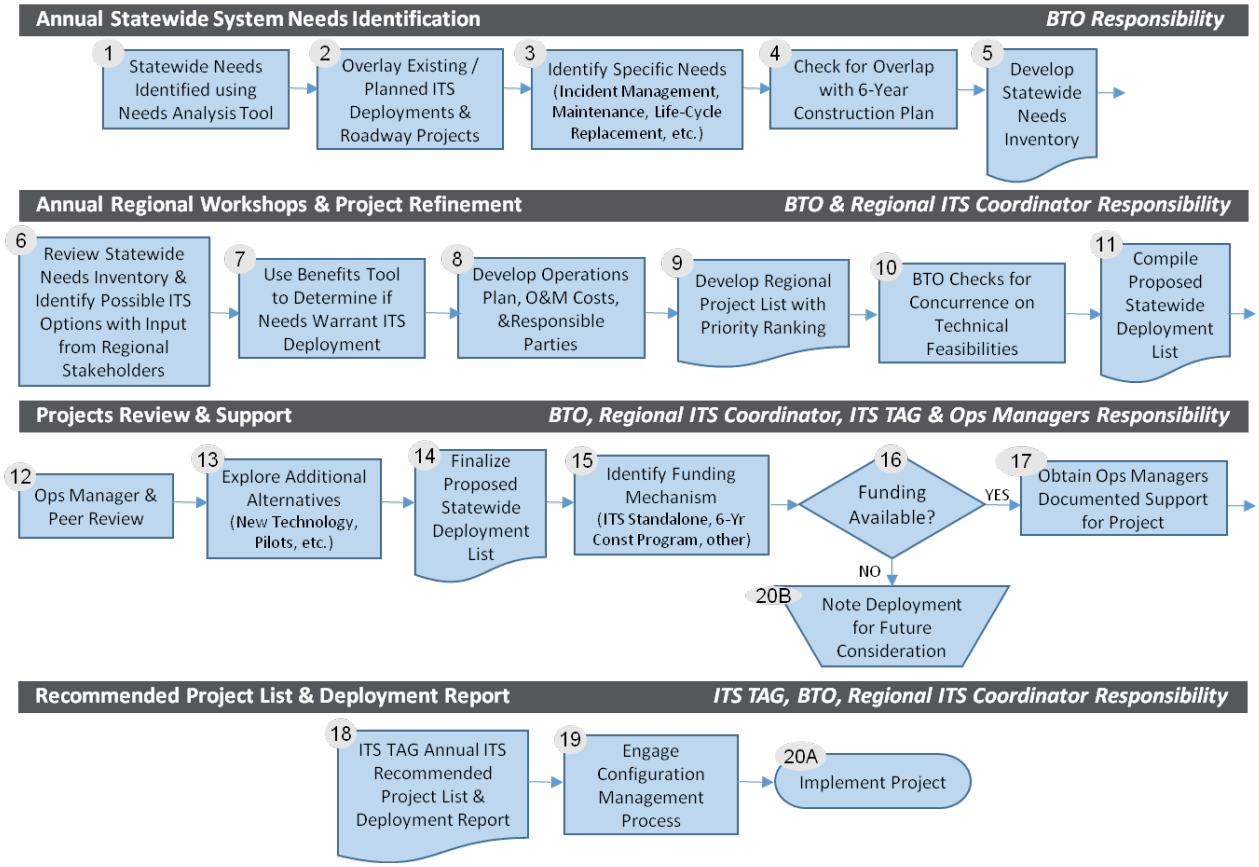
17-6-1 TSM&O Traffic Infrastructure Process (TIP) August 2019

Introduction

The TSMO-TIP process is an annual process to select relevant transportation systems management and operations (TSM&O) deployments for implementation in the next assessment year (AY). The process involves the collaboration and support of many different stakeholders within the Wisconsin Department of Transportation (WisDOT). These stakeholders include the Bureau of Traffic Operations (BTO), regional intelligent transportation system (ITS) coordinators, the operations managers, and the ITS Technical Advisory Group (ITS TAG).

To make the process more streamlined and well-defined, the process has been broken down into a series of 21 steps beginning with a statewide needs analysis and ending with either project implementation or marking a project for future consideration. To make sense of the process, a flowchart is available showing the flow of steps and responsibilities throughout the process.

Each step in the process chart is outlined below and detailed process steps are explained in the remaining document.



Process Task A

Goal: Develop Final Draft of Statewide Needs Inventory

Responsibility: BTO Traffic Systems Unit with stakeholder support

Task A was created to jumpstart the planning process for identifying areas for TSM&O deployments. Although other stakeholders are welcome to submit ideas during this task, the task itself is primarily the responsibility of the BTO Traffic Systems Unit. This group will begin the TSMO-TIP process by creating a draft of the Statewide Needs Inventory which will then be brought to the regions for review. During the first year or two of implementation or as needed, BTO will be a guiding hand through all tasks in this process.

