



ITS Heartland TSMO University Education Project Final Report

ITS Heartland TSMO Training Program

Task 6 – Final Report

ITS Heartland: IA, KS, MO, NE, OK
April 28, 2020



Definitions

AASHTO – American Association of State Highway Transportation Officials
B/C – Benefit-Cost
CDOT – Colorado Department of Transportation
CMF - Capability Maturity Framework
CMM – Capability Maturity Model
CMP – Congestion Management Process
COBRA - Corridor Operations and Bottleneck Reduction Assistance
DSRC – Dedicated Short Range Communications
FHWA – Federal Highway Administration
FRATIS - Freight Advanced Traveler Information Systems
IaDOT – Iowa Department of Transportation
ITS – Intelligent Transportation Systems
ITS Heartland – ITS Heartland Chapter of the Intelligent Transportation Society of America
KDOT – Kansas Department of Transportation
KSA – Knowledge, Skills and Abilities
LBR - Localized Bottleneck Reduction
LOS – Level of Service
MAG - Maricopa Association of Governments
MAP-21 - Moving Ahead for Progress in the 21st Century Act
MDSS - Maintenance Decision Support Systems
MoDOT – Missouri Department of Transportation
MOE – Measure of Effectiveness
MPO – Metropolitan Planning Organization
NDOR – Nebraska Department of Roads
NDOT – Nebraska Department of Transportation
NET - Notify Every Truck
NHI – National Highway Institute
NOCoe – National Operations center of Excellence
OKDOT – Oklahoma Department of Transportation
PCB – Professional Capacity Building
PSC – Project Steering Committee
RFP – Request for Proposal
ROF – Regional Operations Forum
RWMP - Road Weather Management Program
SHRP2 – Strategic Highway Research Program 2
SME – Subject Matter Expert
TMP – Transportation Management Plan
TRB - Transportation Research Board
TSMO – Transportation System Management & Operations
TTI – Travel Time Index
U.S. DOT – United States Department of Transportation

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Introduction

Transportation Systems Management & Operations (TSMO) is a cross-cutting approach meant to optimize existing and planned infrastructure through better integration, coordination, and systematic implementation of key operational strategies. That is the basic and most common definition used by the Federal Highway Administration (FHWA). In simpler terms, TSMO is a huge toolbox of operational and management strategies that give planners, designers and operators many methods for improving reliability, capacity and safety, but implemented in a coordinated and collaborative manner. Many TSMO strategies are ones that have been employed for many years, but typically by operational specialists or Intelligent Transportation Systems (ITS) offices of DOTs. Changing the culture of agencies to embrace operations and management of the transportation system as a new way of doing business is the challenge.

The FHWA provided training on TSMO principles through a series of Regional Operations Forums around the country from 2015 to 2016, but was seeking a better delivery method to impact more transportation professionals. In 2016, the SHRP2 initiative (Strategic Highway Research Program) released a notice of funding opportunity offering grants of up to \$100,000 to fund better delivery methods of TSMO information to a broader audience. The ITS Heartland Chapter of ITS America, with Kansas as the lead state, was awarded a SHRP2 grant in late 2016 to provide TSMO training across the ITS Heartland 5-state region (Iowa, Kansas, Missouri, Nebraska and Oklahoma).

Beginning in 2017, ITS Heartland, with their consultant, facilitated the TSMO University training program through a series of webinars, in-person training sessions, and train-the-trainer seminars over a 30-month period. The goal of the training program was to allow for a greater penetration of TSMO knowledge to a wider audience of transportation and operations personnel as well as decision makers. Nearly 600 transportation professionals from both the public and private sector had participated in the education program and/or the train-the-trainer seminars at the conclusion of the project. This report summarizes the results of the process, training sessions and seminars conducted by ITS Heartland and the many partners who contributed.

Project Scope

DOTs and other public agencies must make a transformational shift in the way they conduct business moving forward by doing more with less and getting the most operational capacity out of existing infrastructure. TSMO education paves the way for that change by supporting knowledge transfer targeted at all levels of an organization and creating a top-down and bottom-up supported strategy, which leads to greater success

The TSMO University training program was broken up in two phases. Phase 1 was baseline TSMO education designed to teach TSMO principles to public and private sector professionals across the 5-state ITS Heartland region. It took place from 2017 to 2018. In 2017, TSMO was a relatively new term and the FHWA was pushing for all states to create TSMO plans. Education level with regard to TSMO was relatively low and there were many misconceptions regarding what TSMO included, the benefits, potential strategies and why it was important. A baseline understanding of TSMO needed to be established so that everyone was working from the same level of subject knowledge. Some of the subjects were well known within our industry and others were not, but the goal of Phase 1 was to lay a foundation for TSMO education that ITS Heartland could build upon.

The following principles were used as the basis for the development of the Phase 1 training program:

- The curriculum must be designed to be beneficial both to practitioners familiar with TSMO activities and to attendees whose experience is outside the TSMO field.
- The training sessions must take advantage of the variety of experiences and backgrounds that exist among the attendees, including practitioners and policy makers, various levels of management, various disciplines (planning, engineering, operations, etc.), various organizations (cities, MPO, DOT, law enforcement agencies, fire and emergency response etc.).
- The curriculum should be designed for flexibility in implementation so that it can be readily tailored to the interests and capabilities of the ITS Heartland region but also present a national perspective.
- The curriculum should balance technical subjects (tools, analytical techniques, devices, standards, testing, etc.) and nontechnical subjects (planning, programming, organization, workforce, funding, and collaboration).

