

# STRATEGIC PLAN FOR THE AASHTO Committee on Transportation System Operations

**As approved by the Strategic Management Committee, September 22, 2018**

## Goal 1: Advance the state of practice and deployment of operation systems.

The United States transportation community is moving from one that primarily builds highway and transit infrastructure to one that actively manages it in real time to improve safety, reduce congestion, and improve reliability. The prohibitive cost of rights-of-way, concerns over neighborhood impacts, and declining budgets limit highway expansion. To address ever-increasing travel volumes, transportation agencies need to actively manage highways and other transportation assets. Agencies must respond immediately to crashes, breakdowns, spills, and weather, while also limiting construction and maintenance impacts.

### 1.1 Build Institutional Capacity to Support Operations

#### Implementation Actions:

- Collaborate with the National Operations Center of Excellence (NOCoE) to support workforce development efforts.
- Promote the Capability Maturity Model as the framework for developing the employee skills, organizational structures, information systems, and agency policies for transportation agencies to actively manage their transportation system.

### 1.2 Support the mainstreaming and integration of operations within AASHTO member departments and partner agencies

#### Implementation Actions:

- Support NOCoE Summit on institutionalizing operations.
- Conduct education and outreach on operations.
- Research career path options for operations discipline.
- Collect and research organizational structures to support operations.

### 1.3 Support Agencies' Research and Information Needs

#### Implementation Actions:

- Develop and refine a prioritized list of operations topics from CTSO members.
- Promote research, studies, training, and benchmarking to meet those needs.

#### 1.4 Establish standards of practice

##### Implementation Actions:

- Support NCHRP Project to develop an Operations Guidebook.

#### 1.5 Share Knowledge

##### Implementation Actions

- Leverage NOCoE for knowledge transfer and to serve as a clearinghouse for promoting, disseminating and sharing information on the latest operations strategies and programs
- Develop and deliver roundtable webinars based on topics identified in 1.3

#### 1.6 Establish a working relationship with other AASHTO committees for multimodal and interdisciplinary integration

##### Implementation Actions

- Identify other AASHTO committees with which CTSO should coordinate.
- Appoint liaisons to those committees.

### Goal 2: Advance the state of practice and performance of traffic incident management nationally.

Traffic incident management (TIM) includes a broad array of practices that help to quickly identify incidents and clear them safely and efficiently. The CTSO will lead AASHTO's efforts to instill best practices in traffic incident management across the United States. It will engage not only state transportation agencies, but local agencies, and all levels of traffic-incident responders in the public and private sectors. A key element CTSO will emphasize is sustainability of TIM efforts. Although training efforts have been successful, continual turnover among incident responders creates the need for continuous, sustainable support for TIM best practices.

#### 2.1 Coordinate extensively within AASHTO to complement and enhance ongoing activities

##### Implementation Actions:

- Formalize membership.
- Appoint liaisons to other groups.
- Collaborate with the Research Advisory Committee to ensure multidisciplinary research activities related to TIM are captured and disseminated.

#### 2.2 Serve as the focal point for TIM collaboration between AASHTO and other organizations

##### Implementation Actions:

- Bring together first responder disciplines to understand multidisciplinary roles and needs to advance the national unified goals for TIM.
- Foster long-term law enforcement leaders and partners to sustain effective TIM programs nationwide.
- Build relationships with the IACP Highway Safety Committee and TRB RTSMO TIM Subcommittee.
- Participate in the TIM Executive Leadership Group.

### 2.3 Support efforts to nationalize TIM performance management

#### Implementation Actions:

- Identify opportunities to continue research on the impact of secondary crashes.
- Advocate adoption of TIM performance measures (incident duration, roadway clearance, secondary crashes) and support the development of national reporting standards.
- Develop a recommended practice for the integration of TIM performance measures into traffic management center software.

### 2.4 Amplify the value of TIM through traditional and progressive outreach

#### Implementation Actions:

- Work with FHWA to promote Traffic Incident Response Week.
- Work with the National Operations Center of Excellence and others to share TIM success stories.

### 2.5 Actively support TIM Practitioners

#### Implementation Actions:

- Identify technologies that show promise for improving TIM.
- Begin identifying best practices for incentive towing programs.
- Disseminate communication to help DOTs understand how TIM falls into DOTs' safety management.

## Goal 3: Facilitate the safe, efficient movement of freight by truck and promote national coordination of federal freight movement mandates.