Step 1: Statewide Needs Identified using Needs Analysis Tool

Timeframe: January to February

Result: Draft of the Statewide Needs Inventory with list by region of statewide area needs to be analyzed further

The Needs Analysis Tool is an online mapping tool displaying information about the current safety, mobility, service, and freight performance for most arterials in the state. The majority of this information is processed from MetaManager data, with the support of algorithms to include weather and special event data. The Needs Analysis Tool is available on the TSMO-TIP website (http://www.topslab.wisc.edu/tsmo/tip/) and was developed by the Wisconsin Traffic Operations and Safety (TOPS) Lab.

The tool includes many functions which support the identification of regional needs across the state. Although this tool identifies areas of need, it does not identify which TSM&O solution *should* be implemented to allay the need, assuming any TSM&O deployment will be able to help.

In this step, the BTO Traffic Systems Unit *should* run regional reports for each region using each preset. There are five regions and six presets, so this will result in thirty reports. At present, this task must be done manually, but future updates to the tool will streamline this process. Once all reports are generated, the top five areas identified in each of the reports *should* be marked for further investigation in step two.

Two short video tutorials are provided on the website. The first gives an overview of all capabilities of the needs tool. The second shows an example of generating the reports required for this step. The Needs Analysis Tool also includes internal documentation as well as a document describing all of the tool's data inputs.

Step 2: Overlay Existing / Planned ITS Deployments and Roadway Projects

Timeframe: January to February

Result: Map of each area needs location including existing / planned deployments

This step involves going back into the Needs Analysis Tool and looking precisely at each area of need on the map. To complete this step, existing and planned deployments *should* be overlayed on the area of interest. A copy of each map *should* be attached to the regional list of identified needs areas. An example is shown in a video tutorial on the website.

Step 3: Identify Specific Needs (Incident Management, Maintenance, Life-Cycle Replacement, etc.)

Timeframe: February to March

Result: Revised draft of the Statewide Needs Inventory including a list of specific needs for each need area

Working with BTO stakeholders, specific needs will be identified for the previously determined needs areas. These needs include incident management, maintenance, and life-cycle replacement, among other possibilities. Engineering judgement must be used to identify the specific need for each area.

This step may involve looking at the Needs Analysis Tool for support, although the only outcome of this step will be the appending to the list of specific needs for each needs area.

Step 4: Check for Overlap with 6-Year Construction Plan

Timeframe: February to March

Result: Revised draft of the Statewide Needs Inventory including list of projects overlapping with the 6-year construction plan

Consult with project designers for highway improvement projects in the six-year plan to investigate the possibility of including the installation of operations technologies in tandem with the highway improvement project, providing a cost-effective approach to deployment.

Mark all potential overlaps on the Statewide Needs Inventory document including needs that are fully addressed by construction projects, needs that could be integrated with construction projects, and needs that would need their own financial support to be implemented.

Step 5: Develop Statewide Needs Inventory

Timeframe: April

Result: Final Draft of the Statewide Needs Inventory

This is the final step completed by BTO before bringing the plan forth to the regions for further consideration and development. In this step, the BTO Traffic Systems Unit will pull together all of the resources in the previous steps and present a clean final draft of the Statewide Needs Inventory, presented by region.

Each regional needs area will include

- a sheet of pertinent data by segment, given by the needs tool,
- a map of the area with current and planned deployments shown,
- a specific need to focus the selection of TSM&O deployment(s),
- and a statement of overlap with the 6-year construction plan.

Process Task B

Goal: Develop Regional Project List with Priority Ranking

Responsibility: BTO and Regional ITS Coordinators

During this process, BTO will work directly with each of the five Regional ITS Coordinators to process the Statewide Needs Inventory into a Regional Project List with Priority Ranking. These project lists will be compiled in Task C.

For the first year or two of implementation or as needed, the BTO and each region will have a meeting walking through all steps of this process and specifically focusing on the steps in Task B. The goal of this meeting will be to allow the Regional ITS Coordinators to become comfortable with the Needs Analysis Tool and the overall process to ensure smooth implementation.

Step 6: Review Statewide Needs Inventory and Identify Possible ITS Options with Input from Regional Stakeholders

Timeframe: April-May

Result: Revision of each of the regional sections of the Statewide Needs Inventory to include possible TSM&O / ITS options for deployment

In a meeting between BTO staff involved in the development of the Statewide Needs Inventory and the Regional ITS Coordinator for the given region, the regional Statewide Needs Inventory will be analyzed and potential TSM&O / ITS deployments will be identified. Regions will be involved due to their involvement with the region including their interest in the region and expertise in regional highway issues. With the support of the TOPS Lab and others as needed for engineering judgement, potential TSM&O / ITS deployments will be determined for each area of need in the region.