As originally envisioned, Phase 2 of the TSMO University training was focused on specific audiences that needed to be educated on TSMO, advocacy techniques, and a Train-the-Trainer curriculum. That curriculum would be used to develop TSMO subject matter experts within the ITS Heartland region that could expand TSMO education efforts and be advocates for TSMO in the Midwest. The specific audience types targeted were Executive Level Staff, Mid-Level Operations Managers, and Field Level Personnel. A Train-the-Trainer type curriculum would be used to provide specific training to enhance TSMO advocacy skills with these audience types and improve overall presentation skills and comfort level presenting. Prior to the start of Phase 2, the focus was shifted to concentrate on the Train-the-Trainer aspect and less on audience specific training.

In addition to the Phase 1 and Phase 2 work, a task was added to the scope to develop a project poster for use in outreach activities, meetings and poster sessions at conferences. The original Phase 1 and Phase 2 project scopes are located in Appendix A.

Phase 1 and Phase 2 Summary

Summary of Phase 1

The Phase 1 webinars started in June 2017 and ultimately included eight TSMO webinars and two live TSMO training sessions conducted by ITS Heartland. Attendance at the webinars was primarily from the ITS Heartland region, but has also included participation from outside of ITS Heartland as well due to national advertising of the TSMO University education program. Phase 1 provided the TSMO foundation that was used as a starting point to educate on more complex TSMO and operational concepts. It included TSMO principles, strategies, benefits, methods for implementing TSMO, and resources required. The Phase 1 webinars and live training concluded in April 2018 with a Planning for TSMO seminar at ITS Heartland's Annual Meeting.

Summary of Phase 2

In Phase 2 of the TSMO training, Train-the-Trainer, TSMO principles and advocacy techniques were taught to potential subject matter experts (SMEs). The program also provided presentations and materials/handouts that were comprehensive yet could be tailored to a particular audience. These techniques and materials were subsequently used by TSMO practitioners to make presentations throughout the ITS Heartland region and beyond. The purpose being to educate and inform others of TSMO principles, strategies, benefits, methods for implementing TSMO, and resources required. Ultimately, Phase 2 supported greater TSMO advocacy and implementation within the region. Two Train-the-Trainer sessions were conducted as part of Phase 2 – one in September 2018 and another in September 2019.

All of the webinars, training sessions and materials are archived on the ITS Heartland website under a special TSMO section along with PDH certificates. See <https://itsheartland.org/tsmo-university/>.

Phase 1 Webinars

Below is a brief summary of each webinar conducted by ITS Heartland during Phase 1. For more information please see Appendix B for PDFs of the full presentations.

Session 1: TSMO Overview – June 22, 2017

The objective of this session was to give an overview of TSMO program areas and strategies. TSMO is about integrating technologies and tactics to optimize operational performance. Through systematic network management, DOTs are able to manage traffic flow, anticipate, and respond to events, influence travel demand and enhance freight mobility. Planning for TSMO occurs in multiple contexts, from national to local agency level. DOTs are able to coordinate transportation networks whether it is statewide or a specific corridor. The application of TSMO allows for improved level of service without the need for additional lanes or other infrastructure. A TSMO update was given by each ITS Heartland state DOT. In total there were six presenters.

Speakers: John Corbin, FHWA; Austin Yates, Nebraska DOT (now with Iowa DOT); Randy Johnson, MoDOT; Alan Stevenson, OKDOT; Mike Floberg, KDOT; Tim Simodines, Iowa DOT

The image shows two presentation slides from the 'TSMO Overview' webinar. The left slide is the title slide, featuring the text 'TSMO Overview' and 'ITS Heartland TSMO Training Session #1 Thursday, June 22, 2017 Webinar 12:00 pm to 1:00 pm'. It includes logos for ITS Heartland Chapter, IOWADOT, Kansas, MoDOT, NDOR, DOT, and HDR. The right slide is titled 'Who is presenting today?' and lists six speakers: John Corbin (Federal Highway Administration), Alan Stevenson (Oklahoma DOT), Austin Yates (Nebraska DOT), Mike Floberg (Kansas DOT), Randy Johnson (Missouri DOT), and Tim Simodines (Iowa DOT). Below the names are small portrait photos of each speaker. Logos for ITS Heartland Chapter, IOWADOT, Kansas, MoDOT, NDOR, DOT, and HDR are also present on this slide.

