Transportation Systems Management and Operation
Traffic Infrastructure Process (TSMO – TIP)

Annual Report of Activities
August 2015 – September 2016

1. TSM&O Traffic Infrastructure Process Development

The transportation industry is constantly changing with advancements in technology. The ability to be flexible and proactive; to take advantage of technological advancements is even more critical today with the on-set of connected vehicle and an expectation of mass amounts of readily available data.

The Moving Ahead for Progress in the 21st Century Act (MAP-21) recognized the advancement of transportation systems management and operations (TSM&O) with an enhanced definition that includes innovative strategies and coordination at a regional scale:

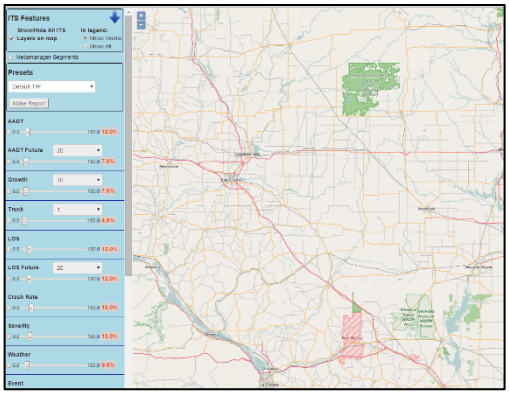
> *Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system. (23 U.S.C. S 101(a)(30))*

Wisconsin Department of Transportation (WisDOT) Bureau of Traffic Operations (BTO) is anticipating a rapidly changing environment by shifting program processes to address needs based on current technologies and innovative strategies rather than completing long-term plans that may be outdated by the time of project implementation.

The Transportation Systems Management and Operations – Traffic Infrastructure Process (TSMO – TIP) has been developed such that needs and solutions are considered on an annual basis; increasing the efficiency and effectiveness of funding resources. A consistent, objective methodology of identifying needs and project development will be used throughout the State.

One-day workshops have been held in each of the regions to work through the TSMO – TIP process and consider current needs and develop potential projects. Needs identification and project justification tools have been developed to assist with project development as described below.

1.1. Needs Analysis Tool



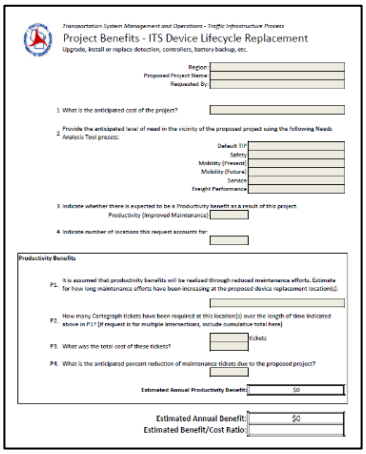
The needs analysis tool has been developed to use current data to identify areas of concern based on various user defined criteria. Examples of criteria that are available for user consideration include: AADT, AADT Future, Growth, Truck, LOS, LOS Future, Crash Rate, Severity, Weather, Event. These criteria can be weighted by the user to focus on a specific area of concern or the user may select pre-determined presets such as: Default TIP, Safety, Mobility Present, Mobility Future, Service or Freight Performance. The user is able to easily see the relative need based on the map color gradient which shows relative measure of need from low to high based on the segment values and user defined weighting criteria.

The needs analysis tool has evolved and been refined over the past year with feedback from various stakeholders throughout the State. Refinements have included:

- Revisions to preset weights
- Capability to view data by Region
- Capability to create and print regional reports
- Ability to download reports
- Functionality to view past metamanager data
- Availability of specific crash data that coincides with benefits analysis tool user inputs
- Beta version of 6-year construction plan integration with the tool

In addition, documentation for the needs analysis tool has been further developed to include material on metrics, preset descriptions, and user help information. It is anticipated that future refinements will include integrating the needs analysis tool with the 6-year construction plan such that upcoming projects can be easily identified and that functionality will be provided to allow for the creation of PDF reports.

