Framing the Discussion:
Opportunities to Plan for Next Generation TMSs

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Session 1 Presentations:

1 | Opportunities to Plan for Next Generation TMSs

2 | Setting a Strategic Direction for TMSs

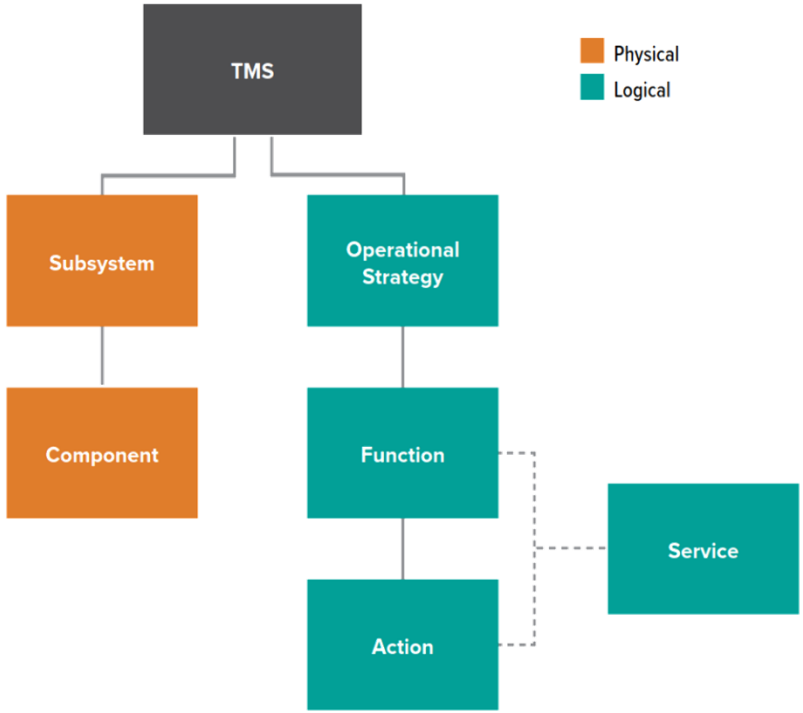
3 | Planning and Plans to Support TMS Improvements

4 | Identifying Needed TMS Improvements and Resources

Framing the Discussion

What is a traffic management system (TMS)?

- Offer agencies the potential to improve the safety and mobility of travel on the surface transportation system
- Complex and integrated blend of hardware, software, processes, and people
- Perform or support a range of functions, actions, and services (e.g., monitor, assess, report on travel conditions)
- TMSs are being actively managed and operated based on:
  -Agency policies
  -Standard operating procedures (SOPs)
  -Support resources and staff
  -Planned and unplanned events
  -Current and predicted conditions



TMS Physical and Logical Structure

Source, FHWA.

Framing the Discussion

What is unique about TMSs?

- Actively monitor system; assess performance; evaluate, recommend, and implement actions
- Collect, process, use, and manage data
- Monitor, assess, and report on condition of TMS assets
- Facilitate the sharing of information and travel conditions within the agency and with other systems, agencies, service providers, public, or stakeholders
- Requires staff, resources, and tools to manage, operate, maintain, repair, support (e.g., IT), and perform needed services
- Adding or changing services, functions, actions, or how a TMS is being managed or operated may require a study, improvement project, funding, or resources to achieve the desired results

TMS Active Management Cycle

Source, FHWA.

Framing the Discussion

Challenges Facing Legacy or Current TMSs?

- Limited resources to manage, operate, maintain or enhance existing capabilities
- Limited ability to capture and use data from 3rd party sources
- Limited ability to share information internally and with other systems or public
- Limited institutional knowledge with legacy systems (e.g., with staff transitions)
- Feasibility studies to identify potential enhancements or new functions is lacking
- Multi-year plans to identify resources to support needed enhancements is lacking
- Inventorying and managing TMS assets is a new and evolving practice
- Assessing and reporting on TMS capabilities and performance isn't taking place

Framing the Discussion

What is the *Next Generation of* an agencies TMS?

Today's Traffic Management Systems

- Focused on improving the safety, efficiency, and predictability of travel on the surface transportation system.
- TMSs combine field devices, ITS infrastructure, communications media, information technology, operations personnel, operational strategies, and operations centers.

Technology Advances

- *Emerging sources of data*
- *Sharing and using data with travelers using mobile devices*
- *Innovative technologies and tools to analyze data*
- *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*
- *Consider adding technologies*
- *Etc.*

Next-Gen TMSs:

- 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.

