## *DRAFT*

## NCHRP 20-7

## Proposed Research Needs Statement

## Subcommittee on System Operations & Management

Chairperson, Don Hunt, Colorado DOT

## September 30, 2013

#### TITLE

Next Generation National Transportation System Management & Operations Research Framework

#### BACKGROUND / NEEDS STATEMENT

Transportation System Management & Operations (TSM&O) has emerged as core business area of state transportation agencies. Beginning in the mid-Twentieth Century, modern and emerging technologies and tactics have been applied to enhance the safety, reliability, and security of traffic operations on the nation’s highway system, as well as multimodal movement of people and goods. In the 1990’s; intelligent transportation systems (ITS), systems engineering and architecture, and a National Dialogue on Operations began to formalize both the national strategic deployment of technologies, and the federal, state, and local programmatic structure of TSM&O.

The national program structure for TSM&O has included the formation of national organizations such the National Transportation Operations Coalition, the National Traffic Incident Management Coalition, the Transportation Safety Advancement Group (formerly the Public Safety Advisory Group), the Transportation Public Safety Executive Leadership Group, the TRB Regional TSM&O Committee, and the AASHTO Subcommittee on System Operations & Management.

A vital mechanism for catalyzing TSM&O programmatic development and implementation has been national transportation research. For example, the TRB Freeway Operations Committee spawned pivotal research projects in the 1970’s and 1980’s that established national best practice in freeway traffic management and traffic incident management (TIM) techniques and technology systems. The creation and funding of the Strategic Highway Research Program (SHRP) Reliability Projects dramatically accelerated TSM&O research & development; producing organizational & institutional development tools, traffic operations performance data analysis & TSM&O program development tools, national multidisciplinary TIM training resources, and the concept of a national TSM&O Knowledge Transfer System prospectively associated with a national TSM&O center or network of excellence.

Since the initial planning for SHRP (or “F-SHRP”) nearly 15 years ago; there have been dramatic programmatic, fiscal, technological, and institutional changes – some of which could be characterized as transformational trends. For example:

* Privatization encompasses functions ranging from program support services to traffic surveillance & data functions.
* Technology is anticipating the Connected Vehicle, the Autonomous Vehicle, integration of cloud computing, and continued evolution of wireless communications.
* Megaregions & multistate corridors are emerging as institutional foundations for Interstate Highway System TSM&O.
* Freight, logistics, & the global supply chain are placing intense and unanticipated economic expectations on the national highway system and intermodal features along it.

There is an urgent need for a coordinated assessment of current and emerging TSM&O knowledge gaps and associated critical research issues. This assessment should establish a basis for coordinating national TSM&O research & development projects across multiple organizations through 2025. TSM&O topics need to be broadly characterized to encompass relevant aspects of transportation security and emergency management, freight operations and supply chain logistics, and active transportation and demand management along with other established areas of traffic and incident management and Intelligent Transportation Systems.

TMC PFS emerging trends

<http://ntl.bts.gov/lib/jpodocs/repts_te/13316.pdf>

<http://cts.virginia.edu/trafficmgmtcentersrfp.pdf>

<http://mitei.mit.edu/system/files/Electric_Grid_1_Challenges_Oppportunities_Major_Recommendations.pdf>

<http://onlinepubs.trb.org/onlinepubs/f-shrp/f-shrp_webdoc_3.pdf>

**RESEARCH OBJECTIVE**

The project will review the status of broader TSM&O research in the context of SHRP-Reliability implementation plans and state transportation TSM&O community knowledge needs and program priorities. The project will identify priority areas for future coordinated national TSM&O research, and begin to consider alternative mechanisms for enhancing and sustaining TSM&O research coordination.

#### WORK TASKS

Tasks anticipated in this project include the following:

1. Complete a literature search & national community scan to synthesize trends, issues, and research status within the TSM&O program area. Incorporate relevant freight operations and supply chain logistics, as well as transportation security and emergency management areas of research.
2. Comparatively review national research program planning approaches from other disciplines and technical areas to identify practices that may be transferable to TSM&O research program planning
3. Convene an expert executive panel in conjunction midyear or annual TRB national meetings to
   1. publicly discuss the recent history & lessons learned in TSM&O research & development
   2. react to the findings of the synthesis
4. Develop a range of preliminary set of alternative frameworks for TSM&O research program that dynamically recognizes priority issues & trends, and responsively translates needs into coordinated national TSM&O research projects. The concept of a framework could incorporate the following dimensions:
   1. Topics, program areas, and projects
   2. Process & schedule for recurrent planning & coordinated execution of research projects
   3. Provisions for stakeholder involvement & oversight
   4. Concepts for funding & resourcing research projects and broader program administration
5. Design & facilitate a national workshop in Summer, 2014 to include leadership and other representation from relevant AASHTO & TRB committees, USDOT (FHWA, NHTSA, & RITA-ITS JPO), and the National Transportation Operations Coalition.
   1. Resolve critical issues that are influencing – and are likely to influence – TSM&O research needs
   2. Review and refine the preliminary set of TSM&O research program alternative frameworks
   3. Determine primary research project concepts
   4. Establish next steps and a preliminary implementation approach to further develop and implement a preferred framework
6. Complete draft and final reports documenting the “Next Generation National TSM&O Research Framework”, and present results and findings to key stakeholder organizations.

### URGENCY

The continued implementation of SHRP-Reliability products will build unprecedented national momentum in TSM&O. Failure to continue the SHRP model for focused and coordinated national TSM&O research will risk the loss of this momentum, and perhaps miss the historic opportunity to fully mainstream TSM&O as a national transportation core competency.

### FUNDING REQUESTED AND TIME REQUIRED

It is estimated that this research will take **14** months to complete and will require $**95,000**.

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