Session 2: Safety – July 27, 2017

The traffic trends related to casualties and fatalities were discussed in Session 2. Along with the issues that lead to a reduction in roadway safety, TSMO strategies that can be implemented to improve roadway safety were presented. Distracted driving and increasing congestion are the leading factors contributing to the increase of crashes resulting in serious injury or a fatality. The following projects were discussed in this session:

- I-70 Continuous Flow Meter Application in Colorado
- I-70 Mountain Corridor Operations Plan
- Straight Creek Issues and Improvements
- I-70 Remote CFM Implementation

Speakers: Matt Volz, HDR; David Millar, HDR

The image shows two presentation slides from the 'I-70 Remote CFM Implementation' webinar. The left slide is the title slide, featuring the text 'I-70 Remote CFM Implementation Design' and a map of the I-70 corridor. The map shows three locations for CFM signal heads: 2.0 miles, 0.5 mile, and 0.25 mile upstream. A legend identifies various traffic signs and symbols. The right slide is titled 'Who is presenting today?' and lists two speakers: Matthew Volz (HDR Kansas City – TSMO Training Program Project Manager) and David Millar (HDR Denver – Colorado DOT TSMO Project Facilitator). Below the names are small portrait photos of each speaker. Logos for ITS Heartland Chapter, IOWADOT, Kansas, Nebraska, MoDOT, DOT, and HDR are also present on this slide.

Session 3: Reliability – August 24, 2017

This session described reliability as it relates to the transportation system and why it is identified as the most commonly used metric for measuring efficiency. Reliability is the consistency or dependability in travel times as measured from day to day or across different times of day. Studies show that customers care about the predictability of travel. To meet the demands of the traveling public, agencies need tools to better understand issues and identify strategies to improve reliability. There are several factors that affect travel time reliability such as work zones, weather, special events, and traffic incidents. Even a normally well-operated system can struggle when disruptions to normal operations occur.

The following strategies were covered in this session, Traffic Incident Management (TIM), Work Zone Management, Planned Special Event Management, and Road Weather Management. Dynamic Messaging Signs and social media tools were also discussed. TSMO strategies can be used by DOTs and transit agencies to adapt to various events and maintain reliability.

Speakers: Tracy Scriba, FHWA; Paul Morris, SRF Consulting

What affects Travel Time Reliability?

- Traffic incidents
- Weather
- Work zones
- Special events
- Demand fluctuations
- Other congestion producers (e.g., bottlenecks, double-parking)

Even a normally well-operating system can struggle when disruptions to normal operations occur.

Who is presenting today?

- Tracy Scriba, FHWA - SHRP2 Reliability Program Manager, FHWA Office of Operations
- Paul Morris, SRF Consulting – Senior Associate in Minneapolis Office

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Session 4: Delivering TSMO – Live Training Session held in Omaha, NE – September 28, 2017

In this session the focus was on how to start internal discussions within agencies to undertake greater effort in the TSMO arena by creating an agency wide TSMO plan. Multiple agencies gave an overview of how they are delivering TSMO and FHWA methodologies.

Speakers:

- Michael Grant, ICF: Michael presented on the recently developed TSMO Program Primer developed for the FHWA which provides guidance on the TSMO planning process and elements to include in a TSMO plan document.
- San Lee, Colorado DOT: The Division of Transportation Systems Management & Operations is responsible for the planning, development, and administration of a statewide program designed to reduce congestion and improve the safety, security, mobility, and efficient utilization of Colorado's existing highway system. The Division is formed on the belief and commitment that CDOT can do more to operate Colorado's existing surface transportation system so that it performs better to meet customer expectations through activities other than building new capacity.



Figure 1 - Jerry Roche of the FHWA explains Data Driven Safety Analysis at Session 4

- Donna Matulac, Iowa DOT and Todd Szymkowski, Gannet-Fleming: Iowa developed an Internal TSMO Steering Committee to continue to foster TIM-Related partnerships, grow interest in integrated corridor management, continue data sharing partnerships like Waze and expanded University research and development collaboration. The three levels of their TSMO plan are Strategic, Programmatic, and Architectural Layers.
- Jerry Roche, FHWA: Application of Data Driven Safety Analysis (DDSA). Every two years, FHWA works with the transportation community to identify a new set of innovations that merit widespread deployment through Every Day Counts (EDC). FHWA's call for suggestions for EDC-4 innovations drew a strong response from stakeholders, who offered more than 80 new ideas. One of the innovations that received some of the highest marks was the continuation of the Data-Driven Safety Analysis initiative that began under EDC-3. DDSA helps you make more informed decisions, allowing you to better target transportation investments, which will lead to fewer fatalities and serious injuries on the nation's roadways.
- Randy Johnson, MoDOT: Randy provided an update on MoDOT's TSMO planning process and documents to date.

Regional Operations Forum Training Program

TSM&O Seminar

ITS Heartland TSM&O Training
Thursday September 28, 2017

September Live Session:

- Delivering TSMO
- Developing TSMO Plans
- Experiences of Iowa and Missouri
- Colorado DOT's TSMO Program
- Using Data to Support TSMO Analysis

Thursday, September 28, 2017
10:00 AM to 2:00 PM
Omaha, NE (HDR)
Also broadcast as a webinar

Regional Operations Forum Training Program

ITS Heartland Chapter

Session 5: TSMO Communications – October 26, 2017

This session discussed the importance of training employees and communicating to the public about TSMO. It is important for agencies to develop a plan and have a dedicated unit for operations. Agencies can work with communication partners to share information consistently and utilize social media to keep the public informed and up to date on new strategies that are being implemented.

Speakers: Les Jacobsen, WSP; Raj Ponnaluri, Florida DOT; Andrea Henry, Iowa DOT

TALKING TSMO

How to start on the path to change?