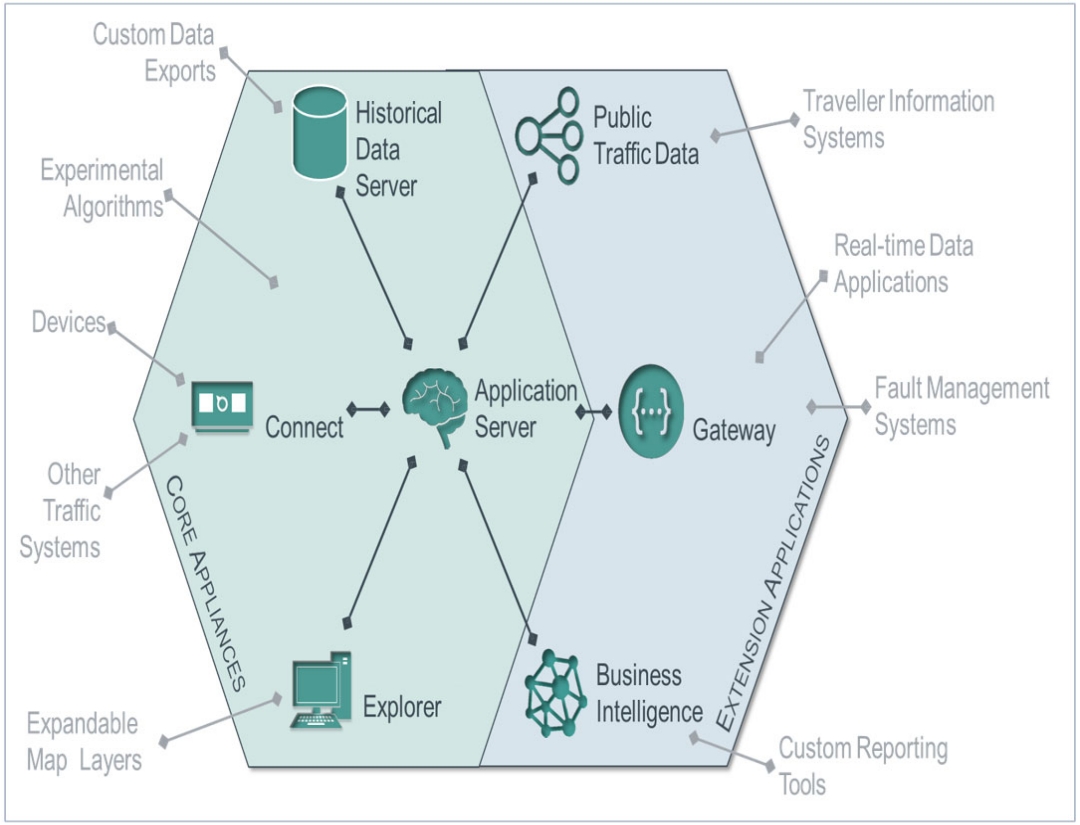
Source, FHWA.

Framing the Discussion

Opportunities for the Next-Gen of TMSs:

- Manage multiple TMSs remotely using one software subsystem & operating environment
- Actively manage and operate TMSs with expanded service areas and functionality
- Use emerging data sources and technologies (e.g, cloud computing, AI, etc.)
- Modify, manage, and incrementally improve system (e.g., data subsystem, software subsystem)
- Automate the management, operation, monitoring, and reporting on TMS performance
- Software platforms use open-source software, commercial off-the-shelf software, and APIs
- Data platforms share and use data with other systems, service providers, or 3rd parties (e.g., travel or roadway condition information)
- Fee-for-service options to meet system requirements (e.g., data, computing, manage software)

Example: "STREAMS" System, Victoria, Australia:



Source, FHWA.

Framing the Discussion

Motivation for Planning and Preparing for TMS Improvements:

- Uncertainty with when or how to modify or upgrade a specific subsystem (e.g., software, data), components, or technologies
- Planning is typically not conducted or plans developed to support obtaining resources to meet current or future needs during the life-cycle of a TMS
- Plans to update TMSs typically have a limited focus (e.g., develop and/or procure a new TMS, expand service area, add or modify operational strategies, or supporting functions)
- Planning, plans, and resources are needed to support and manage the transition from a legacy to an improved TMSs or specific subsystems (e.g., improvements, replacement)
- Transitioning from legacy to next-generation of a TMS is complex, requires time, and resources

Framing the Discussion

Benefits of Planning for TMS Improvements or Next-Generation of a TMS:

- Improving TMSs:
  - -Capabilities (e.g., functions, services, tasks) and performance
  - -Ability to actively manage traffic
  - -Sharing and using information within agency, other systems, service providers, or stakeholders
  - -Coordination with other systems or service providers
- Planning, identifying, and obtaining needed resources for:
  - -Strategic priorities (e.g., day-to-day operations, improvements, new operational strategies)
  - -Highest priority needs (e.g., improvements, maintenance, repairs)
  - -Improvements agencies have planned and identified needed resources
- Incorporating needed capabilities, improvements or resources into agency or regional strategic, planning, or programming processes

