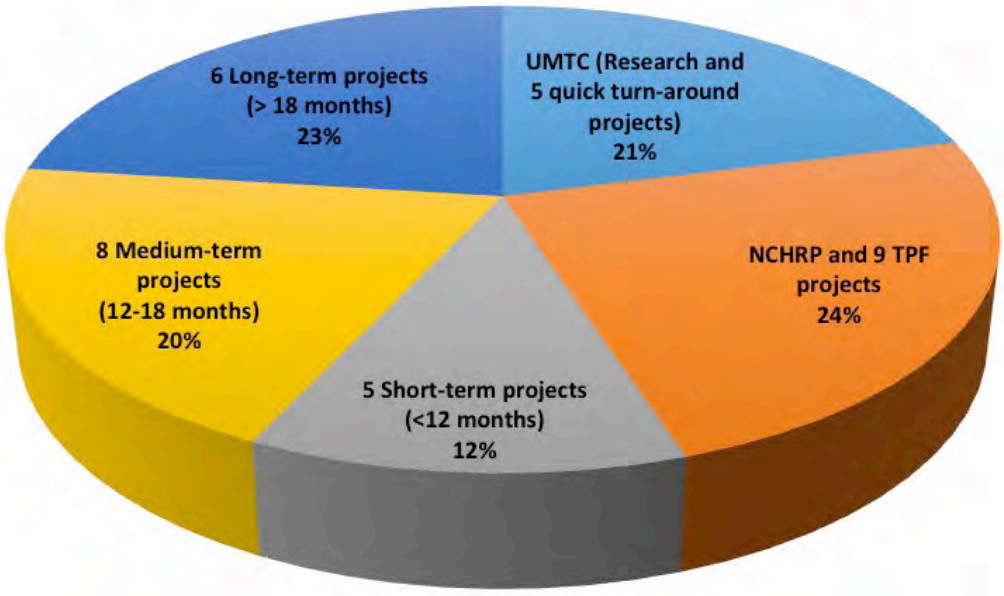
The MassDOT organizational structure is as follows:



Research Project Funding

Each year MassDOT develops its State Planning and Research (SP&R) Work Program to plan out planning and research activities funded through the Federal Highway Administration SP&R funds as authorized by Title 23, U.S. Code, Section 505, and regulated by Title 23, Code of Federal Regulations (CFR), Part 420. Part II of this plan details how MassDOT will use these funds to conduct research and technology transfer activities in the next federal fiscal year. Research projects that come out of these areas are assigned to one of the five categories: quick turn-around (<9 months), short-term (<12 months), medium-term (12-18 months) long-term (>18 months), and transportation pooled fund studies (TPF) with other state DOTs. Through these innovative research projects, MassDOT's transportation research program continues to support a safe, efficient and effective transportation network in the Commonwealth.

FFY19 RESEARCH PROJECT FUNDING



Research Highlights

MassDOT Annual Research Project Solicitation Process and Research Roundtables

Each Spring, MassDOT begins its process of soliciting and selecting research projects for the coming fiscal year. This begins with a solicitation period, to gather Research Problem Statements driven by internal needs for potential future projects, whether surface or intermodal transportation. Each Research Problem Statement is submitted for consideration by a MassDOT staff member who, if the project advances to receive funding, then serves as Project Champion (PC). In the Spring of 2019, MassDOT expanded its efforts to connect state transportation practitioners with academic researchers during this Research Problem Statement solicitation period. The addition of research roundtables allowed for a baseline understanding of statewide research needs, as well as support for future partnerships between the two groups.

The Roundtables were held statewide and focused on different transportation themes, including:

- Roadway Engineering Safety, Maintenance, and Resiliency – 38 attendees
- Active Transportation, Mobility, Health, Safety, and Policy – 54 attendees
- Engineering, Design, Safety, and Asset Management – 24 attendees
- Construction, Materials, and Maintenance – 48 attendees

A total of 49 MassDOT staff and 26 researchers from four universities attended for roundtables. A total of 35 problem statements for FFY 2020 research projects were submitted; of the 13 projects that ultimately received funding, 11 were suggested at the roundtables.

49 MASSDOT MEMBERS

TWENTY-SIX RESEARCHERS

11 of 13
projects that ultimately received funding were suggested at the roundtables

35
PROBLEM STATEMENTS FOR FFY 2020 RESEARCH PROJECTS WERE SUBMITTED

MassDOT Peer Exchange

on June 12-14, 2019, MassDOT held a Reseach Peer Exchange with representatives from the Arizona DOT (ADOT), Georgia DOT (GDOT), Illinois DOT (IDOT), Minnesota DOT (MnDOT), Montana DOT (MDT), and Utah DOT (UDOT). Representatives from the Transportation Research Board (TRB), the Federal Highway Administration (FHWA) Massachusetts Division Office, the University of Massachusetts Amherst Transportation Center (UMTC) also attended. The U.S. Department of Transportation's Volpe National Transportation Systems Center in Cambridge hosted and facilitated the Peer Exchange. The purpose of the Peer Exchange, held once every five years, is to provide an opportunity for participants to exchange and share ideas, and learn about best practices in research program management and project delivery. This sharing of ideas and brainstorming also provides MassDOT and the other State DOTs the opportunity to evaluate programs through a collaborative team of peers, experts, and staff involved in the research process. The Peer Exchange had three focus topics:

1. Managing and Delivering an Effective Transportation Research Program
2. Effective Implementation of Research Results
3. Performance Measures and Communicating the Value of Transportation Research

> ***This year's peer exchange provided ample opportunities for seven DOTs across the nation to come together to share best practices, and levels of expertise within each of our agencies. The research solicitation process can vary throughout our agencies, and to have this opportunity to collaborate with each other to expand upon our practices really helps to provide a bigger picture for how we can grow our own research practices.***
>
> *— Hongyan (Lily) Oliver, Manager of Research, MassDOT*

Additional Highlights

UMass Transportation Center Activities

The UMTC provides research journal articles, papers and on-demand literature reviews, as requested by MassDOT. This past year copies of research articles were provided to MassDOT that included topics relating to river discharge, hydrologic models, water resources assessments, heavy precipitation, and state DOT effectiveness. UMTC staff also conducted literature scans for the 35 Research Problem Statements submitted to MassDOT during the 2020 Problem Statement Solicitation period.

Research Recognition, Presentations, Publications

A MassDOT research project (completed in 2017) on the Performance of Adhesive and Cementitious Anchorage Systems in Transportation Structures, was selected by the American Association of State and Highway and Transportation Officials (AASHTO) as one of sixteen "high-value" research projects for 2019 and featured in AASHTO's annual publication, "Research Makes a Difference." The research project, headed by Dr. Scott Civjan of UMass Amherst, resulted from an Interstate-90 tunnel ceiling failure collapse caused by "creep" failure of adhesive anchors and led to the development of new proposed testing standards. This research was presented at a poster session at 2020 Annual Meeting of the Transportation Research Board in Washington, DC. The results of a MassDOT research project (2019), Risk Factors for Older Pedestrian Injuries and Fatalities in Massachusetts, were presented at the 2019 American Public Health Association's Annual Meeting, published in the meeting's proceedings, and shared on blogs for the Massachusetts Healthy Aging Collaborative and the UMass Boston Gerontology Institute.

Dr. Scott Civjan

APWA Conference

With nearly 6,000 public works personnel in attendance, the American Public Works Association (APWA) conference not only served as an insightful look into the future of transportation, but also as a platform to recognize our Bay State professionals that are making that future a reality. Hosted in Seattle, Washington, those attending this four-day, early September event, saw our Massachusetts municipal, State DOT, and UMTC representatives receive 10 national awards. Recognizing outstanding individuals, groups and Chapters representing the best in the nation's transportation profession, Christopher Ahmadjian, PE, Associate Director at the UMass Transportation Center, received the Donald C. Stone Award for Excellence in Education (Individual).

Christopher Ahmadjian, PE, Associate Director UMass Transportation Center (right), receives the Donald C. Stone Award for Excellence in Education (Individual) from Dave Lawry, PE, APWA Past President, at the 2019 APWA Conference in Seattle, WA.

Research Projects

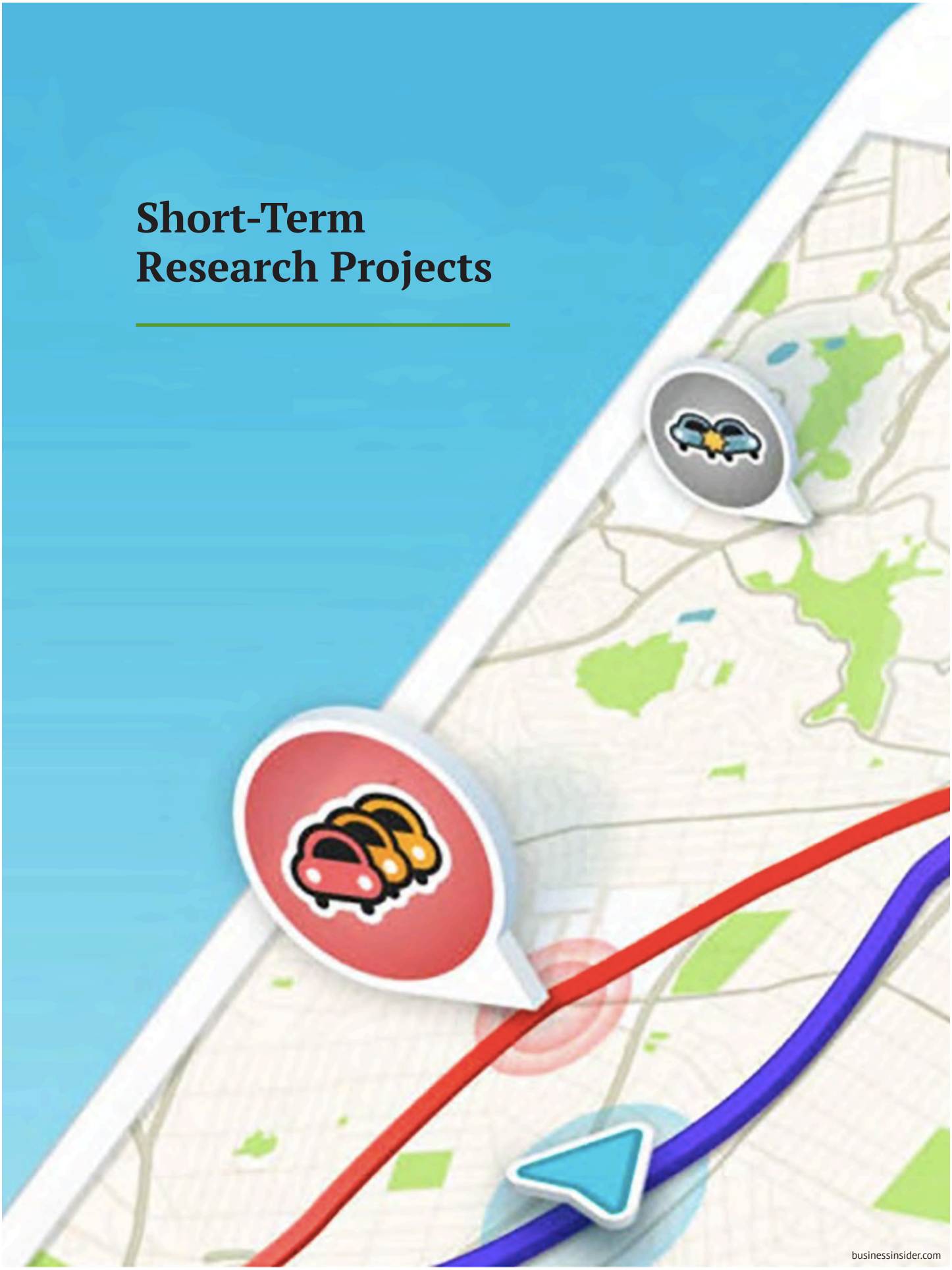
Ongoing Research Projects

During Federal Fiscal Year 2019, MassDOT directly contracted and provided oversight for seven research projects being conducted by academic researchers on topics of MassDOT concern. Each project followed the MassDOT research statement solicitation, review, and selection project process in an earlier year. As shown in the table below and in the brief project descriptions later in this section, together they cover a broad range of topics of interest to MassDOT. Each was selected because they were viewed as helping advance MassDOT's strategic goals and mission of "delivering excellent customer service to people traveling in the Commonwealth by providing transportation infrastructure that is safe, reliable, robust, and resilient" (https://www.mass.gov/orgs/massachusetts-department-of-transportation).

Active MassDOT Research Projects, FFY 2019

Short-Term Research Projects
1. Improved Rating for Deteriorated Bridge Steel Beams with Deteriorated Stiffeners (In Progress)
2. Evaluation and Enhancement of MassDOT Traveler Information Programs (Completed)
3. Risk Factors for Older Pedestrian Injuries and Fatalities in MA (Completed)
4. Traffic Flow Improvements: Quantifying the Influential Regions and Long-Term Benefits (Completed)
Medium-Term Research Projects
1. The Application of Unmanned Aerial Systems in Surface Transportation (Completed)
2. Optimizing Americans with Disabilities Act (ADA) Paratransit (Completed)
3. GHG Reduction Strategy Analysis (Ended upon completion of Task 1 due to inconclusive literature review results)
4. Public Health Assessment for Transportation Projects (Completed)
Long-Term Research Projects
1. Translating Data Generated by the Transit App into Insights on Transportation Use in Greater Boston (In Progress)
2. Characterization of Reclaimed Asphalt Pavement (In Progress)
3. Development of Load Rating Procedures for Deteriorated Steel Beams Ends (Completed)
Cooperative Research Program Projects
1. Improved Pedestrian Infrastructure Inventory in Massachusetts Using Mobile LiDAR (Completed)
2. PERCEPT Indoor Navigation System for Visually Impaired: Beta Study (Completed)
3. Commuter Bus Demand, Incentives for Modal Shift and Impact on Greenhouse Gas Emissions: Part II Service Design Concepts (Completed)
4. Compost Topsoil in Erosion Control and Vegetation Establishments (Completed)
5. Estimating Future Changes in 100-year Floods on the Connecticut and Merrimack Rivers (Completed)

Short-Term Research Projects



1. Improved Load Rating Procedures for Deteriorated Steel Beam Ends with Deteriorated Stiffeners

Principal Investigators: Dr. Simos Gerasimidis and Dr. Sergio Breña, UMass Amherst
MassDOT Project Champion: Alexander Bardow
Allocated Funding Amount: $100,000

Project Overview: This study builds upon earlier research by the same Principal Investigators regarding the inspection and evaluation of corroded steel beam ends on bridges, with this phase of the research focusing on bridges with stiffened. The purposes of this study are to experimentally test deteriorated stiffened beams, analyze the stiffened beam-end corrosion topologies utilizing high-fidelity Finite Element Models (FEM), and then introduce updates for the MassDOT Bridge Manual accordingly.

- Main Research Objectives:
  - Identify the common shapes for and locations of stiffened steel beam end deterioration using data from inspection reports of bridges in Massachusetts
  - Experimentally test real corroded stiffened beams from replacement or rehabilitation projects
  - Conduct computational work using FEM to validate the experimental findings
  - Update the Bridge Manual guidelines with new load rating procedures for deteriorated steel beam ends

Timeframe: Expected Completion March 2021

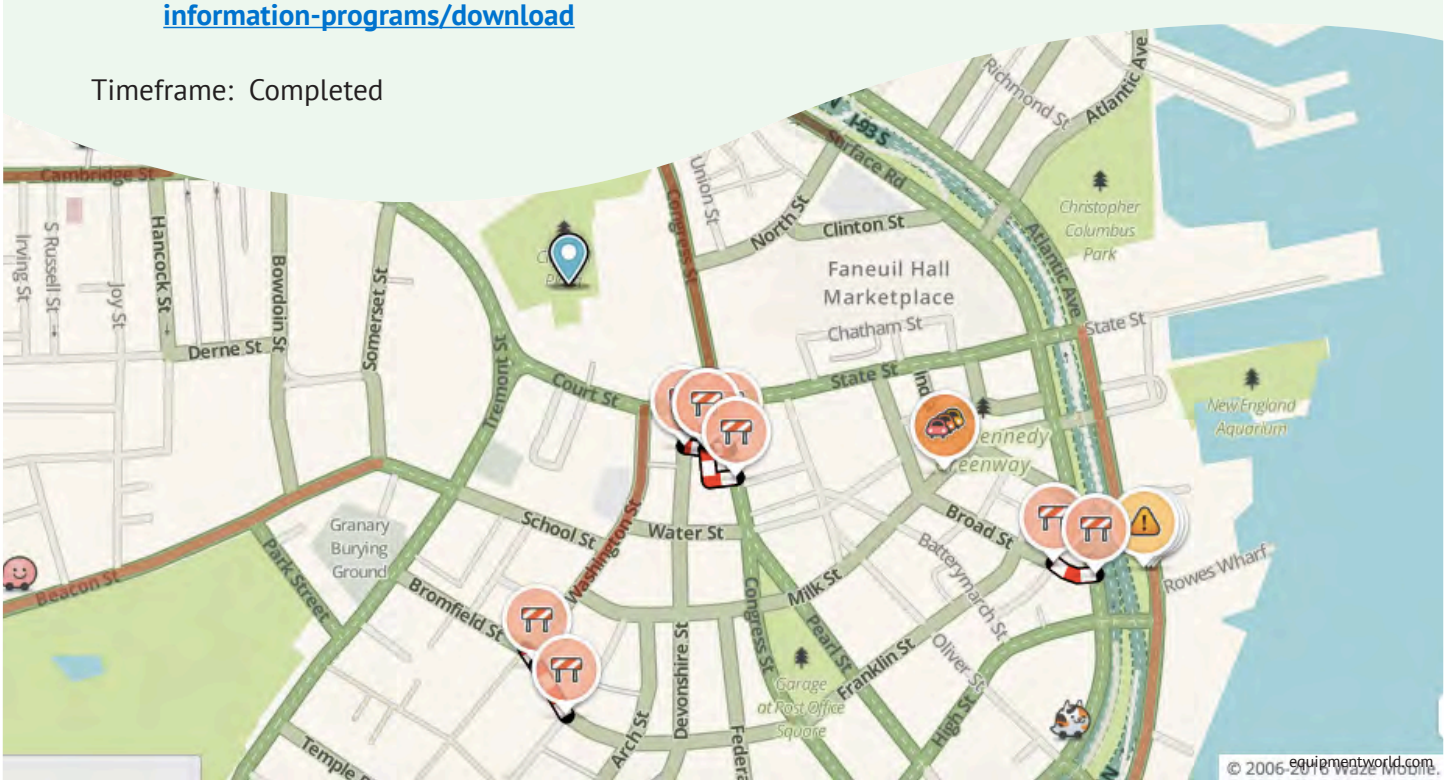
2. Evaluation and Enhancement of MassDOT Traveler Information Programs

Principal Investigators: Dr. Polichronis Stamatiadis, Dr. Nathan Gartner, Dr. Yuanchang Xie, and Dr. Danjue Chen, UMass Lowell
MassDOT Project Champion: Lorenzo Parra
Allocated Funding Amount: $100,000

- Project Overview: There are currently a number of available platforms for traveler information (TI) dissemination, with each platform having different benefits and target audiences. The project developed a proposed structure of various modal TI platforms that could be integrated and supported by the TI technologies. The study also identified beneficial TI elements that are not currently available, and how current gaps could be addressed.