The nation's highway system is central to economic growth, job creation, and it is a key contributor to American competitiveness in the global marketplace. The volume of freight on highways is large and growing, and trip time and reliability are critical in today's "just-in-time" economy. It is essential that steps be taken to facilitate the movement of freight on highways is as efficient as possible.

### 3.1 Provide leadership for AASHTO with regard to highway transport and commercial vehicle safety, size and weight issues

Implementation Actions:

- Recommend policies and initiatives that address highway safety, interstate and in-state movement, emergency movement, federal policies/rulings/changes affecting freight movements.
- Identify and propose research projects to support these recommendations.

### 3.2 Coordinate with truck manufacturing and freight movement industry

Implementation Actions:

- Coordinate with industry and representations regarding vehicle design, standards, and practices associated with commercial motor vehicle operations.

### 3.3 Share best practices and promote deployment of emerging technologies for safe and efficient freight operations

Implementation Actions:

- Share information through conference calls, webinars, and in-person meetings.

### 3.4 Collaborate with regional highway transport committees

Implementation Actions:

- Establish connections with regional highway transport committees.
- Engage in regular communication with regional highway transport committees.

## Goal 4: Implement in state DOTs best practices in system integration, operability, standards, and cybersecurity.

Rapidly developing technology creates opportunities and challenges for state transportation agencies. Operations systems provide volumes of data regarding congestion and reliability that were not available to agencies in past decades. However, using the data to effectively manage the transportation network is a challenge when agencies struggle to develop the appropriate personnel, technology, information systems, and practices. Agency technology systems often include a mix of legacy systems that struggle to integrate operations data effectively. The CTSO will help agencies implement best practices to integrate operations data. In addition, the CTSO will support AASHTO in the development of standards for operation system development and cybersecurity.

### 4.1 CTSO will develop State DOT best practices and actions related to operations technology and systems integration and interoperability.

Implementation Actions:

- Develop and disseminate a survey to State DOTs identifying core challenges associated with operations technology integration and interoperability.
- Summarize results based upon the highest priority, most prominent challenges associated with integration and interoperability.
- Finalize and distribute State DOT current best practices and future actions document related to the operations technology and systems integration and interoperability.

4.2 CTSO will educate State DOTs on available documentation on the use of the Security Credential Management System (SCMS) for connected and automated vehicle deployments and other cybersecurity practices

Implementation Actions:

- Compile documentation associated with the USDOT Proof of Concept (POC) SCMS, and other relevant documentation on current system use (e.g. USDOT CV Pilots.)
- Develop a summary containing information on current USDOT POC SCMS documentation.
- Disseminate the resulting summary to State DOTs and organize outreach and information sharing opportunities (e.g. webinars.)
- Monitor and disseminate findings from NCHRP 03-127 “Cybersecurity of Traffic Management Systems” and other sources providing best practices for cybersecurity in transportation operations.

4.3 CTSO will identify relevant standards that support State DOT, TSMO technology and system deployments, including the identification of the need for new standards, modification of existing standards, and other coordination activities as needed.

Implementation Actions:

- Document relevant standards related to operations technologies including standards such as NTCIP, IEEE, SAE, and others.
- Identify standards gaps including the need for new standards, modification to existing standards, and other coordination activities as needed.
- Quantify and identify the documents that are of value to agencies planning and deploying CAV.
- Work with NOCoE to help accomplish the posting of or linking to CAV documents of value.
- Identify and share information about planned research as available in NCHRP 20-102
- Identify any research needs for CAV deployment (e.g. RTCM accuracy and sources) and convey these to CTSO research coordinators.

**Goal 5: Integrate new and emerging connected and automated vehicle (CAV) technology to improve safety, increase reliability, preserve infrastructure, and reduce congestion.**

U.S. transportation agencies face new opportunities to capture data from vehicles and other technologies to better manage the transportation system. Agency officials predict significant benefits from connected and automated vehicles (CAV) and their interaction with highway infrastructure and personnel. However, increased information is needed on information systems, personnel training, policies, and practices to capitalize on these rapidly emerging and evolving technologies. The CTSO will keep abreast of the existing and emerging technologies to help member departments continually improve the skills, policies, information systems, and practices to capitalize on these technologies. CTSO also will play a critical coordination role within AASHTO because these technologies cut across many agency disciplines such as planning, design, construction, maintenance, and information management.