Framing the Discussion

Issues to consider when *planning for TMS improvements*:

- Assess and establish a baseline of current TMSs capabilities and performance
- Identify the scope of planning effort (e.g., feasibility study, system implementation)
- Identify stakeholders to include in planning process
- Obtain support and resources to facilitate the planning process and plan preparation
- Identify sources, information, and analyses to include in planning process
- Determine what to include in plan to support of proposed improvements and information to include in other processes to obtain needed funding, support, or resources
- Identify other agency or regional planning processes, plans, or initiatives to incorporate the results or plans for TMS improvements

Framing the Discussion

Issues to consider with *setting a TMS strategic direction*:

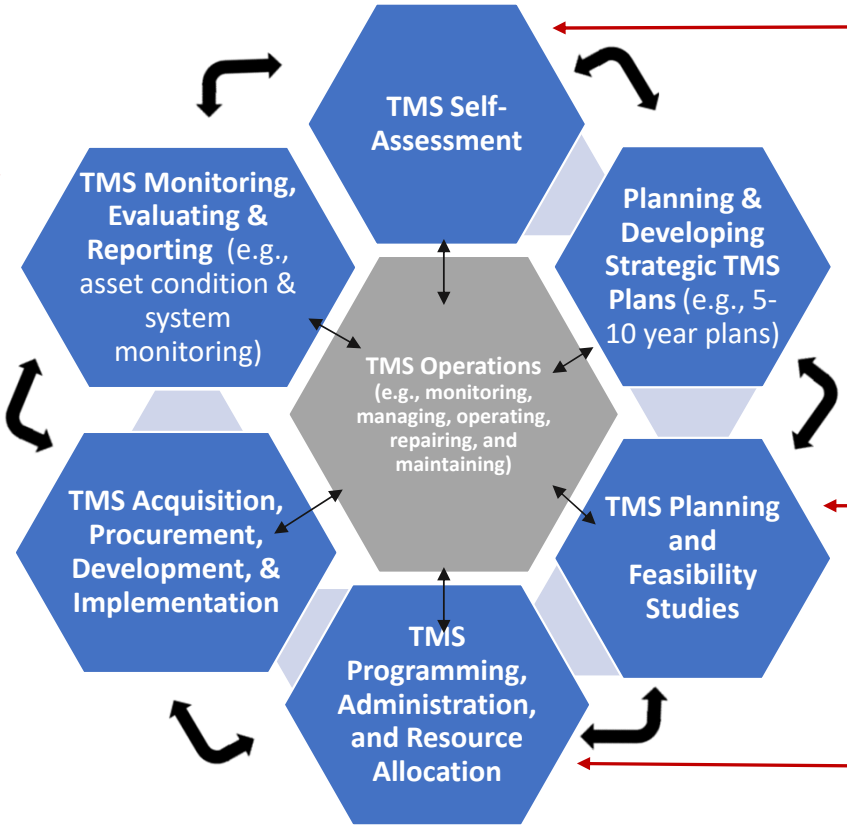
- Does a strategic or multi-year plan exist or is a new plan needed?
- Does a baseline of TMSs capabilities and performance exist or need to be developed?
- Identify key issues to incorporate from or link to agency or regional plans
- Incorporate key stakeholders internal and external to agency into planning process
- Collect data and information (e.g., policies, procedures) to consider in planning
- Is there a need to review and update or develop a new strategic direction for a TMS:
  -Vision, mission, goals, and performance measures
  -Concept of operations, use cases, scenarios, and requirements
  -Current and needed improvements to services, functions, actions, or TMS (e.g., subsystems)
  -Plan for future improvements
  -Plan for needed resources (e.g., staffing, management and operations, maintenance, repairs)
- Define planning process, resources needed to support process, analysis to perform, stakeholder involvement, issues to consider, and elements of plan summarizing results

Framing the Discussion: Considering TMS Strategic Direction, Improvements, and Resource Needs in Other Processes and Plans

Agency Processes & Plans:

- Facilities Performance Monitoring and Reporting
- TMS Asset Monitoring and Condition Reporting
- TMS Performance Evaluation and Reporting

Design, Development and Procurement of Projects (e.g., systems engineering)



Agency Processes & Plans:

Capability Maturity Framework for TSMO (TSMO, Traffic Management, Active Traffic Management)

TSMO Program Plan
- **Strategic Elements**
- **Programmatic Elements**
- **Tactical Elements**

Planning & Design of TSMO Initiatives, Operational Strategies, or Projects (feasibility study, planning study)

TSMO Project Selection and Prioritization, TMS Improvement Projects, Allocating Resources for Maintenance and Operations

Source: FHWA

Opportunities to Plan for Next Generation TMSs

Thank you!