Iowa DOT TSMO

3. Key Info: Travel Time Reliability

- **Reliability:** Consistency or dependability in travel times, as measured from day to day or across different times of day
- Matters to the public – less tolerance for unexpected delay
- What affects Reliability?
- How is the role of TSMO?
- Do you measure Reliability?

What travelers experience

Travel time

What they remember

Travel times vary greatly day-to-day

Jan. July Dec.

SHRP2 STRATEGIC HIGHWAY RESEARCH PROGRAM

6 TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES

Session 6: Performance Management – November 30, 2017

The objectives of this session was to describe the meaning of performance metric and performance measure and how the two are related. Transportation Performance Management (TPM) can be used to improve transportation operations, DOTs can take a strategic approach that uses system information and policy decisions to achieve transportation system performance goals. The six elements of TPM are as follows:

- National Goals
- Measures
- Targets
- Plans
- Reports
- Accountability

Performance Measures introduced included: Travel Time Reliability, Freight Reliability, and Peak Hour Excessive Delay.

Speakers: Alexis Kuklenski, FHWA; Ralph Volpe, FHWA

Who is presenting today?

- Alexis Kuklenski
Transportation Specialist, FHWA Office of Performance Management
- Ralph Volpe
TSMO Specialist, FHWA Resource Center - Operations Technical Service Team

ITS Heartland Chapter

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Overview: PHED Metric: Example

0.500 Mile Reporting Segment

SPEED LIMIT 30

Average of 105 seconds for a 15-min. segment per vehicle

Excessive Delay Threshold: 90 seconds

105 - 90 = 15 seconds

500,000 people traveling during peak hours

For all peak periods in a full calendar year

= 863,025 person-hours

Travel Time → Threshold Travel Time → Travel Time Segment Delay → Total Excessive Delay

U.S. Department of Transportation Federal Highway Administration

Session 7: TSMO Workforce Development – January 25, 2018

There are several issues that we face today with regard to developing our future TSMO workforce. Agencies can implement several strategies to advance TSMO education. This session focused on the importance of training and education of TSMO in the workplace. Patrick Son of the National Operations Center of Excellence presented several strategies and existing programs that demonstrated the value of education and training in TSMO. Dr. Ivey presented on TSMO education efforts at the university level across the U.S. through the National Transportation Career Pathways Initiative (NTCPI) that seeks to document a series of career pathways that engage and prepare students for key transportation occupations.

Speakers: Patrick Son, National Operations Center of Excellence (NOCoE); Stephanie Ivey, University of Memphis

Session 8: CV and AV Impacts to TSMO – February 22, 2018

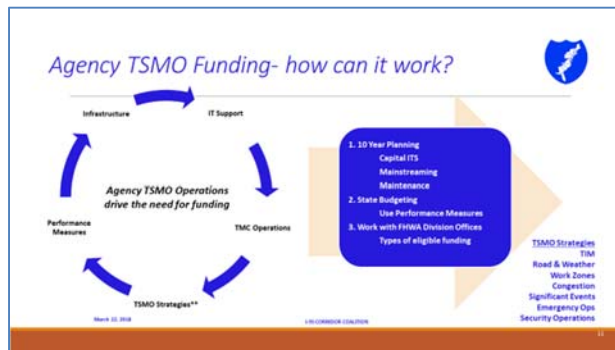
During this session the potential impacts to the transportation industry from connected vehicles (CV) and automated vehicles (AV) was discussed. The application of this technology will change how agencies plan, design, and operate the transportation systems. Iowa conducted a study on an I-80 Automated Corridor. This study will assist in developing a potential range of expectations for future connected automated vehicle adoption and show the estimated benefits of connected automated vehicles (CAV) with improved safety and reliability. Traffic and safety analysis results showed that with 85% AV a 6-lane freeway can serve roughly 1,800 additional vehicles during peak hour. Safety analysis showed that introducing automated vehicles reduces crashes. Vehicles with advanced safety systems such as forward collision and lane change warning as well as cooperative adaptive cruise control all help with this reduction. Ms. Finley presented on a wrong-way driver detection research with connected vehicles being conducted by the Texas Transportation Institute to allow for in-vehicle messaging and alerts.

Speakers: Shailen Bhatt, ITS America; Jon Markt, HDR; Melisa Finley, Texas Transportation Institute

Session 9: TSMO Funding – March 22, 2018

Having agency support of TSMO and having mature TSMO strategy and planning documents clearly aligned with agency goals is of vital importance. Engagement with FHWA Division offices is the best way for agencies to receive federal funding for TSMO related projects. Asking the questions of what types of TSMO programs, strategies, and plans qualify for funding will help agencies plan their projects to fit their budgets for the fiscal year. Agency TSMO operations drive the need for funding. Coordination with the FHWA Division offices with 10-year planning goals and state budgeting will create a streamlined system to deliver projects in a timely manner.

Speakers: Russell Allen, Florida DOT; Donna Matulac, Iowa DOT; Denise Markow, I-95 Corridor Coalition; Tracy Scriba, FHWA



Who is presenting today?