- Key Findings:
  - From the review of TI in similar states and regions, it was found that many highway agencies provide a platform that shares TI for multiple modes but that some of non-motor vehicle information (biking, parking) is largely static, and that highway and transit TI systems are largely separated. Some states provide TI for only interstate and state highways, not arterial roads.
  - More and more agencies are collaborating with third-party companies (such as Waze) for exchanging traffic data. However, there are few formal studies validating Waze or DOT traffic data, or assessing the performance of TI and reliability of TI from different sources.
  - There is a trend towards greater automation for detecting/verifying incidents and posting alerts.
  - The project report's makes short-term and longer-term recommendations for MassDOT on enhancing its TI, and how a comprehensive set of multimodal TI services, including additional TI datasets and coverage, and with better connectivity to other traveler resources, could potentially be created and disseminated.
- Web link to Final Report: www.mass.gov/doc/evaluation-and-enhancement-of-massdot-traveler-information-programs/download

Timeframe: Completed



3. Risk Factors for Older Pedestrian Injuries and Fatalities

Principal Investigators: Dr. Elizabeth Dugan, Dr. Shuangshuang Wang, Dr. Nina Silverstein, Dr. Chae Man Lee, and Dr. Frank Porell, UMass Boston
MassDOT Project Champion: Bonnie Polin
Allocated Funding Amount: $100,000

- Project Overview: This research identified risk factors and community characteristics contributing to older pedestrian crashes and suggested leveraging the state's age-friendly efforts to speed the implementation of countermeasures. Based on ten-year statewide crash data (2006-2015) and community indicators from the 2018 Massachusetts Healthy Aging Data Report, this study examined 4,472 crashes across Massachusetts that involved pedestrians age 55 and over.

- Key Findings:
  - Leading driver-related reasons for crashes involving older pedestrians included driver inattention, driver failure to yield the right-of-way to the pedestrian, and driver failure to see the pedestrian.
  - Other factors contributing to older pedestrian crashes were time of day (rush hour), time of year (winter), and community factors (higher rates of disabilities; higher percentage of racial minority residents; lack of dementia-friendly community efforts).
  - Greater awareness of older pedestrian safety risks is needed. For improving awareness of their risks and spurring innovations to improve safety, convening and engaging stakeholders is recommended.
  - Also recommended are increases in the number, safety, and visibility of crosswalks, and in the prioritizing of pedestrian infrastructure improvements in communities with the highest risks.
- Web link to Final Report: **www.mass.gov/doc/risk-factors-for-older-pedestrian-injuries-and-fatalities-in-massachusetts/download**

Timeframe: Completed

4. Traffic Flow Improvements: Quantifying the Influential Regions and Long-Term Benefits

Principal Investigators: Dr. Yuanchang Xie and Dr. Danjue Chen, UMass Lowell
MassDOT Project Champion: Ethan Britland and Derek Krevat
Allocated Funding Amount: $100,000

- Project Overview: For this project, a synthesis study was conducted on the full-scale effects of Traffic Flow Improvements (TFI) strategies in terms of their influential regions and the changes in improvements over time. The synthesis consisted of three main tasks: a review of common TFI strategies and their impacts on congestion mitigation and emission reduction; a review of methods for quantifying the impacts of Congestion Mitigation Air Quality TFI strategies; and a survey of practitioners.

- Key Findings:
  - Most transportation agencies do consider the long-term impacts of TFI projects.
  - Some agencies also examine the regional impacts of TFI projects based on their size and significance.
  - Few agencies consider the induced demand impacts.
  - Challenges in quantifying TFI benefits include: lack of resources, documented tools/models, and consistent evaluation standards; and lack of project post evaluations.
- Web link to Final Report: www.mass.gov/doc/traffic-flow-improvements-quantifying-the-influential-regions-and-long-term-benefits-0/download

Timeframe: Completed

Medium-Term Research Projects

1. The Application of Unmanned Aerial Systems in Surface Transportation

Principal Investigators: Dr. Michael Knodler, Dr. Michael Plotnikov, Dr. Daiheng Ni, and Dr. Cole Fitzpatrick, UMass Amherst; Lance Fiondella and Walaa Mogawer, UMass Dartmouth; Yuanchang Xie, Danjue Chen, and Tricia Chigan, UMass Lowell
MassDOT Project Champion: Jeffrey DeCarlo
Allocated Funding Amount: $400,000

- Project Overview: This research project was established to assist MassDOT in the development of a pilot program for applying unmanned aerial system (UAS) technology to address surface transportation needs in the Commonwealth. The project examined and assessed a number of potential UAS applications for surface transportation, as well as the advantages, challenges, and other aspects of UAS implementation. This project included six overlapping groups of researchers each studying different aspects of potential UAS use. The areas studied included the use of UAS for bridge and rail inspections, roadway pavement assessments, highway speed sensing, and emergency incident management. The study also inventoried and evaluated current UAS situational awareness and counter UAS technologies and available off-the-shelf projects, and assessed UAS cybersecurity threats and potential countermeasures.

- Key FIndings:
  - UAS technologies hold great potential for bridge and rail inspections and monitoring, roadway pavement and speed management, and emergency response.
  - However, there are some security and safety challenges, and potential challenges with integrating UAS into current practices.
  - The next step of this research should focus on the integration of UAS and implementation of UAS technology and applications for surface transportation purposes.
- Web link to Final Report: www.mass.gov/lists/unmanned-aerial-systems-in-surface-transportation-final-report

Timeframe: Completed

2. Optimizing ADA Paratransit Operation with Taxis and Ride Share Programs

Principal Investigator: Dr. Eric Gonzales, UMass Amherst
MassDOT Project Champion: Ben Schutzman, MBTA
Allocated Funding Amount: $100,000

- Project Overview: This project analyzed the operations and ridership of the MBTA's The RIDE van service, and the demand and costs impact of a pilot program that offered customers subsidized paratransit trips via alternative service providers (Uber, Lyft, and Curb).

- Key Findings:
  - This research estimated that if all eligible paratransit customers were offered trips via alternative service providers, the effect on The RIDE services would be a reduction in the RIDE demand of 42%, but that there would be an increase in total travel of 33% due to induced demand for trips with the alternative providers.
  - These effects together would correspond to an estimated 26% reduction in the MBTA's paratransit costs.
  - The research team developed a model to estimate the marginal cost of each requested trip and to optimize allocation of requests to The RIDE or an alternative provider. Overall, the potential effect of using this model for decision making was a 40-48% estimated reduction in the MBTA's paratransit operating costs.
- Web link to Final Report: www.mass.gov/doc/optimizing-ada-paratransit-operations-with-taxi-and-ride-share-programs-0/download

Timeframe: Completed

3. Greenhouse Gas (GHG) Reduction Strategy Analysis

Principal Investigators: Dr. Danjue Chen and Dr. Yuanchang Xie, UMass Lowell

MassDOT Project Champion: Shannon Greenwell

Allocated Funding Amount: $200,000

- Project Overview: MassDOT's primary approach for reducing greenhouse gas (GHG) emissions has been investment in transportation projects and programs that reduce congestion and promote low GHG emission transportation options such as transit, walking, and bicycling. Investments thus far have included traditional capital projects such as new sidewalks and bike lanes, improved intersections, and the purchase of cleaner transit vehicles. This project will examine and evaluate additional GHG-reducing investment strategies.

- Main Research Objectives/Findings;
  - After completing Task 1, a thorough literature review on the cost-benefit analysis methodology for various GHG reduction measures (a list of pre-identified measures to promote walking, biking, using transits), both sides came to the conclusion that there is not enough clear-cut evidence and data to carry out. Task 2, develop and recommend a methodology and a pilot. Due to the early termination, there is no final report.

Timeframe: Ended upon completion of Task 1 due to inconclusive literature review results.

4. Public Health Assessment of Transportation Projects

Principal Investigators: Dr. Eleni Christofa, UMass Amherst; Dr. Krystal Pollitt, Yale University; Karin Valentine Goins and Dr. Stephenie Lemon, UMass Medical School
MassDOT Project Champion: Elliot Sperling and Michael Bolduc
Allocated Funding Amount: $166,000

- Project Overview: Performance-based assessment of transportation projects related to public health factors is often missing from project evaluations. Health impact assessments require additional resources that are not always available. To address health more systematically, this project focused on identifying health metrics, tools, and data, and on developing a framework for assessing the health-related impacts of individual transportation projects and programs.

- Key Findings:
  - The information gathered in this study led to the creation of eight new project evaluation criteria in the areas of air quality, accessibility, equity, physical activity, and safety.
  - These criteria are recommended for incorporation into the MassDOT highway project scoring process.
  - The research identified and documented existing collaborations between departments of transportation and public health.
  - The research identified remaining research needs and challenges related to incorporating public health factors into transportation decision making, including limited data sets and availability.
- Web link to Final Report: www.mass.gov/doc/public-health-assessment-for-transportation-projects/download

Timeframe: Completed

Long-Term Research Projects

1. Translating Data Generated by the Transit App into Insights on Transportation Use in Greater Boston

Principal Investigators: Dr. Daniel O'Brien, Dr. Ryan Wang and Dr. Justin de Benedictis-Kessner, Northeastern University
MassDOT Project Champion:
Allocated Funding Amount: $300,000

◆ Project Overview: The third-party Transit app can now provide the MTBA with transit rider data that goes beyond that which the MBTA has previously had access to. The project seeks to combine data from the Transit app and other sources to obtain a better understanding of transit riders' travel patterns, and then use that understanding to improve transit planning and services for customers.

◆ Main Research Objectives:

- Develop and document a process for making Transit app data available to the MBTA for real-time tracking and historical analysis.
- Combine the app data with transit usage data from other sources for greater Boston
- Conduct initial studies regarding mobility, transit experiences and resiliency, to demonstrate the benefits of having the Transit app data.

Timeframe: Expected Completion in May 2021

2. Characterization of Reclaimed Asphalt Pavement (RAP) in Massachusetts

Principal Investigator: Dr. Walaa Mogawer, UMass Dartmouth
MassDOT Project Champion: Edmund Naras
Allocated Funding Amount: $783,000

- Project Overview: Reclaimed Asphalt Pavement (RAP) is a valuable recyclable material. It is comprised of aged asphalt binder and aggregates that can be used in new paving mixtures. This study seeks to determine the properties of RAP available in Massachusetts and develop guidelines to maximize the use of RAP without negatively impact the performance of pavement mixtures.

- Main Research Objectives:
  - Sample RAP currently in use, and characterize RAP binder and aggregates
  - Sample and characterize standard virgin binders to determine their ability to accommodate RAP
  - Determine if higher RAP contents can be used in surface course mixtures in Massachusetts
  - Measure the performance of hot mix asphalt surface course mixtures with higher RAP content

Timeframe: Expected Completion in August 2020

3. Development of Load Rating Procedures for Deteriorated Steel Beam without Stiffened Ends

Principal Investigators: Dr. Simos Gerasimidis and Dr. Sergio Breña, UMass Amherst
MassDOT Project Champion: Alexander Bardow
Allocated Funding Amount: $200,000

- Project Overview: MassDOT is increasingly witnessing instances of extensive corrosion at steel beam ends on some bridges. The primary objectives of this study were to (a) review MassDOT inspection reports of bridges without stiffening and with beam end corrosion to learn more about most common corrosion patterns, (b) experimentally test naturally corroded girders, and then (c) analyze the beam-end corrosion topologies using high-fidelity Finite Element Models (FEM).

- Key Findings:
  - During this research, a high-fidelity numerical Finite Element Model (FEM) was developed to predict the capacity of beam ends, and then the model was calibrated based on the data.
  - The model complied with the current procedures for strength evaluation of corroded girders and was compatible with the usually limited thickness measurements performed by state inspection engineers.
  - The research identified the factors that significantly impact the residual strength of deteriorated girders, and proposed new calculations/equations which better resemble the computational and experimental results.

- Web link to Final Report: **www.mass.gov/files/documents/2019/11/13/BeamEndsFinalReportOct_2019.pdf**

Timeframe: Completed

Cooperative Research Program Projects

umass.edu

1. Improved Pedestrian Infrastructure Inventory in Massachusetts Using Mobile LiDAR

Principal Investigator: Dr. Chengbo Ai, UMass Amherst
MassDOT Project Champion: John Moran
Allocated Funding Amount: $100,000

- Project Overview: This project developed a new pedestrian infrastructure inventory and new geometry measurement method by leveraging emerging mobile light detection and ranging (LiDAR), deep learning, and computer vision technologies including computer-aided algorithms for measuring sidewalks and curb ramps. The project focused on the State Route 9 corridor.

- Key Findings:
  - The project used its mobile LiDAR methodology to automatically process the State Route 9 corridor study area, and collect geo-coded data for 85 miles of sidewalk and 1,297 curb ramps.
  - The project demonstrated that mobile LiDAR is effective and efficient for network-level pedestrian infrastructure inventory and assessment.
  - The research team recommends implementing this method for a pedestrian infrastructure inventory of a larger network.

- Web link to Final Report: Should be uploaded on MassDOT page. **https://www.mass.gov/doc/improving-pedestrian-infrastructure-inventory-in-massachusetts-using-mobile-lidar-1/download**

  Other final products of this research were the geo-coded sidewalk inventory data layers.

Timeframe: Completed

2. PERCEPT Indoor Navigation System for Visually Impaired: Beta Study

Principal Investigators: Dr. Aura Ganz and Dr. James Schafer, UMass Amherst
MassDOT Project Champions: Logan Nash and David Barker, MBTA
Allocated Funding Amount: $100,000

Project Overview: The project field tested the PERCEPT navigation app and system in a MBTA station, evaluating its suitability for MBTA system-wide deployment. Designed by the research team, PERCEPT is an indoor navigation system for blind and visually impaired people, that uses real time location and detailed navigation technologies, including Bluetooth Low Energy (BLE) tags in stations.

- Key Findings:
  - The PERCEPT test participants' feedback was very positive.
  - The Bluetooth Low Energy infrastructure is robust and easy to maintain.
  - The PERCEPT application is robust – working well in a variety of testing conditions - and can be remotely monitored.

- Web link to Final Report: www.umasstransportationcenter.org/Document.asp?DocID=757

  In addition to the final report, the principal investigators provided the MBTA with a detailed BLE deployment documentation in order to leverage the BLEs for MBTA purposes.

Timeframe: Completed

umass.edu

3. Commuter Bus Demand Incentives for Modal Shift, and Impact on GHG Emissions (Part II)

Principal Investigators: Dr. Eric Gonzales and Dr. Eleni Christofa, UMass Amherst
MassDOT Project Champion: Abril Nova-Camino
Allocated Funding Amount: $100,000

- Project Overview: This research extended the work conducted in Part I of the project. MassDOT seeks to reduce Greenhouse Gas (GHG) emission from the transportation sector. In support of this goal, this project built on existing models of commuter mode choices to identify express commuter bus services and facilities that could most cost effectively reduce GHG emissions by attracting current drivers. The project considered the impact of dedicated lanes on highway shoulders and of bus stop locations and related facilities on potential commuter bus ridership and GHG reductions.

- Key Findings:
  - Running buses on existing feasible highway shoulders could improve bus travel times by up to 4 minutes, leading to double the reduction in GHG emissions with new commuter bus services compared to mixed traffic operations.
  - Bus stop placement within a town can affect ridership by factor of three, primarily by impacting walk-accessibility of the bus stop, and can make the difference between a route causing a net reduction in GHG emissions or not.

- Web link to Final Report: **https://www.mass.gov/doc/commuter-bus-demand-incentives-for-modal-shift-and-impact-on-ghg-emissions-part-ii-1/download**

Timeframe: Completed

4. Compost Blankets for Erosion Control and Vegetation Establishment

Principal Investigators: Dr. Jack Ahern, UMass Amherst
MassDOT Project Champions: Stephanie Smoot, George Bachelor
Allocated Funding Amount: $100,000

- Project Overview: This project focused on learning about the current use of compost blankets by state DOTs and others, and best practices for applying compost blankets to stabilize slopes and aid in native grass and for establishment on roadside slopes. This project reviewed the state of knowledge and existing best practices regarding the use of compost blankets for these purposes.

- Key Research Findings:
  - Compost blanket particle size distribution is important for erosion control effectiveness.
  - Compost blanket application is best performed with pneumatic blowers to assure even coverage. Native grass/forb seed is best applied as a separate layer mixed with a compost layer.
  - The timing of native species seeding is key to successful vegetation establishment on slopes.