1.2. Benefits Analysis Tool



Project Benefits - ITS Device Lifecycle Replacement

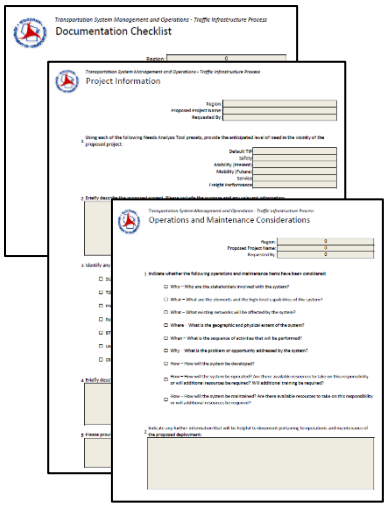
The benefits tool has been developed to assess and quantify potential monetary benefits per project type. The benefits tool uses readily available project specific data from the user and industry research to estimate potential project benefits. Project types include: new signal installation, signal replacement, signal rehab, signal retrofit, signal retiming, LED replacement, intersection communication, software, ITS device replacement, and ITS device deployment. Several types of project benefits are considered for each project type: safety, mobility, productivity, and energy and environment. These estimated project benefits are then compared to the estimated total project cost. This methodology provides a clear and transparent manner in which to document the consideration of a specific project, reducing concerns of inefficient use of funding resources.

The benefits analysis tool has evolved and been refined over the past year with feedback from various stakeholders throughout the State. Refinements have included:

- Inclusion of an ITS warrant approach to analysis DMS and camera projects
- Updated parameters based on currently available data
- Clarified descriptions and direction for users
- Modifications to analysis methodology to better integrate with available data from the needs analysis tool

It is anticipated that future refinements will include updating based on current research and parameters.

1.3. Documentation



The TSMO-TIP process has been developed to provide for a consistent, transparent process for allocating funding in ways that will provide the most benefit and advancement. One of the critical aspects with any project programming process is documentation of the methodology and decision making process. A documentation package was developed this year so that all potential projects will have key pieces of information identified and available on record. The following documentation sheets will be used for each potential project within the TSMO-TIP:

- Documentation Checklist – identifies all of the items to be included in the TSMO-TIP project package
- Project Information – identifies general project information
- Operations and Maintenance Considerations – high level questions that prompt the user to think about the operations and maintenance that will be required upon project completion.

2. Stakeholder Meetings

TSMO-TIP stakeholder engagement has been a primary focus of the past year. The 2015 Annual Stakeholder Summit was held in August; a number of presentation were given at Operations Manager Meetings; a webinar was presented in March; and regional workshops were held throughout the State.

2.1. 2015 Annual Stakeholder Summit

The 2015 Annual Stakeholder Summit was held at the southwest regional office in Madison on August 17, 2015. The summit was attended by 26 of the key stakeholders representing diverse interests across the state. The TSMO-TIP was introduced and discussed at length. The following objectives were met at the summit:

- Ensure internal and external stakeholders are aware of the current status of TSMO traffic infrastructure and related systems
- Solicit feedback on the data-driven needs assessment methodology, the data inputs, and the relative weights
- Provide information to stakeholders about where highway network operational needs are greatest
- Collect recommendations on what new technologies, systems, or data sources the Department should be pursuing and evaluating, as well as existing components that should be considered for retirement
- Address the Project/Program Management (PPM) identified short and long term action items / milestones to conclude the PPM process and to carry forward these items in the TSMO-TIP process

The group was very enthusiastic and showed general support for the process. Many points of clarification were offered and suggestions were made to improve the process which have been incorporated over the past year. The meeting concluded with a discussion on proposed 2016 deployments and application of the TSMO-TIP planning/evaluation process.

2.2. TSMO-TIP Webinar

Coordination continued beyond the 2015 Annual Stakeholder Summit and stakeholder input continued to be solicited and incorporated over the following months. A webinar to present the refined TSMO-TIP was held on March 16, 2016. It was attended by approximately 35 people throughout the State. The presentation included background of the process development, review of the process, and full instructions of each step within the process. In addition, an example project was presented to show how a project would be considered.

The webinar was recorded and made available for viewing from the TSMO-TIP website (link provided below).

2.3. 2016 Annual Stakeholder Summit

The 2016 Annual Stakeholder Summit was held at University of Wisconsin at Madison on September 27, 2016. The summit was attended by 36 of the key stakeholders from across the State. The TSMO-TIP was discussed as well as a lengthy discussion of emerging technologies. The following objectives were met at the summit:

- Continue integration of the TSM&O Traffic Infrastructure Process with priority (direct influence) stakeholders
- Obtain additional feedback of the process and planning tools
- Review new TSM&O technologies in use or upcoming:
    - Traveler Information / RTSMIP
    - Communications Systems / Connectivity
    - Adaptive Signal Control
    - Active Traffic Management