- Russell Allen, PE
ITS Program Development Engineer
Florida Department of Transportation
- Donna Matulac, PE
Asst. Director of Traffic Operations
Iowa DOT
- Denise Markow, PE
TSMO Director
I-95 Corridor Coalition
- Tracy Scriba
Team Leader, Planning & Organizing for Operations
FHWA

Regional Operations Forum Training Program

Session 10: TSMO Planning – Live Training Session at ITS Heartland Annual Meeting, April 23, 2018

This was a presentation of the FHWA's TSMO Program Planning Workshop and presented the approach outlined in the FHWA's "TSMO: A Primer for Program Planning". The objective of this workshop was to equip State DOTs with more knowledge and tools to enable them to develop and sustain a TSMO mission for their organization in cooperation with metropolitan planning organizations (MPOs) and local agencies. TSMO planning can be broken down into three components: strategic, programmatic, and tactical. By breaking planning down into those components DOTs can then identify the gaps in their TSMO program planning and work to "fill in the gaps". A small group activity was conducted by the presenter to allow the audience identify opportunities for advancing TSMO program planning within their respective agencies.

Speakers: Pat Noyes, Pat Noyes & Associates; Jim Hunt, FHWA; Tracy Scriba, FHWA

U.S. Department of Transportation
Federal Highway Administration

Transportation Systems Management and Operations Program Planning Workshop

Lincoln, Nebraska
April 23, 2018

FHWA's Primer on TSMO Program Planning

- The Primer provides the rationale for and the key elements of successful TSMO program planning.
- It is intended to help agencies understand:
 - Why is TSMO program planning important?
 - How can it benefit a transportation agency or region?
 - What are key elements of effective TSMO program planning, and what steps or activities should be taken?
 - What would an effective TSMO Program Plan look like?

<https://ops.fhwa.dot.gov/publications/fhwahop17017/index.htm>

Phase 1 Outreach Achieved

One of the goals of Phase 1 of the program was to reach out beyond the public sector that were benefitting from the information received at the USDOT's Regional Operations Forums. Those classes were only open to public agencies. ITS Heartland, which is an all-inclusive organization of public sector, private sector and

vendor members, wanted to ensure equity for everyone interested in receiving TSMO education. ITS Heartland achieved that goal. Of the 540 transportation professionals that attended ITS Heartland's TSMO University webinars and in-person classes, 1/3 were from the private sector and 2/3 from the public sector. The program also reached beyond the public sector members in the ITS Heartland region with 28% of participants coming from other parts of the country as well as from Federal government and educational institutions.

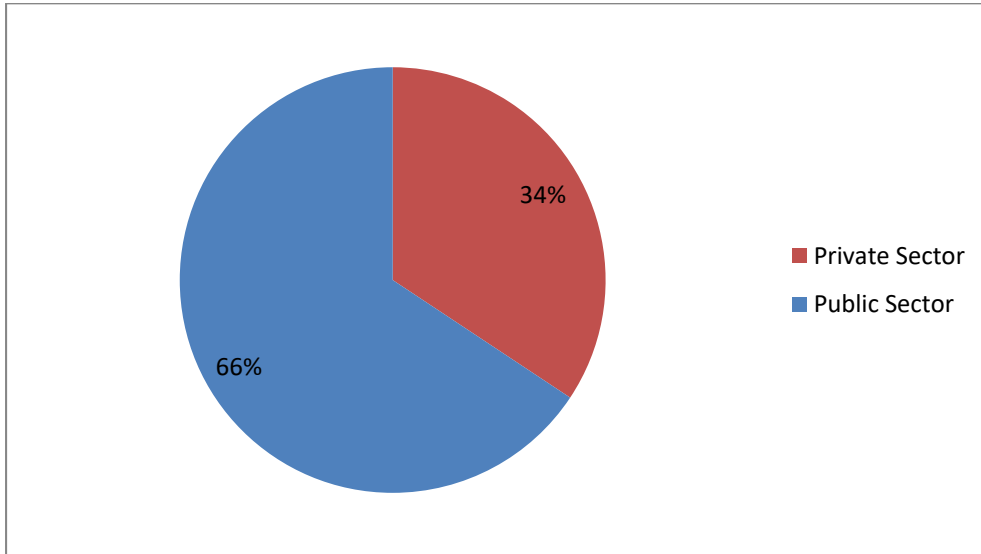


Figure 2 - Public Sector and Private Sector Phase 1 Webinar and Live Training Participation