- Web link to Final Report: www.mass.gov/doc/compost-blankets-for-erosion-control-and-vegetation-establishment-final-report/download

Timeframe: Completed

5. Estimating Future Changes in 100-year Floods on the Connecticut and Merrimack Rivers

Principal Investigators: Dr. Richard Palmer, UMass Amherst
MassDOT Project Champions: Lily Oliver
Allocated Funding Amount: $57,000

- Project Overview: This project investigated the potential climate change impacts on future flows of the main parts of the Connecticut River and Merrimack River within Massachusetts. The project utilized climate projections, and precipitation forecasts from 14 models, to estimate 100-year 24-hour extreme precipitation events and 100-year 24-hour flows in the near term (through 2060) and far-term (out to 2099).

- Key Findings:
  - For many counties in Massachusetts, future projections of 100-year, 24-hours extreme precipitation events show increases of 25% during the near term and over 50% in the far term.
  - Increases were also shown in the 100-year, 24-hour flow estimates.
  - These results suggest that infrastructure designed on historical hydrological events may not be adequate for the potential 100-year, 24-hour flows that may occur later this century.

- Web link to Final Report: **www.mass.gov/doc/estimating-future-changes-in-100-year-floods-on-the-connecticut-and-merrimack-rivers-0/download**

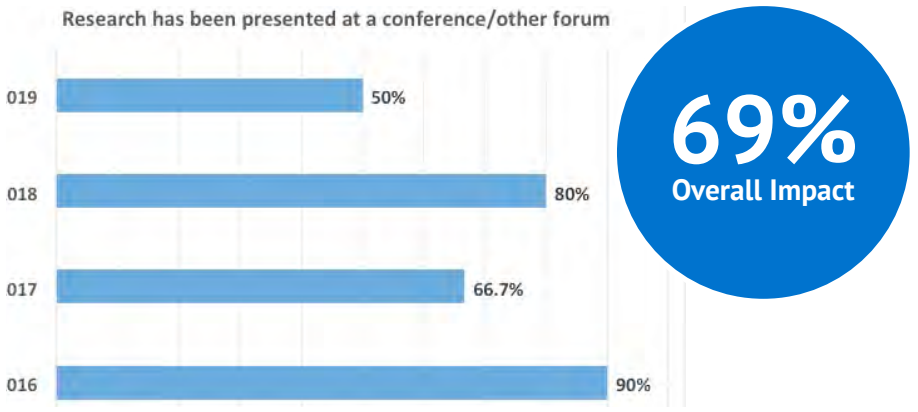
Timeframe: Completed

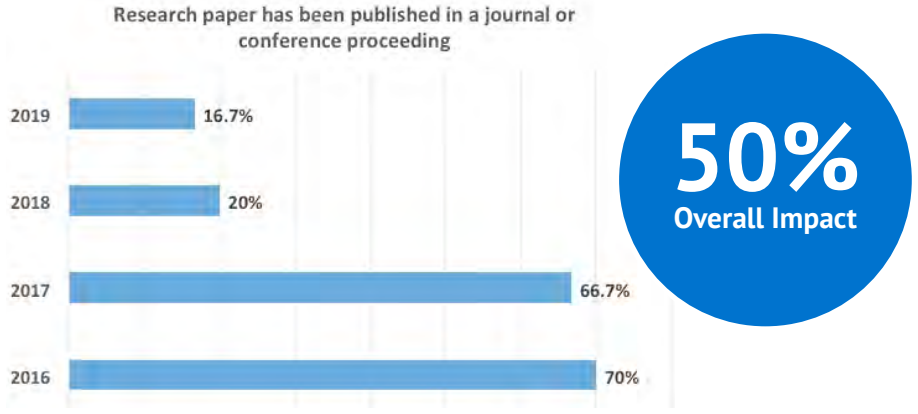
Research Impacts

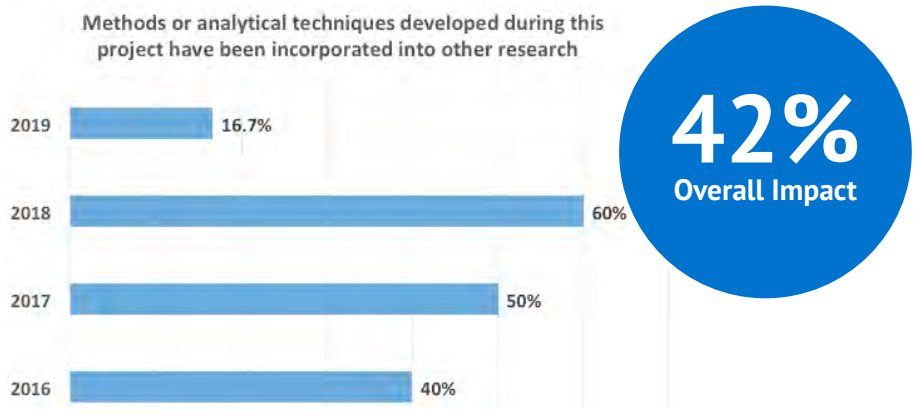
Impacts of Funded Research Projects

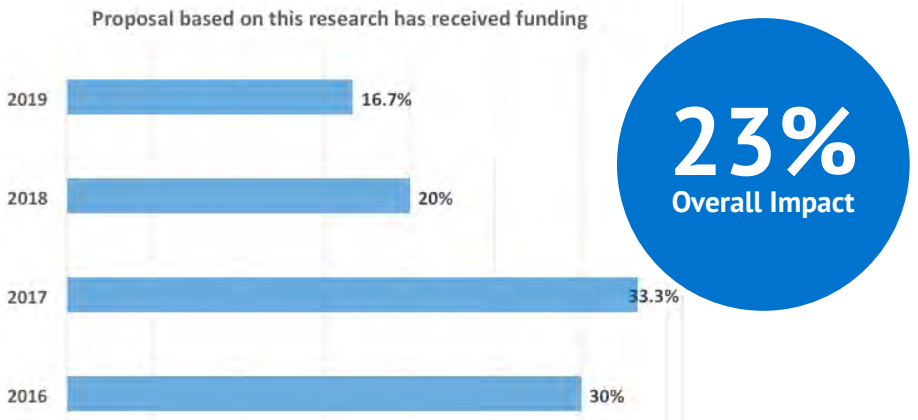
MassDOT is committed to tracking the implementation and impact of research going forward. New practices are currently underway to begin strengthening this tracking process. As part of this plan, MassDOT recently distributed a survey to researchers and MassDOT research project champions who collaborated on projects within the past few years. The intent of this was to see whether or not future implementation came from the research projects.

Two direct FFY19 research impacts included deliverables that changed the way MassDOT information is used. The Performance of Adhesive and Cementitious Anchoring Systems project changed MassDOT's criteria for accepting new products. Based on these findings, the researcher re-wrote the related specifications with the MassDOT Materials group, and with input from several manufacturers. Additionally, findings from the Development of Load Rating Procedures for Deteriorated Steel Beam Ends project resulted in a new set of procedures, updating the current bridge manual, which can now be used by state engineers to assess the remaining loading capacity of corroded steel girders more realistically. These updates are expected to be implemented in the following years.









Technology Transfer & Training Services

Training Courses

Baystate Roads held a total of 136 training courses during this year, attended by 2,212 participants, and with a combined 14,395 hours of instruction. Class topics included a broad variety of subject matter; most incorporated hands-on approaches to skills development. Among others, training topics included:

Baystate Roads

Baystate Roads (BSR) is the Massachusetts Local Technical Assistance Program (LTAP), providing training and technical resources to 351 municipalities across the Commonwealth. Through the development and implementation of an annual Baystate Roads training plan, classes (both online and in person) are offered to municipalities and their contractors based on local needs and MassDOT priorities. Courses, including customized training, are offered statewide from our technical training specialist.

During the FFY2019 year, BSR launched a variety of new services to better meet the needs of our municipal partners and their diverse demographic differences. One development was the establishment of a partnership between Baystate Roads and The Beaver Institute; a Massachusetts non-profit promoting effective, non-lethal control methods. The partnership led to the creation and Winter 2019 launching of an instructional video on the best management practices for beaver control, followed by a series of hands-on training and site assessment classes in the Spring. Beaver management can quickly become a significant consumer of local resources; time, money, and responses to property, roadway, and culvert damage that can result. Several months after completing this effort, a survey focused on the application of these approaches garnered numerous positive outcomes.

Training Provided & Data/Evaluation Strategies

Between April – June 2019, six Beaver Management Basics workshops were conducted across the state. This program presented an opportunity to develop a more thorough training evaluation process. Specifically, the class involved a new training topic, and one that offered a quicker turn-around time to apply the knowledge and skills gained. The program included a number of training approaches and evaluation components:

- A beaver management video had already been developed, and all participants were encouraged/reminded to view it prior to attending the class.
- A pre-training questionnaire, at the start of class, identified participants' current beaver problems, time/labor spent addressing the issue, and management strategies employed.
- A standard post training (Level 1) evaluation was completed.
- A post-training 'Stop, Start, Continue' form was also completed, highlighting anticipated changes, based on the training received. The form also helped identify which strategies people had learned in the class (Level 2).
- And finally, a brief email survey 3 months after training, provided feedback on specific strategy changes (Level 3).

Total people trained = 122
Communities represented = 50

Participants were provided classroom instruction, outside hands-on instruction in construction methods for making beaver deceivers, and taken on site visits to evaluate situations and effectiveness of various approaches installed.

Survey Results

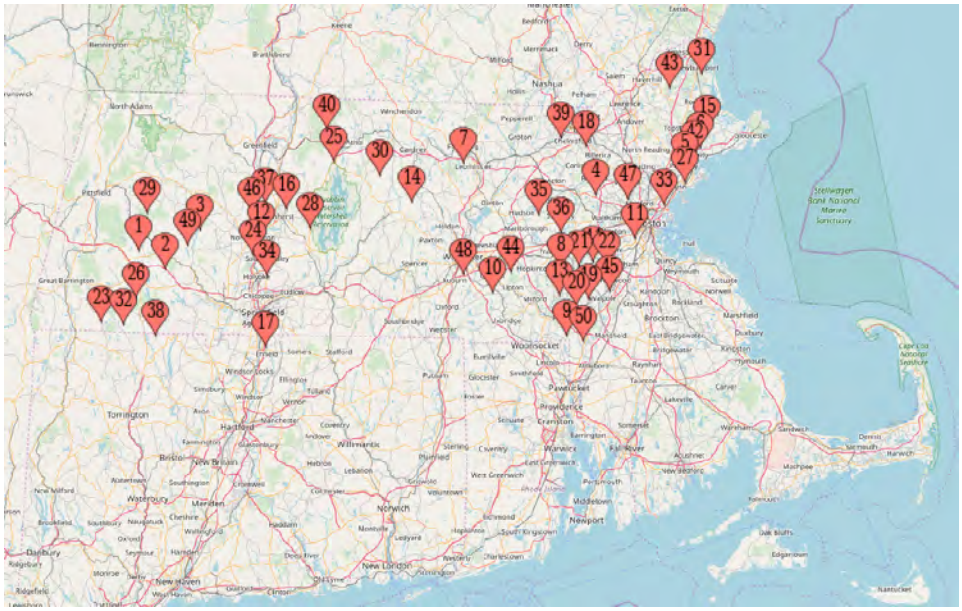
A brief email query was distributed to all participants, three months after completing the training.

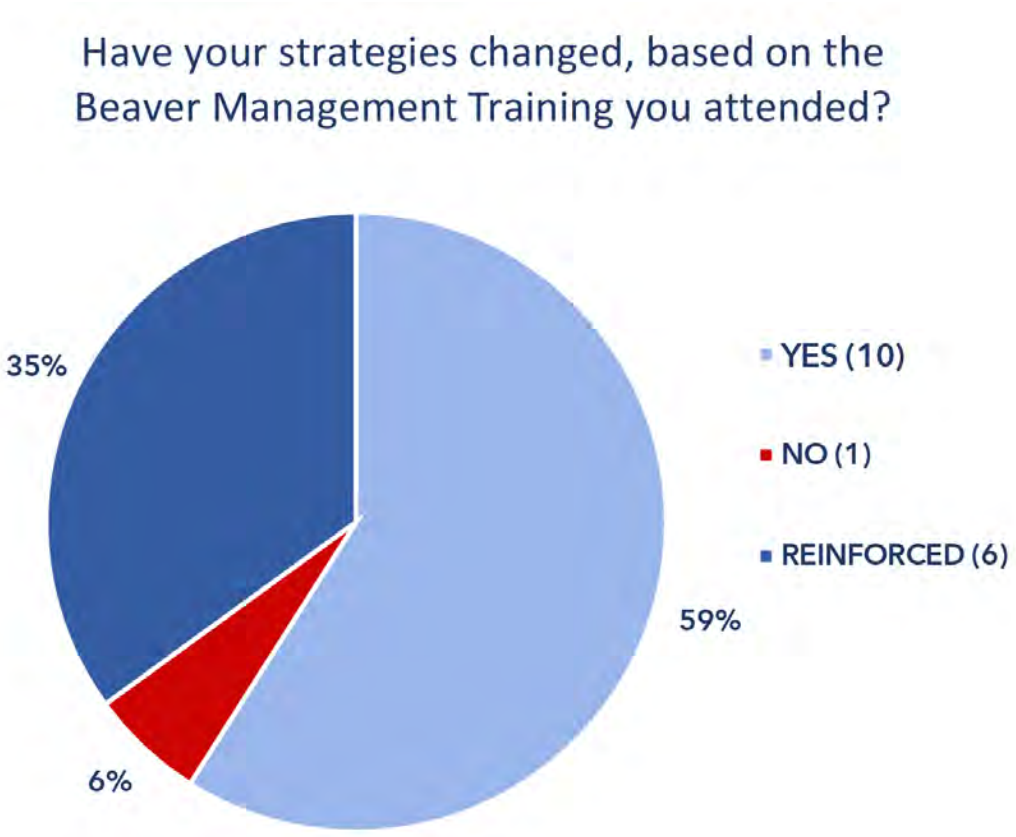
Participants survey responses = 17 (14%) Communities represented = 16 (27%)

Survey results were extremely favorable, with 94% reporting either changes to their approach, or a reinforcement of strategies previously undertaken.

94%

Reported either changing their approach, or a reinforcement of existing strategies



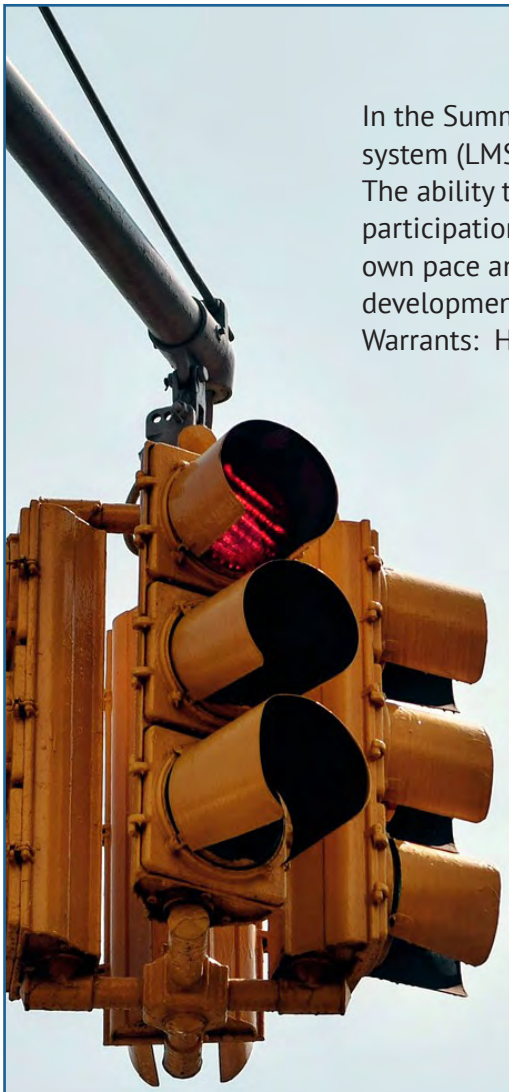


The post training comments below are from case studies of three participants, from locations across the state.