5.1 CTSO will collaborate with other CTSO working groups, AASHTO committees, State DOTs and external industry groups on areas of overlapping interest related to CAV.

Implementation Actions:

- Reach states that are new to CAV and encourage them to participate with CTSO.
- Provide introductory information to DOTs new to CAV to elevate their knowledge or understanding.
- Establish connections with other CTSO working groups and AASHTO committees on areas of overlapping interest in CAV.
- Support DOT and AASHTO executive staff on CAV topics of interest.

5.2 CTSO will promote and support CAV deployment and develop best practices from lessons learned in the deployments.

Implementation Actions:

- Continue opportunities for input to groups such as the IOO/OEM Forum and the AAMVA.
- Participate in and provide technical input to NOCoE activities related to CAV as appropriate (e.g. webinars, peer exchanges, workshops)
- Identify opportunities to have joint meetings or webinars with the various external CAV groups.

5.3 CTSO will identify technology gaps that require additional research.

Implementation Actions:

- Quantify and identify the documents that are of value to agencies planning and deploying CAV.
- Document Signal Phasing and Timing (SpaT) benefits and convey them to local agencies and MPOs to support their cost/benefit considerations.
- Work with NOCoE to help accomplish the posting of or linking to CAV documents of value.
- Identify and share information about planned research as available in NCHRP 20-102
- Identify any research needs for CAV deployment (e.g. RTCM accuracy and sources) and convey these to CTSO research coordinators.

## Goal 6: Ensure that existing communication technologies remain available for transportation departments and capture the benefits of new and emerging communication technologies.

Many promising emerging communication technologies are arising that could benefit transportation agencies. However, land mobile radio (LMR) remains, and will remain for the indefinite future, the critical backbone for agency communications. LMR provides instant communication when new technologies such as cell phones and the internet are interrupted by disasters. AASHTO faces the dual challenge of keeping land mobile radio frequencies, personnel, and technologies available while at the same time capitalizing on emerging communication vehicles such as dedicated short-range communications (DSRC) and the First Responder Network Authority (FirstNet). The CTSO needs to assist AASHTO with spanning and integrating the critical and proven technologies of land mobile radio with the rapidly emerging new technologies.

Strategy 1: CTSO will continue to advocate, promote, and protect member agencies' ability to use land mobile radio and other communications technologies.

### Implementation Actions:

- Advocate for the use of AASHTO's Public Safety frequency coordination services by State DOTs through personal contacts, conferences, and other outreach strategies.
- Provide AASHTO members technical support related to legacy, new and emerging communications technologies through webinars, best practice sharing, and other educational opportunities.

Strategy 2: Serve as AASHTO's lead on interacting with Federal regulators and other parties who are developing and deploying technologies, procedures, and policy for current and emerging communication systems, and educate members regarding related issues and practices.

### Implementation Actions:

- Represent AASHTO and its member agencies on national committees that develop procedures and conduct policy advocacy for the use of communications technologies for transportation uses.
- Coordinate within AASHTO (e.g. with Committee on Right-of-Way) to develop a summary of issues regarding the use of DOT right-of way and property for communication infrastructure development (nano-cell – 5G, or FirstNet) by private industry.
- Support and educate members regarding the use of transportation projects to implement rural broadband deployment.
- Monitor national developments impacting communications technology (e.g. FCC rulemakings) and provide technical input for AASHTO responses as needed.

## Goal 7: Increase standardization and consistency of intelligent transportation system (ITS) deployment and the modernization of technologies and their integration into agency operations.

For more than 30 years, ITS systems have improved reliability and safety. They are so mature that agencies now face the challenges of retiring obsolete technologies, maintaining mature ones, and implementing emerging ones. Agencies face more than a technology challenge because they also need to develop and retain the personnel needed to capitalize on ITS systems. Furthermore, ITS almost always supports a partnership with other incident responders. As technology transitions from one generation to another, new challenges and opportunities arise for transportation agencies, and their many partners who rely on ITS to TSMO.

Strategy 1: CTSO will share best practices and identify techniques to maintain and extend the useful life of operations technology and determine when technology reaches obsolescence.

