Workshop #1004: Ballroom C

Preparing, Conducting, and Summarizing the Results – Assessing Traffic Management Systems

Sponsoring Committees and Organizations:

- ITS Committee (ACP15)
- TRB Freeway Operations Committee (ACP20)
- TRB Traffic Signal Systems Committee (ACP25)
- TRB Joint Subcommittee on Active Traffic Management (ACP 20-5)
- TRB Artificial Intelligence and Advanced Computing Applications Committee (AED50)
- TRB Regional Transportation Systems Operation (RTSMO) Committee ACP 10
- Traffic Management Center Pooled Fund Study
- American Association of Highway and Transportation Officials (AASHTO) Committee on Transportation System Operations ITS Work Group
- International Bridge, Tunnel and Turnpike Association (IBTTA)
- European Association of Operators of Toll Road Infrastructures (ASECAP)
- ERTICO Innovation Platform Traffic Management 2.0 Work Group

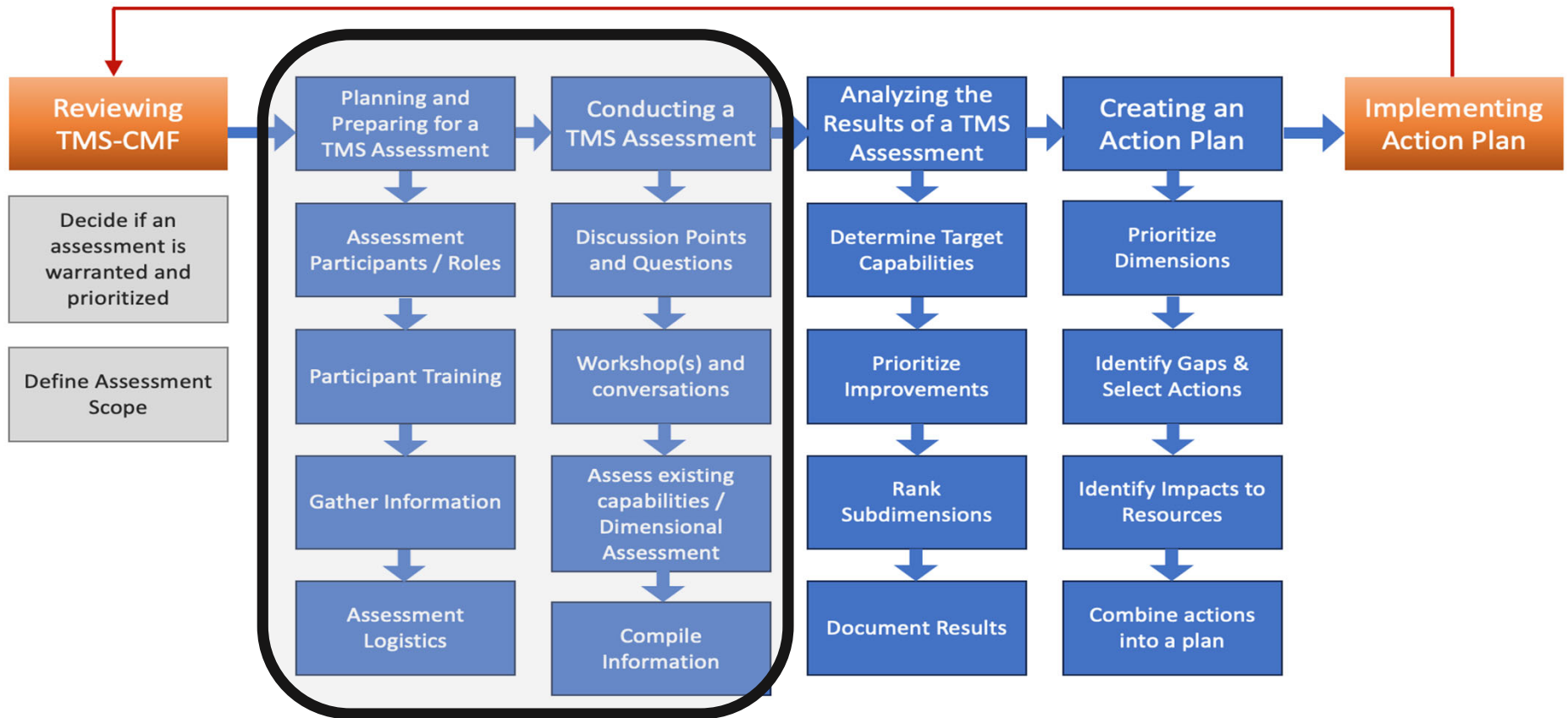# Preparing for and Conducting a TMS Assessment

Dan Lukasik
Parsons

Session 1 Presentations:

1 | Assessing TMSs

2 | Preparing for and Conducting a TMS Assessment

3 | Assessing TMSs Capabilities and Performance

4 | Identifying Opportunities and Approaches for Improving TMSs

Preparing for and Conducting a TMS Assessment

Possible *assessment process and activities* to consider:

Reviewing TMS-CMF	Planning and Preparing for a TMS Assessment	Conducting a TMS Assessment	Analyzing the Results of a TMS Assessment	Creating an Action Plan	Implementing Action Plan
Decide if an assessment is warranted and prioritized	Assessment Participants / Roles	Discussion Points and Questions	Determine Target Capabilities	Prioritize Dimensions	
Define Assessment Scope	Participant Training	Workshop(s) and conversations	Prioritize Improvements	Identify Gaps & Select Actions	
	Gather Information	Assess existing capabilities / Dimensional Assessment	Rank Subdimensions	Identify Impacts to Resources	
	Assessment Logistics	Compile Information	Document Results	Combine actions into a plan	

Source: FHWA

Preparing for and Conducting a TMS Assessment

Contemplating conducting an assessment – examples of issues to consider:

- Build agency support to conduct assessment
- Identify stakeholders to include in assessment process
- Determine timing
- Prepare for how to conduct the assessment
- Plan on how to use the assessment results
- Prepare stakeholders to participate in assessment
- Identify agency resources and information needed (e.g., goals, performance measures, links to agency strategic plans, condition of TMS assets, etc.)
- Obtain resources to conduct assessment

Preparing for and Conducting a TMS Assessment

Conducting an assessment— examples of issues to consider getting started:

- Identify information needed to conduct assessment
- Identify and incorporate key stakeholders
- Agree on process to follow with conducting the assessment
- Determine key issues and actions to be considered in the assessment
- Collect and compile information needed
  - ⁻Pull information from other relevant assessments (e.g., TSMO, traffic signal timing, active traffic management) and plans (e.g., Agency TSMO Plan, Regional Plans, TMS Plans)
  - ⁻Compile information needed to support the assessment
- Determine which analyses to conduct, and outputs to produce

Preparing for and Conducting a TMS Assessment

Examples of information to compile and analyze to support assessing each TMSs Dimension, Subdimension, or Capabilities:

- TMS day-to-day:
  - Maintenance, repairs, and asset management
  - Operation (e.g., center, performance, active management)
  - IT, security, emergencies, and support other systems (e.g., remote operations)

- Staffing TMSs (e.g., plans, policies, resources, scheduling, contractors)

- Policies, procedures, and tools to support managing and operating TMS

- Inclusion of TMS plans, requirements, and resources into agency or TSMO policies, programs, plans, initiatives, services, or efforts

- Planning, design, development, and implementation of TMS

- Planning and plans for an agency's next generation of TMS or improvements

Preparing for and Conducting a TMS Assessment

Examples of issues to consider when assessing performance of TMSs:

- What goals, objectives, or questions need to be addressed or answered?

- What measures are needed to support the assessment?

- Are these measures directly or indirectly produced by available data and/or information?

- What data does the TMS need to collect, use, or make available to support the desired assessment procedure in the future?

- Do you have the resources to collect, compile, and manage desired data and information?

- Are the TMS performance measures and supporting data elements integrated into TSMO planning, programs, and agency strategic plans?

Preparing for and Conducting a TMS Assessment

Subdimensions – *define, describe, and what to assess*?

- Identify and describe dimension (e.g., TMS lifecycle processes, TSMO program and plans, agency programs and plans)
- Identify and describe possible sub-dimensions
- Develop framework to assess tiers of capabilities to assess dimensions and subdimensions
- Measure and identify current capabilities or performance
- Identify possible or desired future capability levels

Dimensions or Process Areas	What Is It?
1. Business Process	*Plans, Programs, Budget*
2. Systems & Technologies	*Approach to Designing, Developing, and Implementing Systems*
3. Performance Measurement	*Use of Performance Measures*
4. Workforce	*Improving Capability of Workforce*
5. Culture	*Changing Culture and Building Champions*
6. Collaboration	*Improving Working Relationships and Operations*
7. Day-to-day Management & Operations	*Preparing for, Managing, and Operating Daily*
8. Day-to-day Maintenance & Repair	*Planning for, Managing, and Conducting Daily Maintenance and Repairs*
9. Sharing and Using Data	**Activities to enable sharing and use of data with sources external to TMS**

	Level 1	Level 2	Level 3	Level 4
Dimension				
SubDimension 1				
SubDimension 2				
SubDimension 3				

Source: FHWA

Source: FHWA

Preparing for and Conducting a TMS Assessment

Example: Systems & technology dimension - *where are we today?*

Today's TMSs

Focused on improving the safety, efficiency, and predictability of travel on the surface transportation system, using:

- Field devices
- ITS infrastructure
- Communications media
- Information technology
- Operations personnel
- Operational strategies and control plans
- Active management and control of traffic
- Operations centers

Technology Challenges Facing Today's TMSs

- Limited ability to share information internally within agency, with other systems or public
- Limited ability to capture or use data from emerging sources or 3rd parties
- Capabilities or resources lacking to automate system functions or use of operational strategies
- Operating environment, software, or components are difficult to modify, replace, or integrate new or emerging technologies or devices
- Adding functions, services or technologies may require replacing or upgrading system due to limitations with how system was designed

Source: FHWA

Preparing for and Conducting a TMS Assessment

Example: Systems & technology dimension - *where can we go tomorrow?*

Technology Advances

- Emerging sources of data
- Sharing and using data with travelers using mobile devices
- Innovative technologies and tools to analyze data
- Advanced computing capabilities
- Open source, agency-owned and off-the-shelf software
- Enhanced capabilities of ITS and traffic control devices
- Ability to share information with other systems and public
- Etc.