> ***We have changed our approach in planning options for beaver control, as the result of several people attending the training. Greater emphasis is placed on blocking access to places beavers now build dams leading to flooding as a preferred long-term solution to trapping beavers and destroying the dam, which would result in new beavers coming in and rebuilding.***

> ***Yes, we have changed our approach in that I was able to convince the DPW to utilize a beaver deceiver at a problem culvert.***

> ***We have put in a beaver deceiver and are waiting to see what happens when the beavers return.***

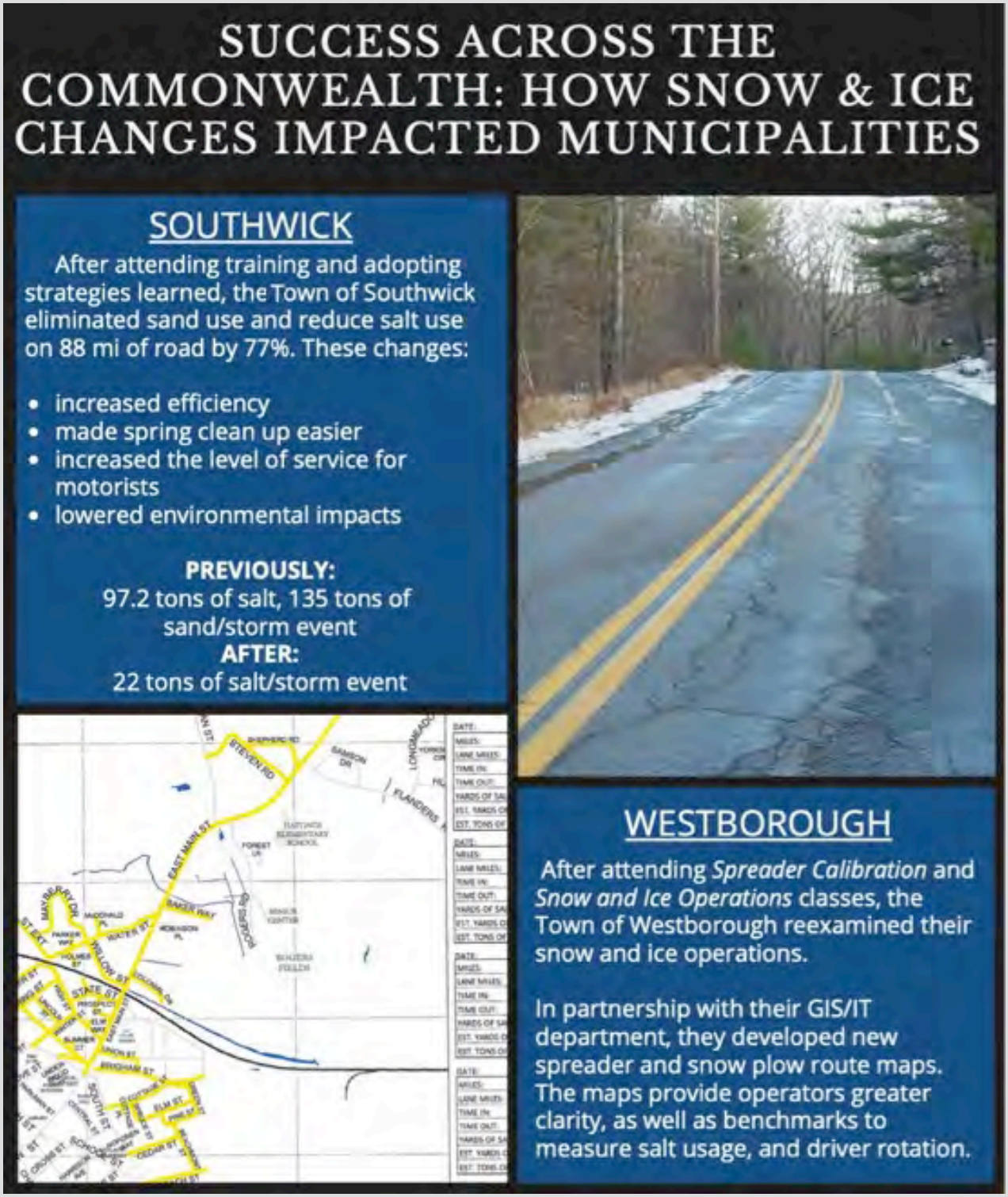


In the Summer of 2019, BSR announced the launch of a new learning management system (LMS) that permits UMTC and MassDOT to house and offer online training. The ability to develop new self-paced and blended learning options will grow participation by allowing the (increasingly tech-savvy) audience to learn at their own pace and convenience. Use of this platform was kicked off with in-house development and launching of a 12-module self-paced course on Traffic Signal Warrants: How to Perform, Assess, and Satisfy the Requirements of Each.

Snow & Ice Operations is one of Baystate Roads most popular courses, focusing on effective methods and planning for winter weather events. Topics include: environmental responsibility, equipment and technology usage, snow and ice control materials, and applying the best strategies and tactics.

Spreader Calibration training also includes essential tools for reducing salt consumption during operations, including techniques for correctly calibrating spreaders for proper pre-treatment and maintaining good roadway condition over time.

Surveys administered several months after training produced the following impacts, as reported from course participants:



Advisory Meetings

In support of these training events, Baystate Roads hosted two regional Advisory Meetings in FFY2019, garnering statewide representation at both. The goal of these gatherings was three-fold:

- To inform the LTAP audience of new program developments
- To identify and discuss municipal training needs, to investigate potential solutions
- To provide another avenue for MassDOT to connect with municipalities throughout the state and gather feedback for internal decision-making.

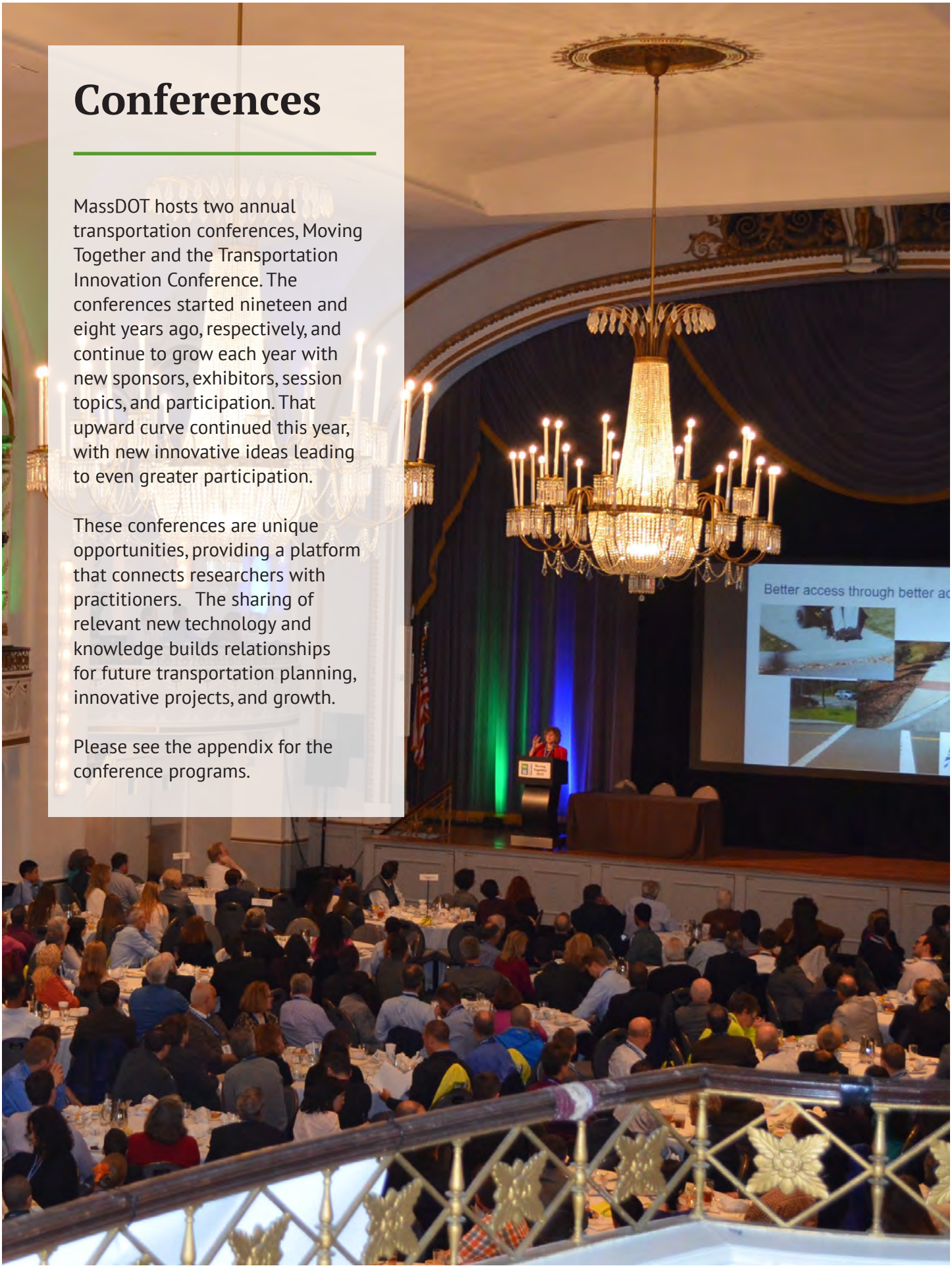
Meetings were hosted in Pittsfield on October 17, 2018 and in Sturbridge on March 12, 2019. Among numerous topics discussed were the Safe Routes to School program, evaluating training impact, applying new technology to increase training capacity, and classes on Liquid Deicers, Basic Rigging, Complete Streets, and Large Mower Operation and Safety.

Conferences

MassDOT hosts two annual transportation conferences, Moving Together and the Transportation Innovation Conference. The conferences started nineteen and eight years ago, respectively, and continue to grow each year with new sponsors, exhibitors, session topics, and participation. That upward curve continued this year, with new innovative ideas leading to even greater participation.

These conferences are unique opportunities, providing a platform that connects researchers with practitioners. The sharing of relevant new technology and knowledge builds relationships for future transportation planning, innovative projects, and growth.

Please see the appendix for the conference programs.



Moving Together, November 1, 2018

In 2018, MassDOT held its 19th annual active transportation conference, Moving Together. The conference was held on November 1, 2018 at the Park Plaza Hotel in Boston, with over 950 registrations for the one day, 17 session event. This year featured the use of an app to better track attendee participation in sessions, provide follow-up session evaluation, provide live feed updates, as well as an easily-accessible resource with which to access all conference information.

Stephanie Pollack, MassDOT Secretary and CEO, gave the keynote address and kicked off another year of the Safe Streets Smart Trips High School Video Contest showings. Another new highlight of this year's conference was the interactive and ongoing ability for participants to design their own Complete Streets space through a desktop-based app. In conjunction with this activity, they were able to ask relevant Complete Streets related questions to some of our engineers, who were able to address concerns participants may be facing in their communities.

Event Participation

957 Total Registrations

Presenters/Moderators/Guests*	118	12.3%
MassDOT/MBTA	183	19.1%
Federal Highway Administration	11	1.1%
Municipalities	126	13.2%
Regional Transit Agencies (in MA)	19	2.0%
Other Public Entities	71	7.4%
Private Companies	330	34.5%
Hosts	36	3.8%
Students	5	0.5%
Complimentary/Sponsor/Exhibitors	58	6.1%

**Anyone listed as a presenter/moderator is not also included in the counts for their organization type.*

Session Attendance

Transforming the Waterfront thru Active Transportation - 87
GeoDot Overview - 117
Knowledge Sharing Round-table #1 - Resource Guide for Pedestrian Walkability - 146
MBTA's Rail Vision - 148
Making the Commonwealth Safer - 57
Unlocking Economic Development thru Transit - 121
Measuring Performance: MassDOT's Pedestrian Plan, Focus 40, and Capital Investment Plan - 118
Knowledge Sharing Round-table #2 - New Mobility Services (Electric Pedal Assist, dock-less bikes, etc.) - 67
Regional Connectivity thru Trails - 83
Regional Connectivity thru Aging - 61
MassTrails Official Launch - 92
Complete Streets Implementation - 78
Innovative Technologies for Active Transportation - 67
Climate Resiliency and Transportation - 83
Focus on Customers: Transit Planning for People - 72
Road Inventory Submission App (RISA) - 8
Statewide Bicycle Plan and Municipal Resource Guide for Bikeability - 195

Transportation Innovation, April 9-10, 2019

The Transportation Innovation Conference was hosted at the Worcester DCU Center on April 9-10, 2019. One of the biggest changes and highlights this year was the addition of a nationally recognized keynote speaker. Carlos Braceras, Executive Director of the Utah Department of Transportation and the AASHTO President in FFY19, joined MassDOT Secretary and CEO, Stephanie Pollack, for the keynote address and spoke about UDOT's experience on how to better innovate the transportation system and promote and capitalize on innovative efforts at a statewide level. Other conference highlights included the full incorporation of a new mobility session track, to support transportation efforts focused on mobility needs, and the addition of exhibitor-designed parklets, to engage participants in thinking about other methods to incorporate complementary infrastructure for more diverse roadway users.

Event Participation

Total Registrations: 1,293		
Presenters/ Moderators/ Guests	199	15.4%
MassDOT/MBTA	262	20.3%
Federal Highway Administration	15	1.2%
Municipalities	104	8.0%
Regional Transit Agencies (in MA)	31	2.4%
Other Public Entities	47	3.6%
Non-profits	57	4.4%
Private Companies	435	33.6%
Hosts	49	3.8%
Students	11	0.9%
Complimentary/ Sponsor/Exhibitors	83	6.4%

**Anyone listed as a presenter/moderator is not also included in the counts for their organization type.*

Session Attendance

Walkability for People of All Ages and Abilities – 85
New Shared Mobility: Electric Scooters, Electric Assist Bicycles, and What's Next – 73
Kelley Square Reimagined – 85
Innovative Approaches to Mobility for Low-Income Individuals – 96
Advancements in Cement Concrete Research and Testing – 75
Flying Colors: How Teamwork & Technology Drove the Success of Highham's Route 3A Road Diet Pilot Program – 81
New England Community Transportation Roundtable – 105
From Ground to Cloud: The Future of LIMMS – 80
Reducing Social Isolation through Age and Dementia-Friendly Transportation – 120
Employment Transportation – 135
Implementing a GIS-based Safety System – 90
Strength Evaluation of Corroded Beam Ends – 87
MassDOT's Project Delivery Process – Updates and Changes – 82

Please see the conference program in the appendix for the complete list of sessions.

National and Regional Research Collaboration

From the TRB Committees that currently exist, MassDOT members participate in a number of them in order to share knowledge of best practices across many different transportation platforms. MassDOT also has representation on the TRB administered research panels. These panels are made up of experienced practitioners and research specialists from across the country, providing technical guidance on certain transportation research projects. Transportation Pooled Funds allow MassDOT to continue to collaborate with FHWA and other DOTs on the regional and national level to fund effective transportation research in a cost efficient manner.

TRB standing committees and projects with MassDOT representation

Standing committees
Standing Committee on Airport Terminals and Ground Access
Standing Committee on Economic Development and Land Use (member)
Standing Committee on Equity in Transportation
Standing Committee on Performance Effects of Geometric Design
Review of Federal Highway Administration Infrastructure R&D – Expert Task Group on Bridges
Standing Committee on Strategic Management
Standing Committee on Transportation Safety Management Systems
Standing Committee on Safety Performance and Analysis

Projects
NCHRP Project Panel on Effective Use of Duplex Coating Systems to improve Steel Bridge Structure Durability
ACRP Project Panel on Airfield Pavement Markings - Effective Removal and Temporary Application Techniques
TCRP Project Panel on Mobility Inclusion for Un(der)served Population with the Emerging Technologies
NCHRP Project Panel on Support for Critical Issues in Transportation and Commitment to the Future HIS
NCHRP Project Panel on Bridge Deck Overhangs with MASH-Compliant Railings
NCHRP Project Panel on Integrating Freight Movement into 21st Century Communities' Land Use Design, and Transportation Systems
NCHRP Project Panel on Structural Testing and Design Methodology for Single Column-Single Shaft Foundation Considering the Flexural Capacity of Steel Casing
NCHRP Project Panel on Guidelines to Improve the Quality of Element-Level Bridge Inspection Data
NCHRP Project Panel on Update of a Guide to Emergency Response Planning at State Transportation Agencies
ACRP Project Panel on Benefit-Cost Analyses for Airport Stormwater Infrastructure Improvements
ACRP Project Panel on Evaluating the Effectiveness of Hazard Zoning at General Aviation

NCHRP Project Panel on Methods for Characterizing Roughness of Urban Pavements
NCHRP Project Panel on Effectiveness of Work Zone Transportation Management Plan Strategies
NCHRP Project Panel on Acceptance Criteria of Complete Joint Penetration Steel Bridge Welds Evaluated Using Enhanced Ultrasonic Methods
ACRP Project Panel on Collecting and Using Pavement Condition Index Data In Airport Decisions
NCHRP Project Panel on Synthesis of the Performance of Portable Concrete Barrier Systems
NCHRP Project Panel on Leveraging Big Data to Improve Traffic Incident Management
NCHRP Project Panel on Strand Debonding for Pretensioned Girders
NCHRP Project Panel on Minimum Flexural Reinforcement Laboratory Testing
NCHRP Project Panel on Guidebook for Implementing Alternative Technical Concepts into All Types of Highway Project Delivery Methods
NCHRP Project Panel on Essential Communications
NCHRP Project Panel on State DOT Contributions to the Study, Investigation, and Interdiction of Human Trafficking
TCRP Project Panel on Guidebook for Deploying Zero Emissions Transit Vehicle Fleets
NCHRP Project Panel on Developing Crash Modification Factors for Corridor Access Management
NCHRP Project Panel on Estimating Effectiveness of Safety Treatments in the Absence of Crash Data
NCHRP Project Panel on Safety Performance of Part-Time Shoulder Use on Freeways Review of Federal Highway Administration Infrastructure R&D – Expert Task Group on Bridges
NCHRP Project Panel on Evaluation of Bridge Rail Systems to Confirm AASHTO MASH Compliance
NCHRP Project Panel on Updating Safety Performance Functions for Data-Driven Safety Analysis
NCHRP 20-05/Topic 51-03 “Pavement Markings Placement and Removal Practices and the Effect on Work Zone Safety”
NCHRP Project Panel on Operational Standards for Highway Infrastructure
NCHRP Project Panel on Organizational and Operational Models used by State DOTs for Emergency Response
NCHRP Project Panel on Alternative Technologies for Mitigating the Risk of Injuries and Deaths in the Work Zone
NCHRP Project Panel on Application of Federal Funding Flexibility at the State DOTs
NCHRP Project Panel on FloodCast: A Framework for Enhanced Flood Event Decision Making for Transportation Resilience – Phase IV
NCHRP Project Panel on Emergency Management in State Transportation Agencies
TCRP Project Panel on An Update on Public Transportation’s Impacts on Greenhouse Gas Emissions
NCHRP Project Panel on Deploying Transportation Security Practices in State DOTs
NCHRP Project Panel on Assessing the Impacts of Connected, Automated and Autonomous Vehicles on the Future of Transportation Safety
NCHRP Project Panel on Proposed AASHTO Highway Safety Manual, Second Edition
NCHRP Project Panel on Methods of Short-Term Crash Prediction
NCHRP Project Panel on Incorporating Driver Behavior Considerations in Safety Performance Estimates on Infrastructure Improvements

NETC Participation

The New England Transportation Consortium (NETC) is a cooperative research effort that includes state DOTs from Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. The NETC is a valuable regional partnership for the identification and dissemination of shared transportation research initiatives.