Implementation Actions:

- Categorize technology focus areas (e.g. cameras, DMS, communications infrastructure, sensors, etc.) to allow for targeted information gathering.
- Gather information from member agencies in an organized manner, to solicit best practices and experiences.
- Identify any relevant literature that may be available to inform this task.
- Synthesize findings (consider whether this could be a research synthesis topic, e.g., NCHRP)
- Share best practices with the CTSO community (NOCoE and other venues). Capitalize on opportunities for early distribution of findings through presentations or webinars by agencies.

Strategy 2: CTSO will develop ITS design standards/guidelines.

Implementation Actions:

- Survey member DOT agencies to collect ITS design standards/guidelines.
- Identify standards gaps, including the need for new standards, modification to existing standards, and other coordination activities as needed. Utilize the Operations Guide to help identify ITS systems/devices for standards development.
- Summarize/distill findings (current standards and gaps) into general guidance.
- Create an ITS design standards “Green Book”.

Strategy 3: CTSO will identify emerging technologies for the mainstream TSO community and pilot these technologies through deployments within the member agencies.

Implementation Actions:

- Reach out to member agencies to identify technological needs/gaps that could be addressed by emerging ITS technologies.

- Poll members to identify technologies (existing products and current R&D efforts) that may meet the needs identified by member agencies.
- Identify and seek out venues for reaching the vendor community to better understand the state of research and product-development efforts.
- Document these emerging technologies and share experiences (e.g., evaluation results or other as available) from DOT agencies who have piloted relevant technologies.

Strategy 4: CTSO will develop best practices for developing and maintaining the needed workforce to support ITS infrastructure.

Implementation Actions:

- Collaborate with NOCoE to support workforce development efforts.
- Promote the TSMO Capability Maturity Model as the framework for developing the employee skills, organizational structures, information systems, and agency policies for transportation agencies to actively manage their ITS infrastructure.

## Goal 8: Enable AASHTO members, the CTSO, its Subcommittees and Working Groups to advance transportation system performance and the state of practice with TSMO strategies and technology through the application of data, analytics and performance management techniques.

It is the intent that the Subcommittee on Performance Management & Data (PM&D) be responsive to the needs and priorities of the other Subcommittees and Working Groups of the Committee. As such, our priorities and agendas will be driven by those groups. Preliminarily, the areas of support for each Working Groups have been identified as follows but may change over time as determined by each group.

### 8.1 Support the Working Group on Operations Strategies

Implementation Actions:

- Address PM&D needs associated with (or to be incorporated into) the Operations Guidebook, for example B/C, decision analysis for various strategies, evaluation of effectiveness, etc.).
- Address PM&D needs associated with priority items they identify annually through member surveys.
- Develop recommended PM processes for specific operations strategy implementations.

### 8.2 Support the Working Group on TIM

Implementation Actions:

- Collect, analyze and report national TIM performance data to establish National standard metrics and in support of the business case for TIM.

- Support advancing the national unified goal for TIM.
- Develop recommended PM processes for specific TIM implementations.

### 8.3 Support the Working Group on Freight Operations

#### Implementation Actions:

- None at this time.

### 8.4 Support the Working Group on System Integration

#### Implementation Actions

- Develop guidance on the analytics used to assemble and make meaningful information from differing sources of data.
- Develop guidance on how to make use of data being generated across technology deployments and from the V2I environment.

### 8.5 Support the Working Group on Communications Technology

#### Implementation Actions:

- None at this time

### 8.6 Support the Working Group on Intelligent Transportation Systems

#### Implementation Actions:

- Collect an inventory of the “national plant” of ITS technology deployments – number and types of deployments, age, condition, functional obsolescence, etc. (reference the recent NCHRP 20-07 study on legacy systems estimation).

### 8.7 Support the Working Group on Connected and Automated Vehicles

#### Implementation Actions:

- Collect an inventory/coverage of national readiness for V2I capability – number of roadside units (RSU)s, of dedicated short-range communication (DSRC) compatible signals, number of DSRC equipped signals, number/miles of working applications and the technologies to support these applications.

### 8.8 Support CTSO Generally

#### Implementation Actions:

- Share and promote best practices in PM&D collection, management, and analytics to assist in building member agencies' capacity in these areas. Leverage the NOCoE for this activity.
- Assist member agencies with MAP-21 operations performance compliance and in overcoming any challenges identified.
- In partnership with the Committee on Performance-Based Management, FHWA and NOCoE, compile and report MAP-21 national operations performance information.
- Consider production of a "state of the nation's highway transportation system operations" report to support the business case for TSMO.