Next-Generation of an agencies TMS:

- Improvements to existing capabilities and entirely new functions or services
- Real-time decision-making, with highly automated operation, to proactively manage and control traffic
- Coordinating and sharing of information with other systems and service providers to improve safety and mobility
- Modular components and expandable platforms, will be easier for agencies to manage, operate, maintain, and modify to meet evolving future needs
- Etc.

Possible functions or services to consider for the next-generation of agencies TMS:

- Monitor, calculate, and predict
- Propose, select, and implement
- Automate management and operation
- Expand service area
- Enhance ability to share information with different systems, agencies, or service providers

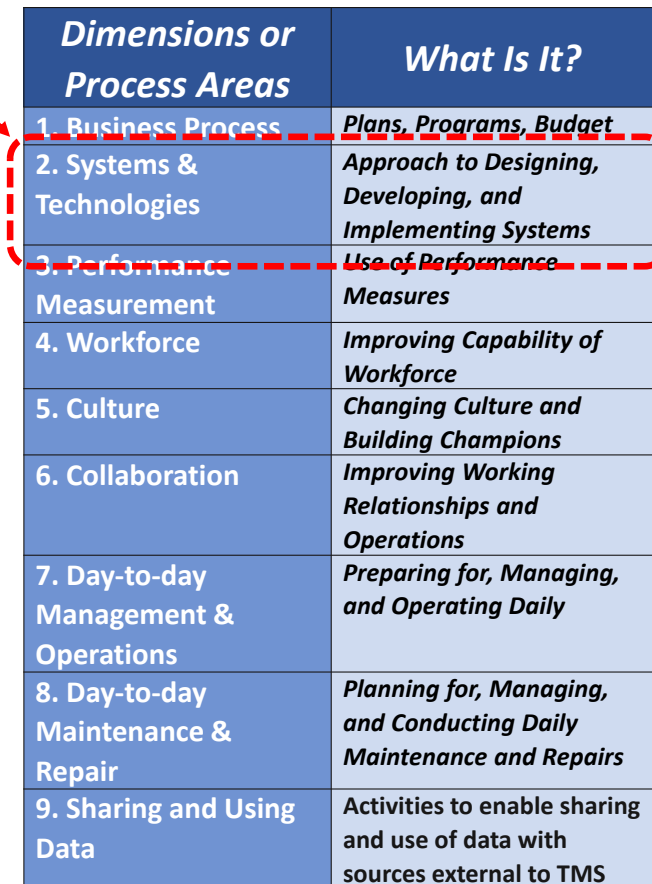Source: FHWA

Identifying Improvement Opportunities

EXAMPLE: Systems & technology dimension - *what are possible improvements?*

- Focus on approaches to planning, developing, or building TMS:
  - Ensure agency and stakeholder needs are addressed
  - Planning for and developing plans identifying, scoping, and estimating needs and costs for improvements
  - Follow systems engineering principles—to develop and trace requirements, establish a concept of operations, etc.

- Other issues to consider:
  - Technical feasibility
  - Operational feasibility
  - Condition of assets
  - Economic feasibility
  - Current and anticipated funding
  - Current and anticipated staff and contract support
  - Planning, plans, and planned improvement projects

Dimensions or Process Areas	What Is It?
1. Business Process	*Plans, Programs, Budget*
2. Systems & Technologies	*Approach to Designing, Developing, and Implementing Systems*
3. Performance Measurement	*Use of Performance Measures*
4. Workforce	*Improving Capability of Workforce*
5. Culture	*Changing Culture and Building Champions*
6. Collaboration	*Improving Working Relationships and Operations*
7. Day-to-day Management & Operations	*Preparing for, Managing, and Operating Daily*
8. Day-to-day Maintenance & Repair	*Planning for, Managing, and Conducting Daily Maintenance and Repairs*
9. Sharing and Using Data	Activities to enable sharing and use of data with sources external to TMS

Source: FHWA

11

Preparing for and Conducting a TMS Assessment

Examples of TMS specific resources available to support conducting assessments:

1. Configuration Management for TMSs

2. TMC Information Technology Security

3. Recovery and Mitigation for TMCs

4. TMC Operator Requirements and Position Descriptions

5. Virtual TMC Development

6. Regional, Statewide, and Multi-State TMC Concept of Operations and Requirements

7. TMC Performance Dashboards

8. Performance Measure and Health Index of ITS Assets

9. Consideration of Current and Emerging TMC Data

10. Procuring, Managing, & Evaluating Performance of Contracted TMC Services

11. TMC Staffing and Scheduling for Day-to-Day Operations

* All of these resources are available via the TMC PFS website: https://tmcpfs.ops.fhwa.dot.gov/completedproj.htm

Preparing for and Conducting a TMS Assessment

Thank you!