The NETC Advisory Committee includes representatives from the state DOTs, FHWA, and New England state universities (including the University of Massachusetts, represented by the UMTC). MassDOT's involvement in NETC includes an annual financial contribution for research projects, collaboration on annual project solicitation and prioritization, and participation on project technical committees, and in monthly meetings and annual events.
New NETC research projects include:

- Quick Response Project: 2019 Infrastructure and Climate Network Workshop
- Integration of Unmanned Aircraft Systems (UAS) into Operations Conducted by State Departments of Transportation
- Framework of Asphalt Balanced Mix Design (BMD) for New England Transportation Agencies
- Development of MASH Computer Simulated Steel Bridge Rail and Transition Details

The following NETC research projects were completed during FFY19:

- Quick Response: New England Connected Automated Vehicles
- Development of High Early-Strength Concrete for Accelerated Bridge Construction Closure Pour Connections
- Quick Response: Quality Assurance (QA) Processes for Asphalt Pavement Construction in the Northeast
- Quick Response: Quantification of Research Benefits
- Measuring the Effectiveness of Competency Models for Job-Specific Professional Development of Engineers and Engineering Technicians
- Using the New SHRP2 Naturalistic Driving Study Database to Examine Safety Concerns for Older Drivers
- Use of Forested Habitat Adjacent to Highways by Northern Long Ear Bats (and Other Bats)

MassDOT subject matter experts from bridge, environment, materials and research participated in the 2019 NETC Symposium which was held in Concord, NH on June 19, 2019 and included a full day of learning, sharing and discussion.

Appendix

SCHEDULE AT A GLANCE

PROGRAM TRACKS: MP (MULTIMODAL PLANS) ED (ECONOMIC DEVELOPMENT) D (DATA)

REGISTRATION/EXHIBITS: 7:45 am - 8:30 am

WELCOME SESSION: 8:30 am - 9:15 am

Grand Ballroom A

Stephanie Pollack, Secretary of Transportation & Chief Executive Officer, MassDOT
Monica Tibbits-Nutt, Morning Keynote, Director, Fiscal Management Control Board & MassDOT Board of Directors
Pete Sutton, Master of Ceremonies, Bicycle and Pedestrian Program Coordinator, MassDOT

BREAK/EXHIBITS: 9:15 am - 9:30 am

CONCURRENT SESSION #1: 9:30 am - 10:45 am

Session 1A – Transforming the Waterfront through Active Transportation - ED

Georgian Room

Active transportation and outdoor community activities are transforming former industrial or otherwise neglected waterfront areas. Learn how new trails, parks swimming sites, and ferries are being added to repurpose these areas. Attendees will also hear about ferry access to many of Boston's harbor islands, as well as opportunities for bicycle and pedestrian exploration on the islands.

Panelists:
Amber Christofferson, Mystic River Watershed Association
Laura Jasinski, Charles River Conservancy
Alice Brown, Boston Harbor Now
Moderator:
Nathan Peyton, MassDOT

Session 1B – GeoDOT Overview – Building Municipal Partnerships through Data Sharing - D

Berkeley/Clarendon Rooms

Create your own personal transportation data maps. MassDOT's GeoDOT is an internet based interactive mapping and data sharing system. Attendees will learn several key program features such as project initiation, mapping, and data collection through the GeoDOT portal. Examples of successful implementation at the regional planning and municipal levels will be highlighted. We will also be introducing a new tool for municipalities to update their Road Inventory attributes and mileage. Learn more about the Road Inventory Submission Application (RISA) during Session 3H.

Panelists:
Quinn Molloy, MassDOT
Andy McCaul, Pioneer Valley Planning Commission
Mike Bolduc, MassDOT
Moderator:
Jose Simo, MassDOT

Session 1C – Knowledge Sharing Round Table #1 - Statewide Pedestrian Plan Municipal Resource Guide for Walkability

First Floor Studio 1

Since its successful launch at last year's 2017 Moving Together conference, MassDOT's Municipal Resource Guide for Walkability has become a valuable resource to communities across the Commonwealth. Learn how best practices from the Guide are being utilized at the local and regional levels. This panel will start with overviews from four different perspectives followed by discussions on outreach, challenges and how adoption can be best achieved.

Panelists:
John Bechard, MassDOT
Steven Tyler, Howard Stein Hudson
Dan Daniska, Central Massachusetts Regional Planning Commission
Stacey Beuttell, WalkBoston
Moderator:
Pete Sutton, MassDOT

Session 1D – MBTA's Rail Vision and First/Last Mile Solutions for Commuter Rail

Arlington Room

The MBTA's Rail Vision is an effort to identify how we can reshape commuter rail service to better align with the needs of our growing and changing region. This panel brings together representatives from across the commuter rail network whose experiences and perspectives provide insight into the issues and solutions to improving first/last mile access to and from important regional job centers and residential clusters along the commuter rail network.

Panelists:
Stephanie Cronin, Middlesex 3 Coalition
Sarah Hamilton, Medical Academic and Scientific Community Organization
Paul Matthews, 495 MetroWest Corridor Partnership
Moderator:
Scott Hamwey, MassDOT

Session 1E – Making the Commonwealth Safer: It Takes All of Us - MP

First Floor Studio 2

Roadway fatalities and serious injuries have dropped by 19% since the launch of the first Massachusetts Strategic Highway Safety Plan (SHSP) in 2006. This session will feature a variety of initiatives from the SHSP that helped to increase safety for roadway users. Topics will include bicycle and pedestrian upgrades as part of a MassDOT highway safety improvement project, the role of the Traffic Records Coordinating Committee in improving the statewide crash data system, changes to the Massachusetts Young Driver law and continued growth of the Safe Routes to School program.

Panelists:
Brook Chipman, Executive Office of Public Safety and Security
Cassandra Gascon-Bligh, MassDOT
Laura Ferreira, City of Fall River
Sara Lavoie, MassDOT Registry of Motor Vehicles
Moderator:
Michael Clark, MassDOT

BREAK/EXHIBITS: 10:45 am - 11:00 am

CONCURRENT SESSION #2: 11:00 am - 12:15 pm

Session 2A – Unlocking Economic Development through Transit - ED

Georgian Room

This panel will feature transportation projects that act as economic generators at the neighborhood, corridor, and city-wide levels. Featured projects include the Silver Line Gateway extension from Logan Airport through Chelsea's new dedicated transportation corridor, upgrades in Springfield's bus and rail network to serve the new MGM Resort Casino, and recent developments that incorporate transit into the revitalization of Lawrence.

Panelists:
Scott Bosworth, MassDOT
Daniel Rivera, Mayor of Lawrence and Merrimack Valley Regional Transit Authority Board Member
Price Armstrong, Pioneer Valley Transit Authority
Moderator:
Tom Schiavone, MassDOT Rail and Transit Division

Session 2B – Measuring Performance: MasDOT's Pedestrian Plan, Focus40 and Capital Investment Plan - D

Berkeley/Clarendon Rooms

MassDOT's annual Capital Investment Plan (CIP) development has been an evolution of data and performance driven processes. This session will discuss current planning efforts such as Focus40 and the statewide bicycle and pedestrian plans. Attendees will hear how tying these data driven efforts into effective performance-based investment planning will help inform the current and future CIP.

Panelists:
Jennifer Slesinger, MassDOT
Michelle Danila, MassDOT
Bryan Pounds, MassDOT
Moderator:
Nicholas Zavolas, MassDOT

Session 2C – Knowledge Sharing Round Table #2 - Electric Pedal Assist, Dockless Bikeshare, and Motorized Scooters as New Mobility Services

First Floor Studio 1

One of the hotly contested transportation topics this year revolves around the recent surge of dockless bikeshare, e-bikes and motorized scooters into the open market. While their expanding presence has led to greater use of non-motorized travel, there are some issues that threaten the access to mobility options. This panel will start with presentations on four successful programs followed by discussions on how challenges can be overcome.

Panelists:
Joseph Barr, City of Cambridge
Catherine Ratte, Pioneer Valley Planning Commission
Kasia Hart, Metropolitan Area Planning Council
Michael Gagne, Town of Mattapoisett
Moderator:
Jackie DeWolfe, MassDOT

Session 2D – Regional Connectivity through Trails across the Commonwealth - MP

First Floor Studio 2

In the quest for statewide connectivity, various metropolitan planning organizations are working to establish growing regional networks for active transportation. This session will showcase the expanding Coastal Trails Coalition's work through the Merrimack Valley, the fifty-mile South Coast Bikeway that links through ten communities, and long-range plans to extend the trail system on Cape Cod.

Panelists:
Betsy Goodrich, Merrimack Valley Planning Commission
Jackie Jones, Southeastern Regional Planning and Economic Development District
Lev Malakhoff, Cape Cod Commission
Moderator:
Richard Fries, Best Buddies

Session 2E – Governor's Council on Health and Aging - Working to Become the Most Age-friendly State

Arlington Room

Learn how Massachusetts is developing a plan to promote healthy aging to achieve the goal of making the Commonwealth an age-friendly state. Panelists will discuss ongoing work to address aging in place by improving transportation options and mobility-related resources. This session will also include strategies and approaches intended to have a positive impact for older adults with their varying needs in our communities.

Panelists:
Aniko Laszlo, MassDOT
Robin Lipson, Executive Office of Elder Affairs
Wendy Wang, UMASS Boston Gerontology Institute
Moderator:
Cindy Campbell, AARP

LUNCHEON/SECRETARY'S KEYNOTE ADDRESS/VIDEO AWARDS: 12:15 pm - 1:15 pm

Grand Ballroom A

Stephanie Pollack, Secretary of Transportation & Chief Executive Officer, MassDOT
Awards: Safe Streets Smart Trips High School Video Contest

CONCURRENT SESSION #3: 1:15 pm - 2:30 pm

Session 3A- SITE VISIT: Tontine Crescent Tactical Plaza

Meet at the Registration Table

Tour is limited to the first 25 attendees to sign up at the registration table the morning of the conference.
Come see the re-imagined Franklin Street, between Devonshire and Hawley Streets, in Boston's latest signature public space. Attendees will visit the site and see tactical urbanism at its best on this full city block - the addition of a designated seating area, separated bike lanes and pedestrian safety upgrades and the provision of space for public art. The visit will also include a walk up to the City's oldest pedestrian priority area (Downtown Crossing), and a visit to the next tactical plaza, Phillips Square in Chinatown.

Guide:
Josh Weiland, Boston Transportation Department

Session 3B-SITE VISIT: Longfellow Bridge and Appleton Footbridge

Meet in the Hotel Lobby

Tour is limited to the first 25 attendees to sign up at the registration table the morning of the conference.
MassDOT's recently completed bridge restoration project serves as an example for balancing all travel modes within an existing footprint. Attendees will visit the site and see the addition of pedestrian and bicycle infrastructure including wider sidewalks and separated bike lanes. This site visit also includes the new Appleton Footbridge, which was included in the overall project scope to improve access between the bridge, MBTA Red Line station, and the Esplanade.

Guides:
Amy Getchell, MassDOT
Robbin Bergfors, MassDOT
Rod Emery, WorldTech Engineering

Session 3C – MassTrails Official Launch - ED

Georgian Room

The MassTrails team helps to develop a unified vision for a trails network across the Commonwealth. This session will mark the official launch of the MassTrails website. Panelists will explain the establishment of the MassTrails concept and brand in addition to highlighting the joint collaboration on a new shared-use path planning design guide that is in development.

Panelists:
Dan Driscoll, Department of Conservation and Recreation
Jackie DeWolfe, MassDOT
Kurt Gaertner, Executive Office of Energy and Environmental Affairs
Moderator:
Kate Fichter, MassDOT

Session 3D - Complete Streets Implementation

First Floor Studio 1

Since the Complete Streets Funding Program was launched in 2016, 90 communities have received competitive capital funding for construction. This MassDOT-led discussion with municipal officials will highlight some of the first completed projects. These early adopters will discuss their experiences and progress with their Complete Streets policies, prioritization plans and construction projects.

Panelists:
Michael Canales, City of North Adams
Wendy Wiiks, City of Leominster
James Czach, Town of West Springfield
Philip Duffy, Town of Clinton
Moderators:
Eileen Gunn, MassDOT
Andy Paul, MassDOT

Session 3E – Innovative Technologies in Active Transportation - D

Berkeley/Clarendon Rooms

Innovative technology continues to transform the way we think about and solve transportation issues. Attendees will hear about these innovative applications that include new video technology that converts the images of pedestrians into digital data; technology that shows traffic counts and concentrations at different times of day; a smartphone mobile application for the visually impaired that leverages crowdsourced clues and picks up signals sent by beacons at MBTA piloted bus stops; and an MBTA pilot project with solar-powered e-Ink digital signage in places with no power.

Panelists:
Anita Lauricella, Downtown Boston Business Improvement District
Siobhan Cunningham, MBTA and **David Baumgartner**, Cambridge Systematics
Luiza Aguiar, Perkins School for the Blind and **David Block-Schachter**, MBTA
Moderator:
Kaitlyn Olbrich, MassDOT

Session 3F – Climate Resiliency and Transportation

Arlington Room

This panel will cover statewide initiatives on climate mitigation and adaptation. Included are MassDOT's ongoing efforts to assess statewide transportation assets' vulnerability to climate change, with a focus on riverine flooding; creating shared-use path trail networks through environmental and habitat sensitive areas, and results from MassDOT's participation on a recent Copenhagen Urban Lab focused on storm surge/climate resilience.

Panelists:
Brittany Meece, MassDOT
Tim Dexter, MassDOT and Aleece D'Onofrio, Stantec
Lily Oliver and **Harshi Weerasinghe**, MassDOT
Moderator:
Andrea D'Amato, MassDOT

Session 3G – A Focus on Customers: Transit Planning for the People - MP

First Floor Studio 2

Learn about new MBTA-led initiatives to implement service improvements such as the Better Bus project; a late night bus pilot project; a GPS pilot on six bus routes; the Washington St dedicated bike/bus lane, and bus network redesign. Attendees will hear how grant funding is playing an increasingly important role in assisting with these initiatives.

Panelists:
Wes Edwards and **Logan Nash**, MBTA
Vineet Gupta, Boston Transportation Department
Caroline Koch Vanasse, MassDOT
Moderator:
Alexandra Markiewicz, MassDOT

Session 3H – Road Inventory Submission Application (RISA)

Boylston Room

MassDOT GIS Services has released the Road Inventory Submission Application (RISA). A tool designed to replace existing methods of updating the Road Inventory File with a modern, web-based interface. RISA will allow local and regional governments to add roads and suggest changes directly to the MassDOT Road Inventory File, a GIS product used to assess municipal Chapter 90 disbursements. MassDOT GIS Services staff will walk users through example scenarios, and workshop current data concerns. A user from a municipal or regional government in Massachusetts can get access to RISA through their geoDOT account. If needed, you can request an account using the form on geoDOT.

BREAK/EXHIBITS: 2:30 pm - 2:45 pm

SESSION #4: 2:45 pm - 4:00 pm

Session 4 – Statewide Bicycle Plan and Municipal Resource Guide for Bikeability - MP/ED/D

First Floor Studios 1 & 2

To realize the potential for everyday biking in Massachusetts and underscore MassDOT's commitment to safety, MassDOT is releasing a new Statewide Bicycle Transportation Plan to make biking in Massachusetts a safe, comfortable, and convenient option for everyday travel. As part of the Bike Plan, MassDOT developed the Municipal Resource Guide for Bikeability in recognition of the important role the 351 cities and towns in Massachusetts will play. Created for municipal staff, elected officials, community members, and anyone interested in biking, the Resource Guide introduces core concepts to enhance community bikeability and directs readers to additional resources for more detailed information.

Be the first to preview the new Plan and Resource Guide, learn more, and share input.

Presenters:
Jonathan Gulliver, MassDOT
Jackie Dewolfe, MassDOT
Pete Sutton, MassDOT
Michelle Danila, MassDOT
Andy Paul, MassDOT

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****YOUNG PROFESSIONALS IN TRANSPORTATION (YPT) SOCIAL HOUR: 4:30 pm**
M.J. O'Connor's
The Young Professionals in Transportation will be hosting a social hour immediately following the Moving Together Conference at MJ O'Connors - located next door to the conference. YPT will be providing light appetizers (while supplies last). Everyone is welcome! Young Professionals in Transportation provides networking, professional development, and fellowship opportunities for young professionals in the transportation field. YPT does not provide an age definition for young - its membership and events are open to all.

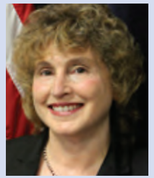
MORNING KEYNOTE SPEAKER

Monica Tibbits-Nutt
Director, Fiscal Management Control Board & MassDOT Board of Directors

Monica Tibbits-Nutt is the Executive Director of the 128 Business Council where she has worked since 2010, advising communities in the 128 Corridor in transit planning and overseeing the operation of 12 shuttle routes with nearly half a million in annual ridership. Tibbits-Nutt also has experience with the MBTA, where she served as a Transportation Planning Consultant to the MBTA Advisory Board, and as Executive Director and Transportation Planner for TransitWorks, providing research evaluation for the MBTA and Secretary of Transportation. She holds a B.S. from the University of Southern Indiana and a Masters of City and Regional Planning from Ohio State University.

LUNCHEON KEYNOTE SPEAKER

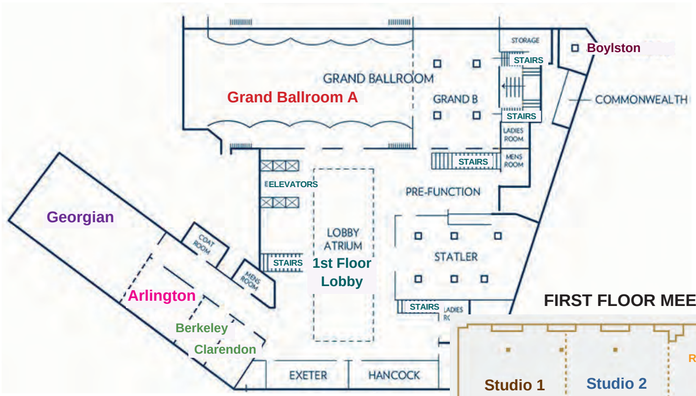
Stephanie Pollack
Secretary of Transportation & Chief Executive Officer, MassDOT



As Secretary, Stephanie Pollack has led efforts to establish project selection criteria and set investment priorities that focus on improving reliability for the traveling public by modernizing Massachusetts' transportation assets. She has focused MassDOT on better serving its customers, with initiatives such as All-Electronic Tolling and reducing wait-times at Registry of Motor Vehicles. Since July 2015, the leadership of the Massachusetts Bay Transit Authority (MBTA) has also reported to Secretary Pollack, giving her a critical role in steering the transit system serving Eastern Massachusetts.