    - Detection Systems
    - Probe Data
    - Big Data
    - Connected Vehicles
    - Automation
    - Other high-tech TSM&O
    - Emerging low-tech TSM&O
- Defining which projects must go through the TSMO-TIP process, both retroactively and in the future
- Discuss documentation requirements of the TSMO-TIP
- Discuss proposed 2017 deployments with list of projects that must go through the TSMO-TIP process
- Discuss retirement concept; evolution of equipment this is outdated or in need of replacement

3. Regional Workshops

A TSMO-TIP workshop was held in each Region in the spring of 2016. The purpose of the workshops was to further explain the TSMO-TIP and available tools, work with Regional representatives to consider projects that will be required to go through the TSMO-TIP moving forward, and to receive input on the process.

Each workshop followed a similar agenda:

- Regional Needs – Regional needs analysis reports (both maps and tables) were shared and reviewed.
- General Project Example – A case study example was explained and worked through. The project was a southeast region example of a potential DMS on I-43 north of Milwaukee.
- Region Specific Project Examples – Two region specific potential 2017 projects for each region were considered. Guidance was provided in the form of "cheat sheets" that explained how the benefits tool could be used for each example.
- TSMO-TIP Project Package – A project package example was discussed and provided for future use.
- Regional Input – Each region was asked for input and comments regarding TSMO-TIP.

The Regional workshops took place on the following schedule:

- Southeast Regional Workshops:
    - May 10, 2016 – Milwaukee (STOC)
    - June 30, 2016 – Waukesha (SE Office)
- Northeast Regional Workshop: May 19, 2016 – Green Bay (NE Office)
- North Central Regional Workshop: June 1, 2016 – Wisconsin Rapids (NC Office)
- Southwest Regional Workshop: June 3, 2016 – Madison (SW Office)
- Northwest Regional Workshop: June 13, 2016 – Eau Claire (NW Office)

4. Sample Project

A sample project has been prepared to be used as a go-by for potential project documentation and analysis needs. A potential new DMS deployment was considered on I-43 north of Milwaukee. For the full sample project description and documentation, see the example included on the TSMO-TIP website links at the end of the report.

5. FY17 TSMO-TIP Projects

The following projects have been identified to retro-actively use the TSMO-TIP process to document project justification logic.

- Bureau of Traffic Operations
  - BTO: I43 - Locust DMS Replacement
- Northeast Region
  - NE002: Leo Frigo Bridge Security
  - NE003: Northeast Region CCTV's
- Northwest Region
  - NW002(FY16): USH 53 Eau Claire Freeway TOIP Implementation South
  - NW005: City of Eau Claire, USH 12, ITS Install
  - NW007: Portable Camera Trailer
- North Central Region
  - N/A
- Southwest Region
  - SW002: IH 90/94 Tomah to Wis. Dells, ITS Enhancement
  - SW007: USH 151, American Parkway Interchange, Madison, ITS Enhancement
  - SW008: USH 12, Middleton, ITS Enhancement
- Southeast Region
  - SE002: Communication Construction 164 & 190
  - SE008: Communication Design of STH 20 & STH 31

All potential TSMO-TIP projects will be required to use the TSMO-TIP process moving forward. Project documentation packages for the FY17 projects identified above as well as all FY18 projects will be due prior to the March 2018 Standalone evaluation process.

6. Next Steps and Resources

The TSMO-TIP will continue to be integrated into existing programs and processes, such as the Signals and ITS Standalone Program, 6-Year Construction planning, and Highway Safety Improvement Program (HSIP). It is expected that the TSMO-TIP will be fully integrated for FY18 deployments. As mentioned previously, all potential TSMO-TIP projects will be required to use the TSMO-TIP process moving forward. Clear direction has been developed to assist with

defining a TSMO-TIP project and the level of documentation per project type, which is available on the TSMO-TIP website.

The TSMO-TIP websites hosts this annual summary, as well as many other relevant resources such as:

- TSMO-TIP Needs Analysis and Benefits Analysis Tools
- TSMO-TIP Documentation Requirements
- 2016 TSMO-TIP webinars
- TSMO-TIP Project Examples
- 2016 Technical Review Document
- TSMO-TIP Traffic Guidelines Manual (TGM) Draft

WisDOT TSMO-TIP Website:
http://wisconsindot.gov/Pages/about-wisdot/who-we-are/dtsd/bto/stoc/tsmo-tip.aspx

TOPS Lab TSMO-TIP Website:
http://www.topslab.wisc.edu/tsmo/tip/