TRB 2021 WORKSHOP #1002 SUMMARY –
MANAGING TRAFFIC MANAGEMENT SYSTEMS (TMS) ASSETS & RESOURCES

Thursday, January 21, 2021, 10:00am – 1:00pm EST (Virtual Participation Only)

Sponsoring Committees:

- TRB Intelligent Transportation Systems Committee [ACP15]
- TRB Freeway Operations Committee [ACP20]
- TRB Traffic Signal Systems Committee [ACP25]
- TRB Artificial Intelligence and Advanced Computing Applications Committee [AED50]
- TRB Active Traffic Management Joint Subcommittee [ACP20-5]
- TRB Regional Transportation Systems Management & Operations Committee [AHB10]
- European Association of Operators of Toll Road Infrastructures (ASECAP)
- International Bridge, Tunnel and Turnpike Association (IBTTA)
- AASHTO Committee on Transportation System Operations, ITS Work Group
- Traffic Management Center Pooled Fund Study (TMC PFS)
- ERTICO Innovation Platform Traffic Management 2.0 Work Group

Workshop Summary and Resources:

This summary of the workshop, presentations, and other resources are available electronically on the National Operations Center of Excellence (NOCoE) Traffic Management System portal.

Workshop Planning Volunteers:

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Brian Simi	*Caltrans*	Matt Junak	*HNTB*
Cheryl Lowrance	*Noblis*	Paul Anderson	*Texas A&M Transp. Inst.*
Dan Lukasik	*Parsons*	Peter Marshall	*Siemens*
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Jon Obenberger	*USDOT FHWA (& workshop lead)*		

Introduction

On Thursday, January 21, 2021, during the Transportation Research Board's 100th Annual Meeting, a three-hour workshop in the form of webinar was held that focused on Traffic Management Systems (TMS) Assets and Resources. The purpose of this workshop was to identify practices, available resources, and key issues to consider to support the integration of inventories (and other information regarding the condition of assets and resources) into the planning, management, and operation of TMSs.

The next generation of TMSs and their traffic management centers (TMCs) offer agencies the potential to improve safety and mobility. As agencies plan, prepare for, or manage transitions to the next generation of their TMSs, agencies may consider modifying, upgrading, or replacing their TMS assets, subsystems (software, data, telecommunication), components, and/or field devices. The inventory and condition of these assets and other TMS resources are critical inputs to planning and prioritization of future improvements, allocation of available resources (e.g., for maintenance, repairs, improvements), and real-time management and operations.

This document provides brief summaries of: (i) each of the workshop's sessions; (ii) feedback from participants provided during the breakout sessions; and (iii) action items recommended for co-sponsoring committees to consider advancing in 2021 and beyond.

State of the Practice (Session 1)

The purpose of this first Session was to give an overview of asset management and to offer information to stimulate the discussions in the breakout discussions in Session 2. The presentations provided context regarding TMS assets and resources, asset inventory development and management, asset monitoring and assessment, and asset-condition reporting. Presenters established a shared understanding of the workshop topics, clarified the meaning and intent of each topic, and provided an initial sample list of issues to consider when developing and maintaining an inventory of TMS assets, monitoring and assessing those assets, or reporting on the condition of those assets.

The first presentation defined, described, and identified TMS asset management as well as high level resources to assist with asset management. *Asset management* was defined as:

- A strategic and systematic process of operating, maintaining, and improving the condition and performance of physical assets
- Processes and activities focused on engineering and cost analysis based on asset data and related information (e.g., repair costs, maintenance costs, replacement costs)

The next three (3) presentations described the workshop's three major topics: *TMS asset inventory development*, *monitoring and assessing TMS assets*, and r*eporting on the condition and performance of TMS assets*. Each presenter touched on three discussion-areas for each of these topics: issues for agencies to consider, successful practices, and existing or needed resources to help agencies apply these practices. Session 1's presentations are available on the TMS portal located on the NOCoE webpage.