Before being named Secretary, Pollack worked on transportation policy, finance, and equity as Associate Director for Research at the Kitty and Michael Dukakis Center for Urban and Regional Policy at Northeastern University, where she has also served as an adjunct professor. Her academic work followed a distinguished legal career at the Conservation Law Foundation in Boston. Pollack has also worked as a consultant to provide strategic guidance on transportation, equity, and environmental issues.

MEZZANINE MEETING ROOMS



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massDOT Transportation Innovation CONFERENCE

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SPEAKERS

Stephanie Pollack

Stephanie Pollack is the Secretary of Transportation & Chief Executive Officer for the Massachusetts Department of Transportation (MassDOT). Prior to becoming Secretary and CEO, she worked on transportation policy, finance and equity as Associate Director for Research at the Kitty and Michael Dukakis Center for Urban and Regional Policy at Northeastern University. She also served as an adjunct professor sharing her skills and experience with the next generation of public policy leaders. Secretary Pollack has also provided over a decade of strategic consulting on transportation issues to the public and private sectors including the Boston Transportation Department and Massachusetts Port Authority, following a distinguished career at the Conservation Law Foundation in Boston.

Carlos Braceras

Carlos Braceras is Executive Director of the Utah Department of Transportation, a position he has held since May 2013. A native of New Jersey, Carlos came to work at UDOT in 1986 because, quite honestly, he loved the skiing in Utah. In the 30 years that have passed since then, he has helped to shape UDOT's strategic direction and its mission of innovating transportation solutions that strengthen Utah's economy and enhance the quality of life, making it one of the most respected and influential DOT's in the nation. Today his influence extends beyond the state of Utah through his service on a number of national and regional boards and committees including president of the American Association of State Highway and Transportation Officials, Chair of the AASHTO Subcommittee on Design, Chair of the Center for Environmental Excellence Advisory Board, member of the board of directors and past president of the Western Association of State Highway and Transportation Officials, past chair of ITS America, and past chair of RUC West.

Patricia Leavenworth

Patricia Leavenworth became Chief Engineer for MassDOT in June 2013. Prior to becoming Chief Engineer she served as the Highway Director for District 4 overseeing a staff of 400 engaged in the design, construction and maintenance of highways in 62 communities in the northeast region of the state. Patricia has a Bachelor of Science in Civil Engineering from Norwich University Military College of Vermont and a Master's Degree in Civil Engineering from Worcester Polytechnic Institute. She is a registered P.E., in Massachusetts.

Jonathan Gulliver

Jonathan Gulliver is the Highway Administrator at MassDOT, having served in this role since May 2017. He joined MassDOT in 2009, and prior to accepting the position of Acting Highway Administrator, he served as the District 3 Highway Director, responsible for the management and oversight of the state highway and bridge system of Central Massachusetts. Jonathan has over two decades of experience in managing complex state and municipal projects, and holds a degree in Civil Engineering from Worcester Polytechnic Institute.

AGENDA

Tuesday, April 9

Registration/First Floor Exhibits: 7:30 AM – 8:30 AM

OPENING PLENARY: 8:30 AM – 9:00 AM

Grand Ballroom
Jonathan Gulliver, Highway Administrator, MassDOT

CONCURRENT SESSION 1: 9:00 AM - 10:15 AM

Session 1, Mobility Track, Room A: Walkability for People of All Ages and Abilities
Walking is a component of most trips – and an important travel mode in and of itself. Join representatives of WalkBoston, the Massachusetts Commission for the Blind, and the Veterans' Administration for a workshop on the elements of a walkable community. Walkable communities promote health, access, community engagement, independence, and quality-of-life for older adults and individuals with disabilities. And when communities meet the needs of seniors and people with disabilities, all residents benefit. Using examples from projects underway in communities around Massachusetts – including urban, suburban, and rural contexts – presenters will highlight ways to improve the built environment, as well as policy changes that can improve walking safety, access, and comfort for older adults and people with disabilities.
Presenters: Adi Nochur, WalkBoston
Meg Robertson, Massachusetts Commission for the Blind
Amber Vaillancourt, U.S. Department of Veterans Affairs
Facilitator: Rachel Fichtenbaum, MassMobility

Session 1, Room B: Techniques to Fingerprint Construction Materials
New technologies such as X-ray Fluorescence (XRF) and Fourier Transform Infrared (FTIR) offer a non-destructive analytical technique to determine and verify material composition, providing MassDOT with a level of confidence related to product quality and long-term performance in less time. Using these technologies on select construction materials, MassDOT will be able to compare the material in the field to what is on file from the initial approval process. The ability to quickly confirm that materials used on-site meet contract specifications minimizes the risk for noncompliance. This presentation will illustrate the various materials that are being tested in the lab using these innovative technologies and the processes that have been developed.
Presenters: Mark Brum and Maggie McDonald, MassDOT Research and Materials
Facilitator: John Grieco, MassDOT Director of Research and Materials

Session 1, Room C: MassDOT Stream Crossing Handbook
The MassDOT Highway Division will introduce its newly updated Stream Crossing Handbook, which revises and improves the 2010 handbook, Design of Bridges and Culverts for Wildlife Passage at Freshwater Streams. The handbook updates information on current federal and state regulations and addresses evolving MassDOT practices for stream crossing design and installation. It also introduces new reference materials for stream crossing design to accommodate wildlife passage, to consider climate change, and provide guidance for municipal personnel on MassDOT standards and review process. New content has been developed to help municipalities develop designs for local projects, including a summary of the MassDOT review process under MGL Chapter 85-Section 35, with links to MassDOT's current submittal requirements. In addition, the handbook now includes illustrative designs of selected prototypical culvert and small bridge structures, with links to CAD drawing files, to help in the selection and design of structures that meet MassDOT standards and regulatory requirements for wildlife passage.
Presenters: Tim Dexter, MassDOT Fish & Wildlife Supervisor
David Nyman, PE, Comprehensive Environmental, Inc.
Facilitator: Tim Dexter, MassDOT Fish & Wildlife Supervisor

Session 1, Room D: New Shared Mobility: Electric Scooters, Electric Assist Bicycles, and What's Next
Nearly ten years after the docked bike share revolution began in North America, dockless bike share launched in 2017 as a new innovative business model for funding and operations. Then, in 2018, dockless e-scooter share rolled out. These shared mobility systems are part of a larger shift toward expanding options for first and last mile access to transit and on-demand transportation, and fueling the need for more dedicated on-street facilities for bikes and scooters. The rate of adoption has been remarkable – in just one year Bird and Lime reported 36 million scooter and bicycle trips. Such unprecedented growth has presented cities and transit agencies with new work to address permitting, design, equity, curb management, and more. Learn more from a variety of perspectives: companies, planners, municipal, MassDOT and MBTA.
Presenters: Heather Hamilton, Select Board Member for the Town of Brookline, MA
Holly Parker, Less Road Traveled
Phil Goff, Alta Planning + Design
Scott Mullen, Lime
Hannah Smith, Bird
Facilitator: Jackie DeWolfe, MassDOT Director of Sustainable Mobility

Session 1, Room E: Connected Vehicle Technology and the Road to a Connected Corridor
According to the National Highway Traffic Safety Administration, connected vehicle technology could reduce crashes by 80%. This session will explore the challenges that come with creating connected infrastructure and will provide information about what is currently being done in Massachusetts. This session will also provide an overview of the US Route 33 Smart Mobility Corridor project near Columbus, Ohio. This 35-mile corridor offers a unique opportunity to deploy and test smart vehicle technology in various settings, including urban, suburban, and rural; and roadway types, including local, arterial, and collector streets and multi-lane divided highway ramps. The project includes the installation of nearly 100 dedicated short-range communication (DSRC) devices, equipping between 600 and 1,200 vehicles with connected vehicle technology, developing V2I applications, and developing a smart network to manage the data flows and system.
Presenters: Lori Duguid, Michael Baker International
Corey O'Connor, MassDOT
Eric S. Phillips, CEO, Union County Chamber of Commerce
Facilitator: Marco Pereira, MassDOT Director of ITS Programs

Session 1, Junior Ballroom: Kelley Square Reimagined
Kelley Square is a complex intersection of heavily traveled streets in Worcester, which has been characterized by the public as "unique", "special" and "weird". Between 2013 and 2016, Kelley Square represented the single location with the highest number of crashes in Massachusetts, and there is currently little in the way of multimodal accommodations for users wishing to travel through the area. MassDOT is currently advancing a project to improve safety and operations at this location. This session will detail the robust/innovative public engagement and design development process that has led to identification of a first of its kind for Massachusetts – the Hybrid Roundabout (aka "peanut") Preferred Alternative. This alternative will provide clearer definition and delineation of traffic movements, calm vehicular traffic, enhance accommodation for non-vehicular users and enhance neighborhood connectivity and access/egress to surrounding commercial and business interests. The session will also highlight the innovative tools such as 3-D visualization and operational simulation modeling used by the design team to achieve consensus on the identification and selection of the Preferred Alternative.
Presenters: Don Cooke and Tracie Lenhardt, VHB
Tom Emerick, MassDOT
Paul Moosey, City of Worcester
Facilitator: Barry Lorion, MassDOT District 3 Highway Director

First Floor Exhibits and Refreshments: 10:15 AM - 11:00 AM

CONCURRENT SESSION 2: 11:00 AM - 12:15 PM

Session 2, Mobility Track, Room A: Innovative Approaches to Mobility for Low-Income Individuals
Low-income individuals need transportation to access jobs and other community services. Hear from two efforts – a nonprofit in Worcester, and a transit authority in Southern Maine – that are using donations to purchase bus passes for people in need. We'll also hear from a non-profit in Framingham that partners with its local transit authority to provide transportation – while helping clients prepare for careers in transportation.
Presenters: Brittany Raposa and Julie Marshall, South Middlesex Opportunity Council (SMOC)
Steve McClure, Tasks for Transit
Perian Carpenter, Shuttlebus-Zoom
Facilitator: Rachel Fichtenbaum, MassMobility

Session 2, Room B: Advancements in Cement Concrete Research and Testing
MassDOT is moving to update its cement concrete specifications for highway construction from a prescriptive-based method to performance-based requirements. During this transition, there is a necessity to expand on – and add to – the methods and technologies used for the evaluation of quality characteristics and mix properties of the concrete. MassDOT's Research and Materials Section has been evaluating and employing new methodologies and technologies to assess concrete performance. This presentation will illustrate MassDOT's implementation of several advancements in concrete testing including the use of "Surface Resistivity Meter", "Maturity Meter", "Freeze-Thaw" and "Ring Shrinkage."
Presenters: Tim Willsmer and Jonathan Olivieri, MassDOT Research and Materials
Facilitator: John Grieco, MassDOT Director of Research and Materials

Session 2, Room C: Accelerated Bridge Construction Techniques
Includes two project presentations, the first will highlight the design process used for the plan development of Bridge 2931 in Preston, Connecticut. This structure was one of the first installations in the state that was designed to rely on Ultra High Performance Concrete (UHPC) shear keys, instead of transverse post tensioning cables for its continuity between beam elements. The presentation will discuss the advantages of this system over conventional construction, and show what sorts of geometries lend themselves well to using UHPC shear keys instead of post-tensioning cables. The second presentation will feature the Darlington Upgrade project, a $620 million project to improve an important transit corridor in Adelaide, Australia. Jacobs was responsible for the analysis and design of a continuous, three-span, curved steel tub-girder bridge, carrying both a multi-use path and vehicular traffic over a major expressway. The project was innovative in its use of double composite concrete construction. To minimize expressway closures, the design-build team constructed the bridge at a nearby off-site location and moved it into place using self-propelled modular transporters (SPMTs). This presentation will focus on the considerable design effort, planning, and analysis for the SPMT move, as well as the lessons learned.
Presenters: Mathew Ingram, Jacobs
Dan Whittemore, Fuss & O'Neill
Facilitator: Olu Adeyemi, FHWA Structures Team Leader

Session 2, Room D: Flying Colors: How Teamwork & Technology Drove the Success of Hingham's Route 3A Road Diet Pilot Program
When engineers and planners proposed narrowing Route 3A east of the rotary in Hingham, many people were skeptical. How could fewer lanes help alleviate safety concerns while maintaining traffic capacity, especially during the peak summer days on the primary route to and from Nantasket Beach in Hull? To test the design, MassDOT and the Town of Hingham, working with engineers from Design Consultants, Inc. and other firms, implemented a pilot program that used delineators to emulate future conditions. The team then employed multiple traffic tracking technologies, including Bluetooth, video and radar, to successfully demonstrate the feasibility of the proposed road diet. In this session, representatives from MassDOT, the Town of Hingham, and Design Consultants, Inc., will detail the challenges they encountered and the path the team traveled to reach consensus on a workable, affordable and effective solution.
Presenters: David Giangrande, P.E., Design Consultants, Inc.
Corey O'Connor, MassDOT
Roger Fernandes, Town of Hingham Town Engineer
Facilitator: Bill Travers, MassDOT District 5 Operations Engineer

Session 2, Room E: Share the Path – Working Together to Expand Our Network of Enjoyable, Useful, Safe, Secure, Comfortable and Inclusive Trails
Shared use paths are intuitively attractive for transportation and recreation, and they support many environmental, transportation and public health goals of the Commonwealth, but recurring challenges face communities and proponents who want to build them. MassDOT, DCR and EEA are working together as MassTrails to help move projects from ideas to implementation. This session will explore the benefits of shared use paths and discuss the MassTrails Shared Use Path Planning and Design Guide under development; we will also delve into how the MassTrails team and MassTrails Grant Program are improving key partnerships between the state, municipalities, path proponents and

consultants – and what this highly-productive model of inter-agency cooperation may offer to the Commonwealth.
Presenters: Michael Trepanier, MassDOT
Samantha Roddy, VHB
Jeff Dietrich, Howard Stein Hudson
Camilla Dartnell, Kittelson & Associates, Inc.
Facilitator: Michael Trepanier, MassDOT Shared Use Path Program Manager

Session 2, Junior Ballroom: Drones Part 1 - UAS Systems and Use-Cases: A New Paradigm for Transportation and Incident Response
The first presentation highlights research by the Bridgewater State University GeoGraphics Laboratory to help improve the safety and security of small suburban and rural commuter rail parking lots through unmanned aircraft systems (UAS). The GeoGraphics Laboratory's project, funded through the National Academies of Sciences, focused on developing and field testing an approach to address these issues using a combination of small UAS (sUAS) for remote sensing, aerial imagery analytics, and cloud-based data analytics, made possible through state-of-the-art communications infrastructure. The second presentation will discuss a UAS research initiative by MassDOT in collaboration with the UMass Transportation Center. The objectives of this research are two-fold: (1) Develop practical procedures and protocols for MassDOT to integrate UAS technology into bridge and rail inspections presently carried out by traditional means, and (2) Conduct a pilot test of the developed procedures and protocols at a bridge or rail inspection site. The third presentation will discuss recent MassDOT Aeronautics Drone Pilot Program shared services mission operations. Activities to be covered include an overview of the breadth of missions across internal and external state agencies. Additionally, a review of the State House Dome inspection mission will include platform selection, sensors, flight operations, team coordination, and analytical products.
Presenters: Lawrence Harman and Uma Shama, GeoGraphics Laboratory, Bridgewater State University
Michael Plotnikov, UMass Amherst
Andrew Mihaley, Terrance McKenna, Scott Uebelhart and Edilberto Diaz, MassDOT
Facilitator: Jeff DeCarlo, MassDOT Aeronautics Administrator

LUNCHEON/KEYNOTE SPEAKER/EXHIBITS: 12:15 PM - 1:30 PM

Grand Ballroom
Stephanie Pollack, Secretary of Transportation & Chief Executive Officer for MassDOT
Carlos Braceras, Executive Director of the Utah Department of Transportation

CONCURRENT SESSION 3: 1:30 PM - 2:45 PM

Session 3, Mobility Track, Room A: New England Community Transportation Roundtable
New Hampshire is amping up its mobility management and statewide coordination efforts. Rhode Island just hired a mobility manager, and the Greater Portland Council of Governments received two national grants this year in support of regional and statewide mobility management efforts they are undertaking. Let's talk to our neighbors about their efforts to see what we can learn and where we might partner across state lines.
Presenters: Zoe Miller, Greater Portland Council of Governments
Fred Roberge, Easterseals New Hampshire
Joelle Kanter, Rhode Island Public Transit Authority
Facilitator: Judy Shanley, Easterseals

Session 3, Room B: From Ground to Cloud: The Future of LIMMS
For decades, MassDOT has relied on an antiquated system of hand-written test report forms, redundant data entry, and numerous decentralized databases to perform its daily functions related to material testing. This inefficient method results in enormous paper consumption, misfiling of documentation, delayed contract certification, sample misidentification, and lack of test data analytics. To resolve these inefficiencies, MassDOT is employing a Laboratory Information Materials Management System (LIMMS) to oversee, analyze and track materials electronically. This presentation will illustrate the implementation strategy for LIMMS including how materials testing equipment will be linked to the software for seamless data collection and the improvement of turnaround time related to material processing, testing, analysis and final acceptance.
Presenters: Richard Mulcahy and Ali Al Saadawi, MassDOT Research and Materials
Facilitator: John Grieco, MassDOT Director of Research and Materials

Session 3, Room C: Developing Strategies for Equity at MassDOT
Equity is a key concern of this administration, and MassDOT is working to incorporate equity considerations into all of our policies, plans, services, and initiatives. We are examining the challenges to equity in access to services and destinations that are newly created or perpetuated by changes in the transportation marketplace, including technological innovations and land use development policies, as well as the impacts of transportation policies and infrastructure on transportation outcomes. This panel aims to raise the profile of some of these barriers and describe ways that MassDOT is being proactive about setting policy, developing tools and metrics, and delivering services that are not only mindful but responsive to issues of equity in transportation.
Presenters: Elizabeth Williams, MassDOT
Jose Simo, MassDOT
Wesley Edwards, MBTA
Facilitator: Andrea D'Amato, MassDOT

Session 3, Room D: Utility Planning Eases Back Bay Bridge Project
During one weekend in 2018, MassDOT replaced the bridge carrying Massachusetts Avenue over Commonwealth Avenue in Boston in just 73 hours, more than 30 hours ahead of schedule. Working with MassDOT, Stantec developed an innovative approach using early utility relocation and accelerated bridge construction techniques to replace the bridge quickly, while minimizing impacts to the traveling public and the local neighborhood. This session will present the innovations that were applied on this project, including use of a separate contract for utility relocations, specially designed precast concrete elements to facilitate rapid construction in the restricted urban environment, and avoiding impacts to surrounding park land through a design approach that established work zones in the existing right-of-way.
Presenter: Joseph Tierney, Stantec
Facilitator: Guy Rezendes, MassDOT State Utilities Engineer

Session 3, Room E: Testing Automated Driving Systems on Public Ways
Representatives of the Rhode Island Department of Transportation (RIDOT) and MassDOT will provide a brief overview of connected and automated vehicles, and discuss how automated driving systems

(i.e. self-driving cars) are being tested and researched in the two states, in partnership with the system manufacturers, transit agencies, and municipalities. RIDOT will highlight the first initiative of its Transportation Innovation Partnership (TRIP), the Little Roady Autonomous Shuttle Pilot Project. Working with the startup May Mobility and local partners, the project is bringing electric autonomous shuttles to Providence. This is enabling RI to test and research a range of factors to better understand the potential of new technology to improve mobility options, and will help the State prepare for these changes. MassDOT will share information about the Commonwealth's application process for permitting testing of automated driving systems in well-defined environmental conditions, on approved municipal and state roads across the Commonwealth, and will outline opportunities for municipalities and road owners to participate and facilitate testing. Ryan Jacobs of nuTonomy, a developer of automated vehicles, and currently testing in the Boston area, will provide an overview of the company's local and international activities.