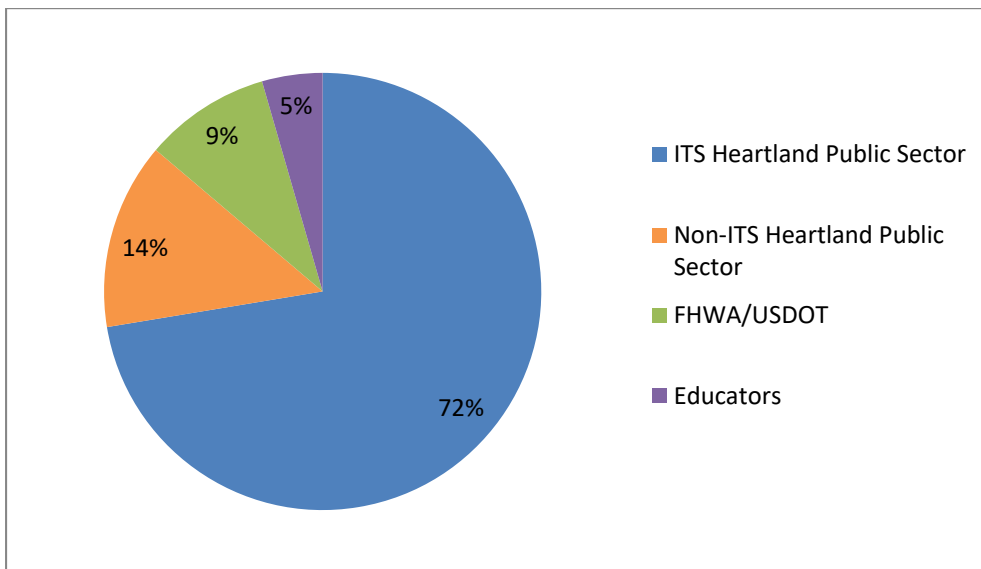


Figure 3 – Phase 1 ITS Heartland Public Sector and non-ITS Heartland Public Sector Distribution

Phase 2 Train-the-Trainer Seminars

Phase 2 of the ITS Heartland TSMO University was originally envisioned to be TSMO training for smaller group sizes, regional in nature, and targeted toward specific groups of transportation professionals. The desire was to have the training in a more personalized setting to achieve greater penetration of TSMO education within the DOT's and other organizations based upon the skills they seek to develop/build. However, the training plan was modified to provide more focus on a train-the-trainer type experience. By engaging in train-the-trainer, those individuals would be able to go back to their respective agencies and offices and promote TSMO principles more broadly.

As part of the Phase 2 activities, a 2-day TSMO Train-the-Trainer session was held in September 2018 and again in September 2019. Representatives from all five ITS Heartland state DOTs as well as MPOs and consultants participated in the training. In total, 39 people participated in the Train-the-Trainer sessions conducted in 2018 and 2019. The session presentations and materials are located in Appendix C.

Train the Trainer #1 – September 2018, Lenexa, KS

The “Train-the-Trainer” #1 was broken up into two parts. The first part focused on how to communicate and encourage adult learning as well as how adults learn. In the second part, TSMO principles were reviewed along with materials available to use with various audience types. The class focused on how the TSMO representatives can deliver information about TSMO to various groups from executive level leaders in their DOTs to operations staff, designers, contractors and maintenance personnel. Each participant had to practice their public presentation skills and was graded by their peers. Adult learning principles were discussed as well as meeting facilitation techniques. Finally, materials for TSMO presentations were reviewed and each participant had to practice presenting some aspect of TSMO to a mock audience that acted the part. It was a very positive and fun experience for all and the confidence level of all participants in being able to discuss TSMO with their agencies was raised. This training was facilitated by Negil McPherson, Jr. and Matt Volz of HDR. The presentations and materials can be found in Appendix C and are archived at <https://itsheartland.org/tsmo-university/>.



Figure 4 - Zhaia Wineinger, Mandy Anderson and Negil McPherson, Jr. at the Train-the-Trainer #1 September 2019



Figure 5 - Train-the-Trainer #1 participants listen to Alan Stevenson of the OKDOT present



Figure 6 - Kristi Ericksen, Dave LaRoche and Randy Johnson discuss TSMO at Train-the-Trainer #1

Train the Trainer #2 – September 2019, Olathe, KS

This second seminar focused on learning how to address TSMO benefits/concerns and explain why TSMO is important. Several TSMO strategies were reviewed along with the five cogs that make TSMO strategies work - education, planning, design, construction, and operations. During Train-the-Trainer #2 the supporting adult learning activities were broken down and reviewed. Participants practiced presentation skills in front of the class and concluded by making a persuasive argument related to a TSMO strategy. Guest speaker Brent Cain from Arizona DOT presented on the extensive TSMO program in Arizona and the processes they engage in. Tracy Scriba from the FHWA Office of Operations spoke about the national TSMO program

and how ITS Heartland's TSMO University plays into their overall strategy for education. This training was facilitated by Negil McPherson, Jr. and Matt Volz of HDR. The presentations for Train-the-Trainer #2 can be found in Appendix C and are archived at <https://itsheartland.org/tsmo-university/>.