a. "TMS Assets and Resources – Framing the Discussion" (Peter Marshall, Siemens)
b. "Developing and Maintaining an Inventory of TMS Assets" (Dan Lukasik, Parsons)
c. "Monitoring and Assessing TMS Assets" (Les Jacobson, WSP)
d. "Reporting on the Condition and Performance of TMS Assets" (John Benda, HNTB)

Discussions (Session 2)

In Session 2, six breakout groups (two for each of the three topics) were formed to discuss information presented in the previous Session 1 and exchange new ideas regarding the workshop's three topics:

1) Developing and maintaining TMS asset inventory
2) Monitoring and assessing conditions of TMS assets
3) Reporting on the condition and performance of TMS assets

Each breakout-group was preassigned a facilitator and note-taker and met for 45 minutes. At the end of the Session, each group voted on their top three items for each of the three discussion areas (with respect to their topic): 1) issues for agencies to consider, 2) successful practices, and 3) existing or needed resources. Breakout groups were encouraged to comment on items provided in the previous session and introduce new items—allowing a maximum of ten items to be identified for each discussion area.

Report-out (Session 3)

In Session 3, each breakout group reported the top three items they identified for each discussion area. The following is a summary of the priorities the breakout groups identified:

- **Bold** text indicates mutual interest between a topic's two breakout rooms.
- *Italicized* text indicates question worth noting from the group.

Topic 1: Developing and maintaining TMS asset inventory

Discussion area 1 – Issues to Consider

- **Create or retain tools needed to develop, use, and maintain asset inventory, with a focus on tools for data quality and data management standards**
- Develop scope, parameters, and proposal to understand how the TMS asset inventory fits into agency goals, missions, and TSMO plans
- Plan, identify, and obtain resources to develop inventory
- Prepare configuration management plan with protocol, processes, tools, actions, and resources to ensure day-to-day activities are covered (e.g., maintenance, replacement)
- Asset tracking geographically and by serial number (use an ID system to label them so it's clear which device is which)

Discussion area 2 – Successful Practices

- **Data collection and management plan, GIS map, and user interface to inventory (Nevada DOT)**
- Using a tracking process to manage maintenance (MnDOT)
- SunGuide Dashboards reporting integrates ITS asset information (FDOT)
- Addressing component issues (WSDOT)
- Training to ensure correct, consistent data entry
- Leverage increased device self-reporting to identify issues earlier

Discussion area 3 – Existing or Needed Resources

- Peer exchange on asset management with various DOTs, link: https://transportationops.org/publications/2020-asset-management-peer-exchange
- AASHTO TAM Portal, link: https://www.tam-portal.com/
- Improving Asset Inventory and Improved Asset Tracking (NCHRP)
- Asset Management Data Collection for Supporting Decision Processes (USDOT-FHWA)
- Need resources on obsolescence planning for assets in light of new technology

Topic 2: Monitoring and assessing conditions of TMS assets

Discussion area 1 – Issues to Consider

- Is there a current data management plan? (if so, what is its current condition and utility?)

- Determine whether incoming asset data is useable or reliable and if the resources for collecting data are available
- Define different condition rating systems
- **Have a dedicated resource/staff with "ownership" of the agency's asset condition monitoring, data collection, and data management (such staff are assigned the tasks of asset inventory data collection, asset inventory advocacy within organization, and define who is responsible for managing data access and use permissions).**

Discussion area 2 – Successful Practices

- Commercial off-the-shelf (COTS) software to monitor, assess and manage asset inventory and conditions (MNDOT)
- ITS Device Status Monitoring and Maintenance Contract (Georgia DOT)
- Database and software that manages TMS inventory and condition information (WADOT)
- GIS-based asset inventory and tracking system for TMSs (NYDOT)
- Asset management software that manages and reports on TMS assets conditions (PADOT)
- *Would partnerships with public agencies be considered to be a successful practice?*

Discussion area 3 – Existing or Needed Resources

- Performance Measures and Health Index for ITS Assets (USDOT-FHWA)
- TMC Performance Monitoring, Evaluation and Reporting (FHWA)
- TMC Performance Dashboards (FHWA)
- Performance Measures and Health Index for ITS Assets (FHWA)
- TMC Performance Monitoring, Evaluation, and Reporting (FHWA)
- Need assistance or partnerships with universities