Presenters: Julia Gold, Rhode Island DOT
Daniel Sullivan, MassDOT Policy Analyst
Ryan Jacobs, nuTonomy Technical Advisor
Facilitator: Daniel Sullivan, MassDOT Policy Analyst

Session 3, Junior Ballroom: New Methodologies for Bicycle, Pedestrian and Access to Transit Project Prioritization

As part of the recently released 2018 Pedestrian and Bicycle Transportation Plans, MassDOT is taking a data-driven approach to prioritize locations for new projects that address safety, equity, accessibility, access to transit, and critical gaps in connectivity. Learn about the new methodology and new public engagement strategies that informed the analysis, how the outcomes are being used to transition quickly from planning to implementation in 2019, and a new count pilot to help track progress.

Presenters: Nick Jackson, Toole Design Group
Pete Robie, Toole Design Group
Pete Sutton, MassDOT Bicycle and Pedestrian Program Coordinator
Michelle Danila, and Jackie DeWolfe, MassDOT
Facilitator: Pete Sutton, MassDOT Bicycle and Pedestrian Program Coordinator

First Floor Exhibits and Refreshments: 2:45 PM - 3:15 PM

CONCURRENT SESSION 4: 3:15 PM - 4:30 PM

Session 4, Mobility Track, Room A: Reducing Social Isolation through Age- and Dementia-Friendly Transportation

Access to appropriate transportation is a core component of what makes a community welcoming and livable for residents of all ages – including those with dementia. Communities and regions around the Commonwealth are working on age- and dementia-friendly initiatives, and last year, Massachusetts built on local progress and joined the network of AARP Age-Friendly States with a multi-year action plan. In this session, presenters will discuss local and statewide initiatives to promote age- and dementia-friendly transportation systems, as well as examples of how these efforts are promoting local mobility and reducing social isolation across the Commonwealth.

Presenters: Patty Sullivan, Massachusetts Association of Councils on Aging
Beth Dugan, UMass Boston
David Kucharsky, City of Salem
Amanda Bernardo, Executive Office of Elder Affairs
Facilitator: James Fuccione, Massachusetts Healthy Aging Collaborative

Session 4, Room B: Concrete Pavement Solutions

This session will include panel members from the concrete industry and MassDOT. Members of American Concrete Pavement Association (ACPA), Massachusetts Concrete & Aggregate Producers (MaCAPA), and National Ready-Mix Association will present on the benefits of concrete pavement as construction strategies. Presenter Bill Cuerdon, former Director of the NY chapter of the ACPA has 30 years of experience with the NY DOT, and a wealth of knowledge in many areas including the design and construction of concrete pavement. There will be an overview of different design, material, and construction specifications and techniques of full depth and overlay projects. Information on projects from New York and midwestern states will also be shared. MassDOT personnel Andrew Paul and Lyris Liautaud will discuss three projects (located in District 2, District 3 and District 4) that have been selected to use concrete pavement solutions.

Presenters: Bill Cuerdon and Craig Dauphinais, Massachusetts Concrete & Aggregate Producers Association
Andy Paul and Lyris Liautaud, MassDOT
Facilitator: Andy Paul, MassDOT Highway Design Engineer

Session 4, Room C: Innovative Driven Pile Solution for the Rhode Island Route 6/10 Interchange Project

This presentation details the execution and results of a comprehensive pile load test program, offers guidance for the potential use of taper tube piles on projects across the New England region, and presents a unique case study where driven piles were value engineered to develop the optimal deep foundation solution.

Presenter: Seth H. Hamblin, P.E., Principal Geosciences Testing and Research, Inc.
Facilitator: Pete Connors, MassDOT Geotechnical Engineer

Session 4, Room D: Beyond the Public Meeting – #PublicInvolvement

We live online – it is where we get our news, where we work and socialize, and where we share our opinions. While public engagement is a critical facet of each of our projects, it is traditionally conducted in a way that is at odds with our evolving digital world. Smart and authentic public engagement can not only inform design, but also enhance our relationship with the communities we serve. Join this interactive session as presenters and participants dive into some of the challenges and opportunities of strategic communications and how a new approach can change the way today's public is engaged. Learn how to use technology to give voice to under-served populations, get inside the world of virtual public involvement, and learn how to pair digital tools with traditional outreach to engage new audiences.

Presenters: Erica Blonde, HNTB
Michael Trepanier, MassDOT Project Manager
Theresa McClure, HDR Inc.
Facilitator: Michael Trepanier, MassDOT Project Manager

Session 4, Room E: In the Zone - Work Zone Safety
This session includes three presentations. The first will discuss MassDOT's deployment of Portable Traffic Signals (PTS) to alleviate traffic congestion and assist with safety during a 2018 construction project on the Sagamore Bridge. This presentation will discuss the unique circumstances of the project, as well as take an in-depth look at the PTS and associated technologies utilized on-site. The presentation will also discuss the use of PTS as an emergency-response tool for traffic management. The second presentation will focus on better hazard awareness for work zone safety, including a module on resources to prevent struck-by incidents with an emphasis on typical hazard scenarios, blind spots for major types of construction equipment, work zone safety construction equipment diagrams, swing radii, the penalty of unverified assumptions in work zone communications, and job hazard analysis. The final presentation will highlight the use of truck mounted attenuator (TMA) automation to improve work zone safety. Through a partnership with Kratos Unmanned Systems Division, Royal Truck & Equipment has developed the first autonomous TMA truck, known as the ATMA. This presentation will discuss the details of the ATMA and its safety benefits.
Presenters: Wes Hutchinson, MassDOT
Craig Doolittle, TRC Companies
Scott Heydt, Horizon Signal Technologies, Inc.
Fred Bergstresser, Royal Truck & Equipment, Inc.
Facilitator: Neil Boudreau, MassDOT State Traffic Engineer

Session 4, Junior Ballroom: Creating a Complete Street on a Gateway Bridge
The 120-year-old North Washington Street Bridge over the Boston Inner Harbor needed to be replaced. The challenge was to create a Complete Street on a Gateway Bridge. The 100' wide x 1087' long structure carries 42,000 vehicles per day, heavy pedestrian traffic and numerous utilities from Boston's North End and West End areas to Charlestown. The existing bridge was eligible for National Register of Historic Places listing, and in conformance with the National Historic Preservation Act, a Memorandum of Agreement (MOA) was signed by the Federal Highway Administration (FHWA), the State Historic Preservation Officer (SHPO), MassDOT Highway Division and the City of Boston. The agreement stipulated that the proposed replacement structure be a Gateway bridge, with architectural design elements incorporating the new structure into its surroundings, distinguishing the crossing as a unique place in itself, and include architectural design of structures, lighting, overlooks, separated bicycle lanes and other elements, to encourage use by people of all ages and interests. The design team, included the Boston Public Works Department, MassDOT, Alfred Benesch & Company, and Rosales + Partners, who developed a highly collaborative process, soliciting stakeholder feedback, while working within MOA constraints. Presenters will discuss this process and project results.
Presenter: Edward Baumann, Alfred Benesch & Co.
Facilitator: Mike O'Dowd, MassDOT Senior Project Manager

RECEPTION AT INNOVATION: 4:30 PM - 6:30 PM
Showcase Corner, first floor

Wednesday, April 10

Registration/First Floor Exhibits: 7:30 AM – 8:30 AM

OPENING PLENARY: 8:30 AM – 9:00 AM
Grand Ballroom
Jonathan Gulliver, Highway Administrator, MassDOT

CONCURRENT SESSION 5: 9:00 AM - 10:15 AM

Session 5, Mobility Track, Room A: Employment Transportation
In 2016, 85% of all U.S. workers drove to their workplace. In other words, 128 million people drove a car, a van or a truck – mostly alone – contributing to road congestion, pollution, and greenhouse gas emission. The Federal Highway Administration, through the Congestion Mitigation and Air Quality Improvement Program (CMAQ), has funded transportation demand management (TDM) activities nationwide since 1990.

Delivered regionally by 15 Transportation Management Associations (TMAs) east of I-495 and by MassRIDES for the rest of the Commonwealth, TDM activities focus on educating employers and employees about public transit and other healthy mobility options, tax credits, and provide incentives to counterbalance single occupancy vehicle use. On July 1, 2019, the way MassDOT distributes CMAQ funding will change. Please attend this session to learn about incentives and funding changes, and how the CrossTown Connect TMA, Middlesex 3 TMA, and the 495/MetroWest Partnership are already laying the groundwork for innovative employment transportation services.
Presenters: Astrid Glynn, MassDOT
Paul Matthews, 495/MetroWest Partnership
Stephanie Cronin, Middlesex 3 Coalition
Scott Zadakis, TransAction Associates
Facilitator: Aniko Laszlo, MBTA Director of Coordinated Mobility

Session 5, Room B: Implementing a GIS-based Safety System
State DOTs are looking for data driven approaches to improve highway safety. Presenters will discuss the approach developed in Connecticut, which includes a custom Safety Management System based on Parts B and C of the Highway Safety Manual (HSM). Network Screening, Diagnosis and Countermeasure Selection Modules are currently in use by CTDOT. VHB presenters will also discuss the updated Crash Data Portal being developed for MA, which will enable users to access crash data in numerous ways.
Presenters: Dale Abbott, GISP – Applied Technology Manager, VHB
Gary Stevens, Transportation Solutions Architect, VHB
Shanshan Zhao, PhD, Project Manager, UConn
Facilitator: Bonnie Polin, Manager, MassDOT Highway Safety Programs

Session 5, Room C: Advancements in Curb Management and Bus Rapid Transit in Massachusetts
The compact downtowns of Massachusetts are attractive to infill development and walkable, transit-oriented lifestyles, but a lack of street parking has driven many communities to restrict new development through impractical parking requirements and the fear of burdensome traffic. Learn how this paradigm is being flipped on its head by treating

curb spaces not as parking but as high-capacity terminals for accessing downtown, thanks to new mobility technologies. With smart curb management, development is increasing the person-carrying capacity of front-door parking over thirty times, by integrating ridesharing, micro-transit, e-scooters, shared bikes, and shared autonomous vehicles directly into their access profile. In addition to these new technologies, 2018 was a momentous year for bus riders in greater Boston, as municipalities around the region took bold steps to pilot elements of BRT (Bus Rapid Transit) in collaboration with the MBTA. Focusing on the Massachusetts Avenue pilot project in Arlington, this session will walk participants through the process of putting BRT elements along a critical and congested corridor, including development coordination with a multi-agency working group, public outreach efforts, use of innovative BRT elements, design constraints, alternatives development, and selection of a preferred alternative.

Presenters: Ralph DeNisco and Jason Schrieber, Stantec
Julia Wallerce, Institute for Transportation & Development Policy (ITDP) Boston
Albert Ng,VHB
Jenny Raitt, Town of Arlington

Facilitator: Andrew Wilkins, MassDOT Project Manager/Designer, Highway Design

Session 5, Room D: 2-D Hydraulic Analysis of the Tower Road Bridge

The Tower Road Bridge, programmed for complete replacement by MassDOT in FY 2022, spans the Chickley River approximately 100' upstream of the confluence of the Chickley and Deerfield Rivers in Charlemont, Massachusetts. This confluence, coupled with the presence of an existing 2-span railroad bridge just 50' downstream of the Tower Road Bridge, creates a hydraulically-complex bridge replacement project well-suited to be one of MassDOT's first applications of two-dimensional (2-D) hydraulic analysis. The presentation will provide an overview of the unique hydraulic features of this crossing, explain the advantages offered by the use of 2-D modeling on this project, discuss model development, summarize hydraulic and sediment transport/scour analysis results, and wrap-up with lessons learned.

Presenters: Aaron Lachance and Jeffrey DeGraff, Hoyle, Tanner & Associates

Facilitator: Hanan Fouad, MassDOT Hydraulics Engineer

Session 5, Room E: Construction Project Sequencing, the Customer Wins!

The MassDOT Highway Division and the MBTA have been working to develop a more coordinated approach for the 2019 construction season and beyond. The goal is to have ongoing coordination efforts to maximize regional traffic mobility in the face of multiple highway, transit, municipal and private development projects that are reducing vehicular lane capacity and creating train and bus diversions. In 2019, a combined 125 projects will have impacts to the Greater Boston road and rail network. Working collaboratively, the MassDOT Highway Division and the MBTA will strategize future project sequencing to mitigate the overall impacts to the customer and ensure that construction activity on one road or transit facility will not place a severe burden on other roads and transit facilities.

Presenters: Amy Getchell, MassDOT Highway Division
Nicolette Hastings and Christine Trearchis, VHB

Facilitator: Neil Boudreau, MassDOT State Traffic Engineer

Session 5, Junior Ballroom: Drones Part 2 - Developing & Deploying Advanced UAS Applications: The Case for Collaboration Among Government, Industry and Academia

In the first presentation, the MassDOT Aeronautics Division will discuss how the big data challenges are being addressed through an effort known as the Drone Data Analytics and Cybersecurity Program. The program includes managing the voluminous amount of collected data (predominantly imagery and video). The MassDOT Aeronautics Drone Program team recognizes the need for a solution to support, 1) the management of UAS operations, 2) secure storage and analysis of the UAS sensor data, and 3) the secure dissemination of end products to MassDOT users and decision makers.

The second presentation will discuss a collaborative UMass Lowell-MassDOT study on the use of unmanned aerial systems (UAS) in surface transportation applications, including highway traffic accident reconstruction, incident situational awareness, and post-disaster transportation system damage assessment. The project aims to identify the optimal locations for deploying UAS to promptly respond to highway incidents and natural disasters, taking into account all important factors that can impact the optimality of UAS locations. The researchers have created a generic analysis procedure that can be applied to evaluate potential UAS location plans.

The third presentation focuses on the integrated use of data from UAS and from laser scanning to create immersive 3D and Virtual Reality (VR) models of public infrastructure, which can help with facility inspection and monitoring. In this presentation, aerial and laser scanned data from the Waterbury Bus Maintenance and Storage Facility in Watertown, Connecticut will be utilized to generate VR-based immersive visualizations. The presentation will include the methodology and protocols involved in the generation of VR models, the visualization itself using VR equipment, as well as its potential usage for stakeholders in decision-making and planning.

Presenters: Danjue Chen, UMass Lowell
Farrukh Arif and Michael Giacco, AI Engineers
Andrew Mihaley, Terrance McKenna, Scott Uebelhart and Edilberto Diaz, MassDOT

Facilitator: Dr. Jeff DeCarlo, MassDOT Aeronautics Administrator

First Floor Exhibits and Refreshments: 10:15 AM - 11:00 AM

CONCURRENT SESSION 6: 11:00 AM - 12:15 PM

Session 6, Mobility Track, Room A: Integrating Consumers into Community Transportation Planning

Groups in Springfield and Worcester each received national, competitive grants this year to include consumers in planning transportation services. Each initiative used different strategies to engage older adults, individuals with disabilities, and other groups that have traditionally been left out of transportation decision-making processes. Learn about each project, its outcomes, and lessons learned.