Figure 7 - Negil McPherson, Jr. and Matt Volz facilitate Train-the-Trainer #2

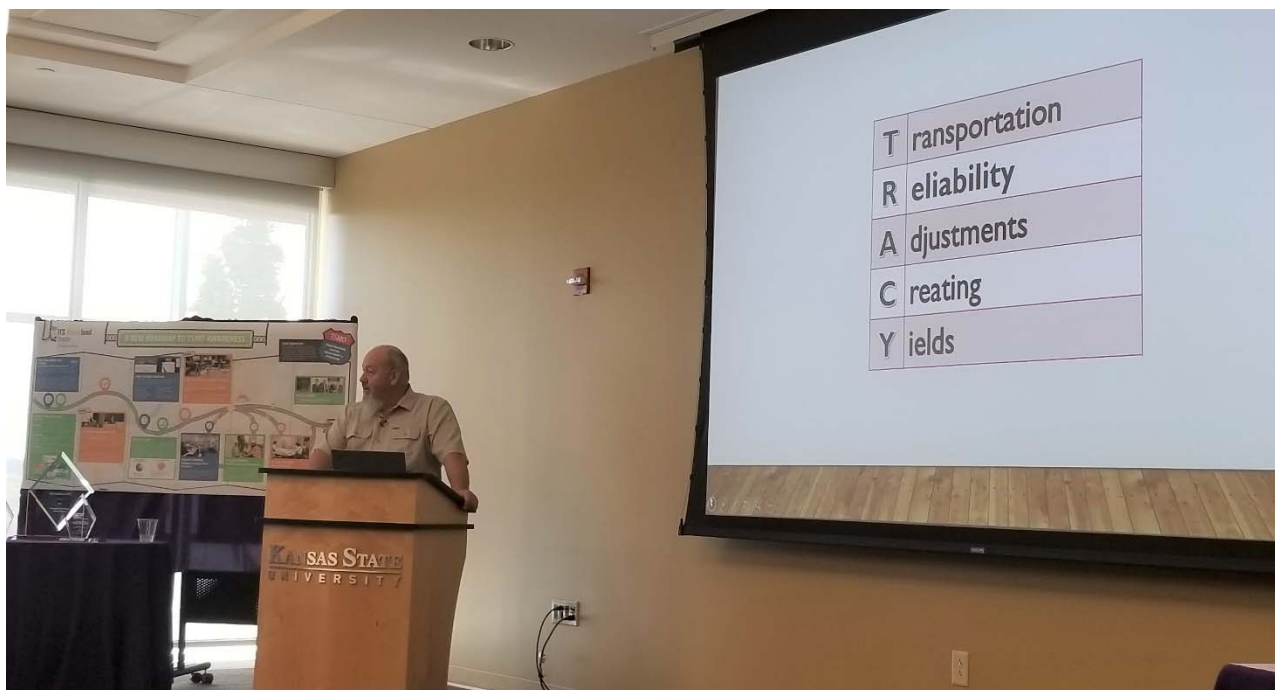


Figure 8 - Tom Hein of KDOT explains the "Tom Project" at Train-the-Trainer #2



Figure 9 - Lindsay Francis of WSP presents her TSMO advocacy at the Train-the-Trainer #2



Figure 10 - Kristi Ericksen from the City of Topeka presents her TSMO advocacy at Train-the-Trainer # 2

Roadmap to TSMO Awareness Poster

As an additional task, a TSMO infographic-type poster was developed for use at several conference poster sessions beginning with the 2018 TRB conference. Over the course of the project, two versions were published to provide updates on the project status and milestones. The poster has been used in publications and at ITS Heartland events. It is available on the ITS Heartland website for download. A high resolution large format version is located in Appendix D.

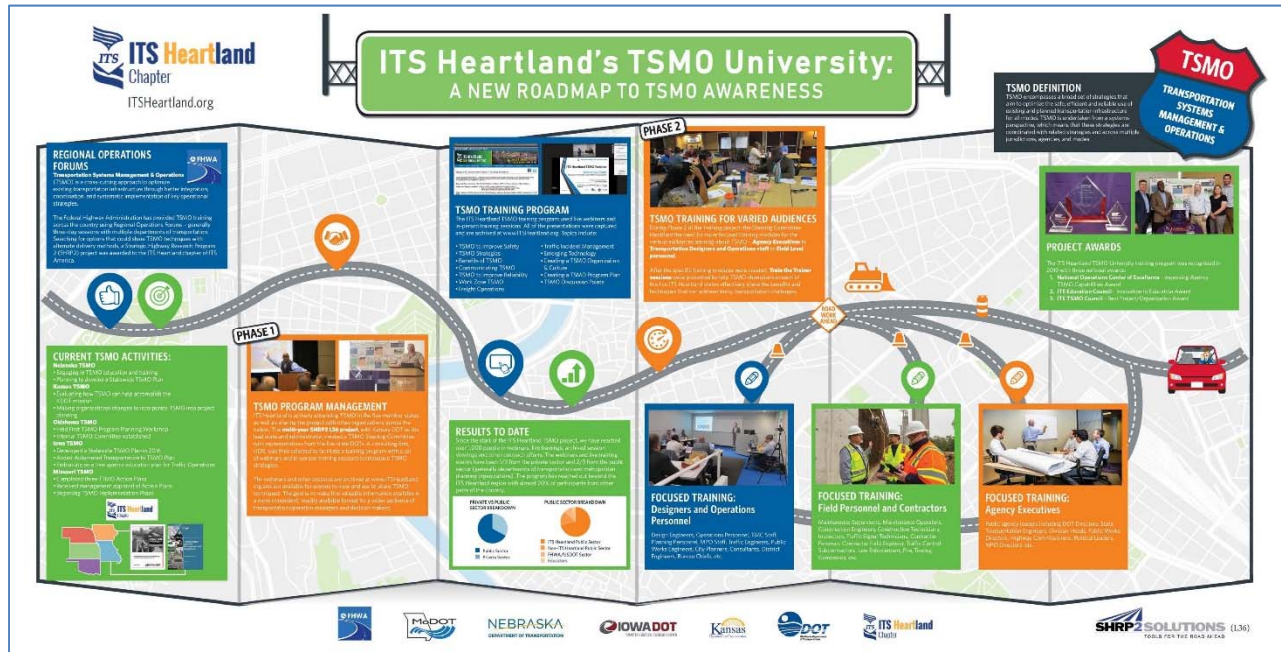


Figure 11 - ITS Heartland TSMO University Poster

Awards

In 2019, the ITS Heartland TSMO University Education Project won several prestigious national awards. In January 2019, the project was awarded the National Operations Center of Excellence TSMO Advocacy Award which was presented to ITS Heartland at the TRB Annual Meeting in Washington, DC. In July of 2019, the project won two Institute of Transportation Engineer (ITE) awards - the ITE Education Committee Best Project Award and the ITE TSMO Council Best Project Award.