Topic 3: Reporting on the condition and performance of TMS assets

Discussion area 1 – Issues to Consider

- **Different processes may use and report information differently (e.g., dashboards, alarms)**
- Monitoring and reporting on condition and performance of assets are different processes
- How to present data to leadership (e.g., executive summaries)
- How to deal with new technology that replaces/duplicates older assets (e.g. CVs)
- The user experience of viewing and working with data

Discussion area 2 – Successful Practices

- ITS device metrics report and ITS device performance report (Maryland Transportation Authority)
- TMS asset condition information included in agency asset management program (PADOT)
- Risk-based Asset Management Plan (CDOT)
- KC Scout Asset Management Plan
- Integrating agency IT into TMS asset-management efforts (TNDOT)
- TMS asset condition information included in broader agency asset-management (PADOT)

Discussion area 3 – Existing or Needed Resources

- Need automated diagnostics for asset failure
- Need automated reporting of conditions/performance
- Transportation Asset Management Gap Analysis Tool (AASHTO)

- Signal System Asset Management: State-of-Practice Review (FHWA)
- Connecting Transportation Asset Management to Operations (NCHRP)
- Integrating Asset Management into the Planning Process (FHWA)

Action Planning & Next Steps (Session 4 and Closing)

Workshop co-sponsors and facilitators used the remaining workshop time to elicit feedback on possible immediate next steps and longer-term activities for the workshop co-sponsors. The intent was to consider activities that would advance the overall dialog on this topic, improve the sharing of practices, and pursue other actions that would support agencies considering integrating asset management practices into their efforts to manage and operate TMSs. Workshop co-sponsors expressed significant interest in further collaboration—to continue exchanging information and conduct other activities to help advance agency practices related to the evolution and day-to-day activities of their TMSs. Potential forums for this ongoing engagement included future TRB workshops and other major events over the next few years. The proposed actions are provided below. A video recording of the closing remarks provided by the co-sponsors is available at: https://www.youtube.com/watch?v=QjCMXqBVp1Y.

Possible Actions for Co-sponsors to Consider:

1. Prepare workshop summary, April 2021
2. Conduct workshop at 2022 TRB Annual Meeting. Potential topics to consider:
   - *Assessing the capabilities and maturity of TMSs*
   - *Planning for and programming agency resources for next-generation TMSs*
3. Advance activities to foster a global dialog to engage key organizations and jointly pursue efforts to develop technical resources and share best-practices on next-gen TMSs (e.g., AASHTO, CTSO, ITS Work Group, EU, ASECAP, IBTTA, ERTICO, International Road Federation, Geneva, Switzerland)
4. Enable sharing of TMS information and highlight successful practices:
   - Share resources on TMS portal on NOCoE website: https://transportationops.org/traffic-management-systems-and-centers
   - Support peer-to-peer exchanges (e.g., webinars) on key topics (NOCoE, TMC PFS)
5. Encourage public agencies to join and contribute funds to TMC PFS to develop resources to meet agency needs for technical resources and information
6. Conduct in 2023 an International Symposium in Vienna Austria (e.g., the 4th International Symposium of ACP20 with support from other TRB Committees, ERTICO, IRF Geneva, ASECAP, IBTTA) to be organized by Austria Tech.
   - Share best practices (e.g., Next-gen TMSs, Managing and Reporting on TMS Assets)
   - Discuss pooling resources and jointly developing products to help agencies
7. Establish partnerships to:
   - Collaborate and jointly sponsor or advance research priorities (e.g., FHWA, EU)
   - Identify and prioritize needs for research, technical resources, and activities—example possible TMS topics include:
     - Inventory, document, and configure TMS assets and resources
     - Assess and report on current and planned future TMS capabilities and maturity
     - How to design the next generation of agency's TMSs and what to consider (Design TMS Toolbox)
     - Planning and programming resources for next-gen TMSs (developing multi-year plans)