As part of this step, all regional staff and stakeholders will be encouraged to provide input into better understanding the areas of identified need and ideas for types of deployments.

Step 7: Use Benefits Tool to Determine if Needs Warrant ITS Deployment

Timeframe: April-May

Result: Revision of each of the regional sections of the Statewide Needs Inventory to include warrant information for each possible TSM&O / ITS deployment option

Each Regional ITS Coordinator will be trained and use the Benefits Tool. The Benefits Tool was developed by Kimley-Horn, and is also available on the TSMO-TIP website.

The tool will be used to run a benefits-cost analysis on each of the potential TSM&O / ITS deployments for each needs area. Most of the inputs will come from regional knowledge of the area or the Needs Analysis Tool. There are some inputs into the Benefits Tool that will require engineering judgement and estimation.

Each of the deployments with a positive value for benefit-cost analysis (as determined by the tool) will be listed along with the needs area in a revised Statewide Needs Inventory for each region.

A tutorial of the Benefits Tool is provided for use of the tool on the TSMO-TIP website.

Step 8: Develop Operations Plan, O & M Costs, and Responsible Parties

Timeframe: April-May

Result: Draft of Regional Project List for each region

This step involves creation of an operations plan to document the operating procedure for each deployment, creation of a list of all operating and maintenance costs involved in deployment of the TSM&O solution, and a list of responsible parties for operation and maintenance of the TSM&O solution.

Step 9: Develop Regional Project List with Priority Ranking

Timeframe: May

Result: Regional Project List with Priority Ranking

This is the final step completed by each region with BTO support before merging the regional plans into a statewide list. In this step, each region will pull together all of the resources in the previous steps of this task and present a clean list of projects with priority rankings for their region.

Each project will include:

- all information on the project area as produced in the Statewide Needs Inventory for the region,
- a list of TSM&O solutions to be deployed,
- a benefits-cost analysis summary (from the Benefits tool) for each TSM&O solution,
- and an operations plan with O&M costs and responsible parties listed for each TSM&O solution.

Projects will then be ranked with a priority based on benefits-costs results as well as regional and BTO judgement.

Process Task C

Goal: Compile a Statewide Deployment List

Responsibility: BTO and Regional ITS Coordinators

This is a relatively quick task that involves BTO oversight of the Regional Project Lists. This task culminates with the merger of these lists into a Proposed Statewide Deployment List which will be passed on to the Operations Managers.

Step 10: BTO Operations Unit Checks for Concurrence on Technical Feasibilities

Timeframe: June

Result: Revised Regional Project Lists with projects marked for concurrence with technical feasibilities

In this step, the BTO Operations Unit will go through each of the five Regional Project Lists and verify that all proposed TSM&O deployments are feasible for deployment during the next AY.

Although the main process involved is verifying if deployments can be made given current technical expertise and availability at BTO, this step also offers BTO a chance to review materials before creating a final list to pass on to the Operations Managers.

BTO *should* work with the Regional ITS Coordinators at this point with any projects and/or deployments in question to resolve any issues.

Step 11: Compile Proposed Statewide Deployment List

Timeframe: June

Result: Proposed Statewide Deployment List

This is the final step completed by the BTO Operations Unit with support from the Regional ITS Coordinators. In this step, BTO will pull together the resources from Step 10 and the previous tasks to compile a proposed Statewide Deployment List.

Each deployment in the list will include

- all information on the project area as produced in the Statewide Needs Inventory for the region,
- all information on the specific projects and TSM&O deployments as produced in the Regional Project List including priority rankings,
- and a verification of deployment feasibility.

Process Task D

Goal: Finalize Statewide Deployment List

Responsibility: BTO and Operations Managers

This task allows for a review period to consider all deployments and offer any suggestions of criticisms. At this stage, new technologies will also be considered. This task culminates with the finalization of the Statewide Deployment List which will be passed on to the ITS TAG.

Step 12: Operations Manager and Peer Review

Timeframe: July

Result: Reviewed Statewide Deployment List

In this step, Operations Managers will review all suggested deployments and offer input, concerns, and criticism. Peers including other regions, MPOs, TOPS Lab, and other relevant bodies will also be asked to provide feedback at this stage.

All feedback at this stage *should* be documented and BTO *should* record all feedback and attach it to each proposed deployment's package on the Proposed Statewide Deployment List.