Figure 12 - Matt Volz - HDR, Negil McPherson, Jr. - HDR, Tom Hein - KDOT, Tracy Scriba - FHWA, and Kurt Rotering - Walter P. Moore and ITS Heartland President



Figure 13 - National awards won by the ITS Heartland TSMO University Education Project in 2019

Results

Over the 30-month period of the ITS Heartland TSMO University education effort, 579 people from across the ITS Heartland region and beyond participated in the TSMO training either through a webinar, an in-person training class, or a Train-the-Trainer seminar. A total of 8 webinars, two in-person training classes,

and two train-the-trainer 2-day sessions were conducted over the course of the project resulting in 44 total hours of training time produced and conducted. A wealth of TSMO material was produced for use by ITS Heartland members and participants to conduct TSMO advocacy. All webinars, live training sessions, and materials have been archived on the ITS Heartland website and webinars are available for viewing anytime along with PDH certificates. PDF versions of the general TSMO training module slides are located in Appendix E.

The training has produced many TSMO advocates, introduced TSMO to many people who had not been exposed to it previously, and has advanced TSMO within the DOTs that are members of ITS Heartland. In Nebraska, a TSMO Engineer position was created in 2019 to specifically manage the burgeoning program and the Nebraska DOT. That position was filled by a TSMO University Train-the-Trainer graduate, Matt Baker. TSMO has been a topic of presentation by many of the Train-the-Trainer graduates at conferences and committee meetings, including, but not limited to, Ray Webb of the Mid-America Regional Council, Randy Johnson of the Missouri DOT, Zhaia Wineinger of the Iowa DOT, Matt Baker of the Nebraska DOT, Tom Hein of the Kansas DOT, Kristi Ericksen of the City of Topeka, and Alan Stevenson of the Oklahoma DOT. Private sector members of ITS Heartland who participated in the training events have advocated to clients, successfully incorporated TSMO strategies into their projects, and developed TSMO planning documents for public agencies.

Awards may not be a true measure of the success of a project, but they are a good indication of quality as they are judged by a group of peers against many other projects. ITS Heartland is proud to have won the three national awards they did and have shared their success story with many other ITS America Chapters and at several regional meetings and conferences. Conferences and meetings where the ITS Heartland TSMO University results were presented include:

- 2017 ITS Heartland Annual Meeting (5-1-17, 5-3-17 - Wichita, KS)
- 2017 MOVITE Fall Meeting (10-5-17, Hot Springs, AR)
- 2018 TRB Annual Meeting (1-9-18, Washington, DC)
- 2018 MoDOT TEAM Annual Meeting (3-8-18, Branson, MO)
- 2018 Kansas Transportation Engineering Conference (4-11-18, Manhattan, KS)
- 2018 ITS Heartland Annual Meeting (4-23-18, Lincoln, NE)
- Kansas DOT Communicators Meeting (6-27-18, Topeka, KS)
- 2018 ITE Annual Meeting (8-20-18, Minneapolis, MN)
- 2018 MARC MPO Meeting (9-26-18, Kansas City, MO)
- 2018 ITS 5C Conference (10-8-18, Jacksonville, FL)
- 2018 National Rural ITS Meeting (10-20-18, Ft. McDowell, AZ)
- 2018 ITS Washington Annual Meeting (12-10-18, 12-11-18, Seattle, WA)
- 2019 TRB Annual Meeting (1-13-19, Washington, DC)
- 2019 TSMO Workshop for Wichita MPO (3-12-19, Wichita, KS)
- 2019 TSMO Training KDOT District 5 (4-25-19, Hutchinson, KS)
- 2019 ITS Heartland Annual Meeting (5-1-19, Kansas City, MO)
- 2019 ITS America Annual Meeting (6-4-19, Washington, DC)
- 2019 Iowa DOT Regional Operations Leadership Forum (6-19-19, Ankeny, IA)
- 2019 ITE Annual Meeting (6-22-19, Austin, TX)
- 2019 Gulf Region ITS Annual Meeting (11-4-19, Jackson, MS)
- 2019 ITS Texas Annual Meeting (11-14-19, Irving, TX)
- 2019 ITS Washington Annual Meeting (12-3-19, Seattle, WA)
- TRB Annual Meeting (1-12-20, Washington, DC)
- ITS Heartland State Updates Meeting (4-29-20, Web-Based Meeting)



Figure 14 - Randy Johnson, MoDOT presents at the 2018 National Rural ITS Meeting in Ft. McDowell, AZ

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