Presenters: Joe Bellil, Easterseals Massachusetts
Price Armstrong, Pioneer Valley Transit Authority
Moumita Dasgupta, Smith College

Facilitator: David Hoff, UMass Boston, Program Director, Institute for Community Inclusion

Session 6, Room B: Use of Adaptive Traffic Control Signals in Massachusetts
Three presentations will highlight the development, installation, and implementation of adaptive traffic signal systems to increase efficiency and improve the operation of existing roadways. The first presentation discusses a project that has installed an adaptive traffic signal system in Burlington, Massachusetts, at 27 signalized intersections along Burlington Mall Road, Cambridge Street, and the Middlesex Turnpike. The upgraded system provides enhanced capabilities to adapt to seasonal increases in traffic flow accessing the Burlington Mall, adjust timings to accommodate traffic volume surges due to events on I-95 nearby, and to minimize disruptions to normal signal operation resulting from emergency vehicle passage as they service Lahey Clinic and the two fire stations located within the project area. A live demonstration of the traffic management software will also be shown. The second presentation highlights an innovative public-private partnership between the City of Quincy and Ocean State Signal to bring the City's traffic signal technology up to a modern standard and implement adaptive traffic signal system technology at more than 20 intersections along key corridors. The final presentation will focus on an innovative adaptive control method called Self-Organizing Traffic Signals. This method retains the essential features of fully actuated control, supplemented by new switching rules that organically lead to coordination and can reduce traffic delays and may offer significant decreases in delay for transit vehicles.
Presenters: Joseph Herr, Angela Dempsey and Dave Greenberg, VHB
Christopher Cassani, City of Quincy
Mike Wasielewski, Ocean State Signal
Peter Furth, Northeastern University
Facilitator: Jim Danila, MassDOT Assistant State Traffic Engineer

Session 6, Room C: Strength Evaluation of Corroded Beam Ends
The state of Massachusetts maintained 482 structurally deficient bridges in 2017 (FHWA 2017). Corrosion of steel girder ends is a prevalent problem, due to chemical substances which are employed seasonally to winterize the road. These substances, due to leaking bridge joints, result in section loss at beam ends, significantly reducing the bearing capacity of the bridges. Extensive thickness reduction can potentially result in load posting recommendations. This study investigates the effect of beam end corrosion on the capacity of steel girder bridges, and aims to develop a new procedure to accurately evaluate their remaining strength. The first part of this research is initiated by collecting data from MassDOT inspection reports. The most common shapes and locations of corrosion topologies are identified and quantified, making use of inspection reports across the state of Massachusetts. Second, loading tests are performed on six full-scale beams with natural corrosion obtained from bridges undergoing deconstruction. The effects of initial deformation, web and flange holes are investigated. The ultimate strength and post buckling behavior of the system are presented. Numerical models are developed and calibrated using the experimental data. Finally, new procedures, which could be incorporated in the Massachusetts Bridge Manual, may also be useful for DOT engineers nationwide.
Presenters: George Tzortzinis and Simos Gerasimidis, UMass Amherst
Facilitator: Alex Bardow, MassDOT State Bridge Engineer

Session 6, Room D: South Massachusetts Avenue Corridor Safety Improvements
The City of Cambridge undertook the South Massachusetts Avenue Corridor Safety Improvements project in 2017, with the goal of improving overall safety for users and supporting sustainable transportation through "quick-build" methods. The City and design team evaluated existing conditions and worked to develop low-cost and highly-effective design solutions to increase safety and support walking, bicycling, and transit along one of Cambridge's busiest corridors. With input from the community and the stakeholders, the team created a low-cost design involving multiple quick-build design elements that offered flexible implementation as well as the possibility for future modifications. The design incorporated restriping pavement markings, signal re-phasing with protected/separate turning movements, additional signage, installation of flexible delineators, separated bicycle lanes, an additional crosswalk, accessible parking spaces and on-street parking, and the City's second bus priority lane. Through these modifications, the City produced not only an affordable solution, but one that improves the safety and comfort of sustainable transportation. The project was implemented in late fall 2018.
Presenters: Christopher Balerna, Senior Project Manager, Kleinfelder Inc.
Cara Seiderman, Transportation Program Manager, City of Cambridge
Facilitator: Michelle Danila, Complete Streets Engineer, MassDOT

Session 6, Room E: Digitizing Municipal Transportation Workflows
MassDOT GIS Services has released the Road Inventory Submission Application (RISA), a tool designed to replace existing methods of updating the Road Inventory File with a modern, web-based interface. RISA will allow local and regional governments to add roads and suggest changes directly to the MassDOT Road Inventory File, a GIS product used to assess municipal Chapter 90 disbursements.
Presenters: Quinn Molloy, GIS Municipal Coordinator
Facilitator: Jose Simo, GIS Division Coordinator

Session 6, Junior Ballroom: Erosion and Sediment Control Training
MassDOT, MassDEP, ACEC and CIM have partnered to provide statewide environmental training for consultants, contractors and public servants. The purpose of this training is to improve environmental stewardship on Highway Division projects through design, selection and implementation of stormwater Best Management Practices. The session will provide an overview of the material provided in the training, with focus on particular issues and challenges that have emerged during the development and implementation of this training. Panel members will share their unique perspective on these challenges and discuss opportunities to improve environmental compliance on construction projects statewide.
Presenters: Jessica Kenny and George Batchelor, MassDOT
Facilitator: Jessica Kenny, MassDOT Director of Environmental Compliance

LUNCHEON/KEYNOTE SPEAKER/EXHIBITS: 12:15 PM - 1:30 PM
Grand Ballroom
Patricia Leavenworth, Chief Engineer, MassDOT

MOBILITY MANAGEMENT NETWORKING LUNCH: 12:15 PM - 1:30 PM

Showcase Corner, first floor

Any attendee who is specifically interested in mobility for older adults, people with disabilities, and/or low-income individuals is invited to the Mobility Management Networking Lunch! Connect informally with peers in a smaller setting. Meet a potential collaborator or compare notes with a peer from another region. Bring your business cards!

CONCURRENT SESSION 7: 1:30 PM - 2:45 PM

Session 7, Mobility Track, Room A: Transportation as a Social Determinant of Health

Transportation is one of the "social determinants of health:" the social, economic, and environmental factors that affect health. Learn about examples of partnerships between public health and transportation that are underway in Massachusetts to reduce barriers to healthcare. First, hear from two Community Health Network Area (CHNA) coalitions that have identified transportation as a priority. The CHNAs from the Blue Hills and North Central regions will each discuss why they see transportation as a health issue and how they are addressing it through multi-sector collaboration. Then, learn about an innovative effort from rural Central Mass to help physicians understand the role of transportation in healthcare – by incorporating transportation experiences into the medical school curriculum.

Presenters: Gail Farnsworth French, Quaboag Valley Community Development Corp
Kym Williams, Blue Hills Community Health Alliance
Dr. Sarah McAdoo, University of Massachusetts Medical School - Baystate
Chelsey Patriss, Community Health Network for North Central Mass

Facilitator: Angie Constantino, Senior Transportation Planner, Southeastern Regional Planning and Economic Development District

Session 7, Room B: Using Sketch-Level Modeling Tools for Rail Vision

By the end of 2019, the MassDOT/MBTA Rail Vision will describe a commuter rail system that more effectively serves the future Boston Region. Planning for an uncertain future over a vast established network of commuter rail lines, spanning 388 route miles and almost 150 stations, requires creative thinking, regarding what kind of service is explored and how performance is measured. Rail Vision is conducting this analysis through two tiers– one using sketch tools and a second tier using traditional models (CTPS Travel Demand Model and Rail Traffic Controller). This presentation will focus on what has been learned from the first tier, where sketch-level modeling tools were applied to quickly and easily model performance of different service concepts, to understand how they affect key metrics, including ridership and operational feasibility, at a high-level. These tools – ATTUne for rail operations, the Regional Dynamic Model for ridership, and an Operating Costs model – informed decisions about which types of concepts work best for this region, helping narrow the options from over 65 service concepts to 7 alternatives in a short time frame.

Presenters: Alexandra Markiewicz, MassDOT Transportation Planner
Michael Gordon, VHB
Facilitator: Alexandra Markiewicz, MassDOT

Session 7, Room C: Redefining How We Think about Infrastructure: Improving Mobility and the Public Realm

While roadway viaducts, bridges, and overpasses are commonly found in cities, at times even occupying large areas, the spaces below them often create undesirable public realm experience and impacts on pedestrian and bicycle networks. Some past attempts at creating public realm improvements under viaducts have suffered, due to a lack of design and planning integration with basic maintenance and repair requirements for the viaduct structure above. This presentation will focus on design innovations to the spaces under roadway viaducts developed through two projects, one that was recently completed, and another in the preliminary design phase: MassDOT's Underground at Ink Block, and the community-led concept design process for Charlesgate park under the Bowker Overpass, both in Boston. These projects show, that when included early in the integrative design process, these types of spaces can become mobility and public space assets, and potentially even facilitate maintenance and repair for the viaduct structures. Both projects also incorporate green storm water infrastructure where possible, improving water quality while also creating a more aesthetically pleasing environment. The presentation will outline observations and lessons learned, in terms of how the design team considered bridge maintenance and repair from the outset, green storm water management opportunities, and partnerships with local private actors and community groups to ensure viable and sustainable activation and maintenance of the under-viaduct spaces.

Presenters: Marie Law Adams and Daniel Adams, Landing Studio
Geoffrey Morrison-Logan and Eric Monkiewicz, VHB

Facilitator: George Batchelor, MassDOT Supervisor, Landscape Design

Session 7, Room D: An Ongoing Study in Municipal Transportation Best Practices

Every town in the Greater Boston Metro area struggles with traffic. Traffic congestion affects quality of life, has economic impacts in lost productivity, and contributes to climate change. On a local level, traffic congestion is often used as a basis for opposition to new development. A 2018 study by Einstein, Palmer, and Glick of Boston University, found that the most cited reason for opposition to new development is traffic. As much as the problem will show up as a municipal concern, most towns lack the means, expertise, and influence to deal with this regional scale problem, and the issue is often passed on as one to move up the chain (i.e. to the state or federal level). Despite the ostensible size mismatch there are significant opportunities for towns to help address both the local and regional problem. The Town of Weston has been collaborating with other towns, regional/state/federal agencies, and other transportation experts and providers on a practical set of solutions, and will share its initial findings on Transportation Best Practices where a municipality (Weston) can mitigate traffic issues and help improve transportation locally and regionally.

Presenters: Imaikalani Aiu, Town Planner, Town of Weston
Anthony Flynn, Planning Board Member, Town of Weston

Facilitator: Kate Fichter, MassDOT Assistant Secretary for Policy Coordination

Session 7, Room E: Accessibility Apps at the T: Removing Barriers through Technology

The panel will introduce three distinct existing and/or emerging applications designed, in whole or in part, to address accessibility barriers. Applications to be discussed include: the BlindWays App,

which uses crowdsourcing to provide blind/low vision users with detailed directions to bus stops; the MBTA Trip Planner, in which the T and Google Maps partnered to provided heightened accessibility information about all MBTA stops; and AccessMBTA, which will be piloted this spring, and which uses Bluetooth beacon technology to convert text-based travel information on station advertising screens into audio. The session will also cover the importance of user testing in ensuring such emerging technologies are accessible to all.

Presenters: Luiza Aguiar, Executive Director of Perkins Solutions
Anoopa Sundararajan, Senior Inclusive Technology Researcher, Institute for Human Centered Design
Josh Fabian, MBTA Realtime Applications Coordinator
Elizabeth Winters-Ronaldson, MBTA Deputy Director of Advertising
Laura Brelsford, Assistant General Manager, MBTA System-Wide Accessibility
Facilitator: Miriam Cooper, MBTA System-Wide Accessibility Coordinator

Session 7, Junior Ballroom: State and Local Efforts Surrounding Climate Change Resiliency

The panel for this session will describe the efforts behind creating the nation's first, integrated State Hazard Mitigation Climate Adaptation Plan (SHMCAP) and the development of statewide climate change projections, including MassDOT's/EOEEA's efforts to standardize sea level rise and storm surge data along the Massachusetts coastline for use by state agencies, municipalities, and private stakeholders. An overview of MassDOT's actions contained in the SHMCAP will be provided, including those that affect design standards and guidelines. This session will further present the City of Boston's Climate Ready Boston initiative and the steps the City is taking towards implementation, including the Public Works Department's recently released "Climate Resilient Design Standards & Guidelines for Protection of Public Rights-of-Way".

Presenters: Steve Miller, MassDOT Environmental Management and Climate Resiliency
Sarah White, Massachusetts Emergency Management Agency (MEMA)
Alisha Pegan, City of Boston
Julie Eaton, Weston & Sampson, Inc.
Facilitator: Tim Dexter, MassDOT Fish & Wildlife Supervisor

First Floor Exhibits and Refreshments: 2:45 PM - 3:15 PM

CONCURRENT SESSION 8: 3:15 PM - 4:30 PM

Session 8, Mobility Track, Room A: Connecting Seniors to Ride-Hailing Platforms

On-demand ride-hailing platforms like Uber and Lyft are helping to improve mobility, but can be challenging to use for those unfamiliar with or not in possession of the necessary smartphone technology. This session will feature a presentation from TRIPPS, a transportation resource for older adults based in Brookline, that developed a curriculum to teach seniors how to use Uber and Lyft. We'll hear from GoGoGrandparent, a company that requests and monitors transportation network company (TNC) rides for older adults who do not have access to a smart phone. And Lyft will demo their "concierge" product, a tool used by transit agencies and organizations to schedule and dispatch rides for consumers. General information about organizations partnering with TNCs to serve older adults, people with disabilities, and low-income individuals will also be included.

Presenters: Jane Gould, TRIPPS
Ben Sisko, Lyft
Justin Boogaard, GoGoGrandparent
Facilitator: Jenna Henning, MassMobility

Session 8, Room B: See session information board outside conference room

Session 8, Room C: See session information board outside conference room

Session 8, Room D: See session information board outside conference room

Session 8, Room E: Applied Technology for the Inventory and Assessment of MassDOT and MBTA-owned Pedestrian Infrastructure

The first presentation will focus on the accessibility of the MBTA system and the MBTA's Plan for Accessible Transportation Infrastructure (PATI), a part of its long-range strategy to achieve a fully accessible system. To support that goal, the MBTA collected accessibility data at 7,690 bus stops and 177 rail stations throughout its service area. The presentation will discuss the planning and design process that went into this substantial data collection undertaking, the data scoring, and the establishing of priorities for future improvements. The presenters will also share lessons learned about survey and scoring design, personnel selection and training, and quality control. The second presentation will highlight an ongoing MassDOT project examining the use of LiDAR as a tool to support efficient inventory updates and condition assessments of pedestrian infrastructure under MassDOT's jurisdiction. Focusing on the State Route 9 corridor, the immediate scope of this study is to collect and process data with a mobile-LiDAR system, to verify and update the existing MassDOT's sidewalk inventory data, and to incorporate physical condition information into the inventory geodatabase. It is anticipated that the outcome will provide MassDOT's Highway Division with accurate information from which to prioritize sidewalk infrastructure maintenance and construction programs.

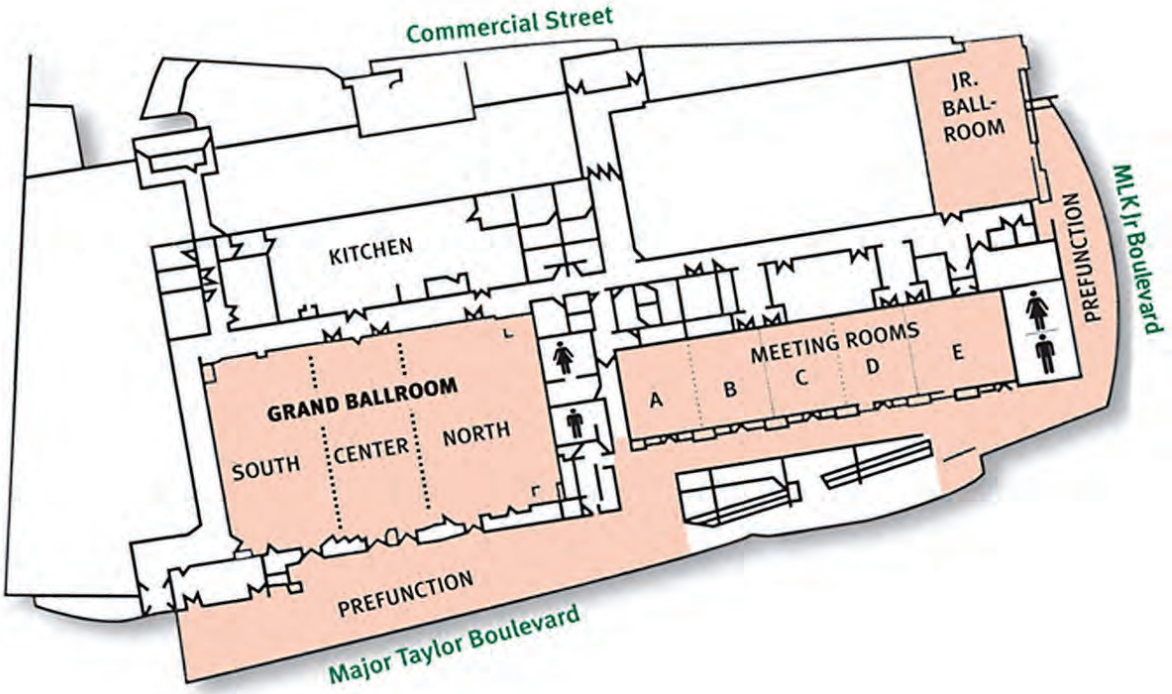
Presenters: Bill Schwartz, Nelson\Nygaard Consulting Associates
Matt von Wahlde, Geonetics, Inc.
Chengbo Ai, UMass Amherst
Jack Moran, MassDOT
Facilitator: Jack Moran, MassDOT Deputy Chief of Performance and Asset Management

Session 8, Junior Ballroom: MassDOT's Project Delivery Process - Updates and Changes

This session will focus on recent improvements to the MassDOT Highway Division's project delivery process including: early project coordination and scoping, how they are leveraging technology and lessons learned from the use of MapIT and Bluebeam, how they are using metrics to drive performance, and tips for municipalities for managing STIP projects, and upcoming initiatives.

Presenters: Patty Leavenworth and John Bechard, MassDOT
Facilitator: Patty Leavenworth, MassDOT Chief Engineer

MEETING ROOMS



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