Step 13: Explore Additional Alternatives (New Technology, Pilot Possibilities, etc.) Timeframe: July

Result: Reviewed Statewide Deployment List with suggested alternatives

Using the TOPS Lab's annual evaluation of emerging and current TSM&O technologies, BTO will decide if new technologies *should* be deployed in place of or in addition to the suggested TSM&O deployments for each project.

If any significant changes are made at this point, Regional ITS Coordinators *should* be brought back into the discussion as necessary to provide feedback.

Any changes that are made to the Proposed Statewide Deployment List *should* be recorded and all relevant documentation (including benefits-cost analyses and changes to the operations plan, O&M costs, and responsible parties) *should* be attached to each proposed deployment's package on the Proposed Statewide Deployment List.

Step 14: Finalize Proposed Statewide Deployment List

Timeframe: July

Result: Finalized Statewide Deployment List

This is the final step completed by the BTO before the deployment plan is sent out for funding and support. In this step, BTO will pull together the resources from Steps 13 and 14 as well as the previous tasks to compile a finalized Statewide Deployment List.

Each deployment in the list will include

- all information on the project area as produced in the Statewide Needs Inventory for the region,
- all information on the specific projects and TSM&O deployments as produced in the Regional Project List including priority rankings,
- verification of deployment feasibility,
- and notes from all reviews.

Process Task E

Goal: Identify Funding Sources and Obtain Support Documentation for Statewide Deployments List

Responsibility: ITS TAG, BTO, and Regional ITS Coordinators with Operations Managers oversight

This task involves the selection of a funding mechanism for each project and allows for one final review before passing the list on to ITS TAG for their approval.

Steps 15/16: Identify Funding Mechanism – ITS Standalone, 6-Year Construction Program, Other Funding – Is Funding Available?

Timeframe: August

Result: Append funding mechanism to Final Statewide Deployment List

During this step, each of the projects listed in the Statewide Deployment List will be reviewed and funding mechanisms will be selected. Each deployment will fall be marked with one of the following:

- Funding from 6-Year Construction Program – specific program and timeline will be identified and listed with the deployment
- Funding from ITS Standalone
- Funding from other source – specific source must be identified with timeline
- Not Funded – Reason for lack of funding must be documented and deployment will be marked for future consideration

Step 17: Obtain Operations Managers Documented Support for Project

Timeframe: August

Result: Append Operations Managers Support to the Final Statewide Deployment List

During this step, the Operations Managers will review each project paying particular attention to verified funding sources. Any questions or concerns *should* be directed to all stakeholders.

Operations Managers *should* approve (or deny) all projects and these approvals **shall** be documented and included with Final Statewide Deployment List.

To summarize, this step will include attaching funding mechanisms and approvals to the Final Statewide Deployment List.

Process Task F

Goal: ITS TAG Final Review and Approval of Statewide Deployment List

Responsibility: ITS TAG

This task is the final chance for ITS TAG to review all deployments and place the deployments into the official list for the next AY (or future).

Step 18: ITS TAG Annual ITS Recommended Project List and Deployment (Decision Making / Justification Summary) Report

Timeframe: September

Result: ITS Recommended Project List and Deployment Report

In this step, ITS TAG will review the Statewide Deployment List and use this list to develop their ITS Recommended Project List and Deployment Report. This report will include a list of all deployments for the next AY (as well as any projects marked for future AYs). Each deployment *should* include a short decision making and justification summary.

Process Task G

Goal: Implement Projects

Responsibility: BTO and Regional ITS Coordinators

In this task, BTO will work with Regional ITS Coordinators to successfully implement the projects listed in ITS TAG's ITS Recommended Project List and Deployment Report.

Step 19: Engage Configuration Management Process

Timeframe: October/November

Result: Final Configuration Plan

In this step, the configuration management process *should* be used to determine exactly how the project will be deployed in the field. A configuration management process is one that manages changes to a system, to ensure that a system is operated as it is intended throughout its design life cycle. Configuration management includes documenting upgrades and modifications that are performed and other attributes related to this work, including the date and reasoning why the work was completed.

Step 20A: Implement Project

Timeframe: Next AY during Construction Season

Result: TSM&O solution successfully deployed

The project is implemented by whatever means determined in the previous steps and responsibility is passed on to the identified responsible parties for operations and maintenance.

Step 20B: Mark Deployment for Future Consideration

Timeframe: Any Time During Current AY

Result: List of Deployments for Future Consideration

Any deployment that was taken off the ITS Recommended Project List and Deployment Report at any point during this entire process *should* be moved into the next AY process cycle for consideration. To make this list easier to use, all deployments in this list *should* include all documentation that was created during this process.