

PTSMO Workforce Guidebook: NCHRP 20-07/Task 408



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TSMO Workforce Guidebook (to discuss today)

- The Project Team
- Purpose
- Approach
- How the Guidebook is organized
- Overview
- Audience
- The Emerging 19 TSMO Positions
- The “Eye Chart”
- Scenario for the Position of Computer Engineer
- What is Success for the Guidebook?

TSMO Workforce Guidebook: The Project Team

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- The NOCoE Team

TSMO Workforce Guidebook: Purpose

- Funded by NCHRP 20-07/Task 408
- To provide practitioners with a tool to understand what is needed for and how to develop a strong TSMO workforce.
- The Guidebook focuses on workforce development practices rather than the specific details of TSMO, so readers without a background in TSMO will find the information useful.
- The hoped for outcome: A Strategic Management Framework for identifying new positions, recruiting and retaining TSMO staff.

TSMO Workforce Guidebook: Approach

- A literature review and stakeholder interviews were used to identify issues, needs, and best practices for a TSMO workforce. A scan of existing professional education and training programs detailed more than 1,500 existing TSMO-related training programs and educational courses.
- The combination of the literature and stakeholder interviews allowed the development of 19 model position descriptions for TSMO-related positions. KSAs were defined for each of the 19 emerging position descriptions to help practitioners understand what is needed to attract and retain TSMO personnel.
- Finally, a strategic management framework was developed for identifying new positions, recruiting, and retaining TSMO staff. This framework incorporates position descriptions, KSAs, triggers for hiring new positions, and best practices for workforce recruitment and development.

TSMO Workforce Guidebook: How it is Organized

Chapter 1 Using the Guidebook

Chapter 2 Recruiting a TSMO Workforce

Chapter 3 Model TSMO Position Descriptions

Chapter 4 Developing a TSMO Workforce

Chapter 5 TSMO Workforce Retention

Appendix A Catalog of TSMO-related Undergraduate Courses

Appendix B Catalog of TSMO-related Graduate Courses

Appendix C Catalog of TSMO-related Prof. Dev. Courses/Training Programs

Appendix D Example TSMO Position Descriptions

Desired Information	Guidebook Section
<ul style="list-style-type: none"> • An understanding of the evolving skillsets and backgrounds needed for successful and innovative approaches to TSMO. • Understanding when an agency is ready to hire TSMO personnel. • Recommendations and best practices for hiring TSMO positions. 	<p>Chapter 2. Recruiting a TSMO Workforce</p>
<ul style="list-style-type: none"> • A description of 19 TSMO-related positions and the knowledge, skills, and abilities required by each position. • Information on when, where, and how to recruit for each of the TSMO-related 19 positions. 	<p>Chapter 3. Model TSMO Position Descriptions</p>
<ul style="list-style-type: none"> • Crafting a professional development plan for the TSMO workforce. • Information on TSMO-related educational programs at the undergraduate and graduate level. • Information on TSMO-related professional development courses. • Areas of investment to strengthen a TSMO workforce. 	<p>Chapter 4. Developing a TSMO Workforce</p>
<ul style="list-style-type: none"> • Recommendations and best practices for TSMO workforce retention through improvements to training and professional development, human resource benefits, and workplace culture. 	<p>Chapter 5. TSMO Workforce Retention</p>

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TSMO Workforce Guidebook: Overview

- Information to assist with TSMO workforce education, training, recruitment, retention, and development.
- Determine the need for new knowledge, skills, and abilities (KSAs) to support TSMO.
- Formulate position descriptions, recruiting and hiring for emerging positions.
- Develop new and existing agency personnel to support and advance TSMO.

TSMO Workforce Guidebook: Audience

- People involved in recruiting, hiring, or training in the transportation field
- People at transportation agencies looking to begin or develop a TSMO program
- Consultants working with TSMO programs
- Educators at the undergraduate and graduate levels

TSMO Workforce: The Emerging 19 TSMO Positions

- Traffic Data Scientist/Statistician
- TSMO Manager/Chief/Bureau Director
- TSMO Program Manager
- Computer Engineer
- Artificial Intelligence Scientist
- Telecommunications Engineer
- Data Management Specialist
- Visualization Specialist
- Connected and Automated Vehicles (CAV) Program Manager
- Traffic Incident Management (TIM) Program Manager
- Cyber Security Engineer
- Transportation Data Ethicist
- Surface Weather Specialist
- Systems Engineer
- TSMO Modeling Specialist
- Emerging Technologies Industry Liaison
- Transportation Systems Performance Manager
- Integrated Corridor Management Manager
- Transportation Management Center Manager

Job Position	Admin.	Planning	Design	Construction	Maint	Asset & Perf. Management	Permitting & Enforcement	Traffic & Safety	Operations	Research
Traffic Data Scientist/Statistician	○	◐	◐	◐	◐	◐	○	●	●	●
TSMO Manager/Chief/Bureau Director	●	●	●	●	●	●	●	●	●	●
TSMO Program Manager	●	◐	◐	◐	◐	●	◐	●	●	●
Computer Engineer	○	○	○	○	○	◐	○	◐	◐	●
Artificial Intelligence Scientist	○	○	○	○	○	◐	○	◐	◐	●
Telecommunications Engineer	○	○	○	○	○	◐	○	◐	◐	●
Data Management Specialist	○	○	○	○	○	●	◐	◐	●	●
Visualization Specialist	○	◐	◐	◐	◐	●	○	●	●	●
CAV Program Manager	●	◐	◐	◐	◐	◐	○	◐	●	●
TIM Program Manager	○	○	○	○	◐	◐	●	●	●	○
Cyber Security Engineer	○	○	○	○	○	◐	○	◐	◐	●
Transportation Data Ethicist	◐	○	○	○	○	◐	○	○	◐	●
Surface Weather Specialist	○	○	○	○	◐	○	○	●	●	○
Systems Engineer	○	◐	◐	◐	◐	●	○	●	●	●
TSMO Modeling Specialist	○	●	◐	◐	◐	◐	○	●	●	●
Emerging Technologies Industry Liaison	◐	○	○	○	○	◐	○	○	◐	●
Transportation Systems Performance Manager	●	◐	◐	◐	◐	●	◐	◐	◐	◐
Integrated Corridor Management Manager	●	●	●	●	●	●	◐	●	●	●
Transportation Management Center Manager	◐	○	○	○	●	●	●	●	●	●
Legend		Abbreviations: Admin: Administration Maint: Maintenance Perf: Performance								
○ represents not typically involved										
◐ represents some involvement										
● represents frequent involvement										

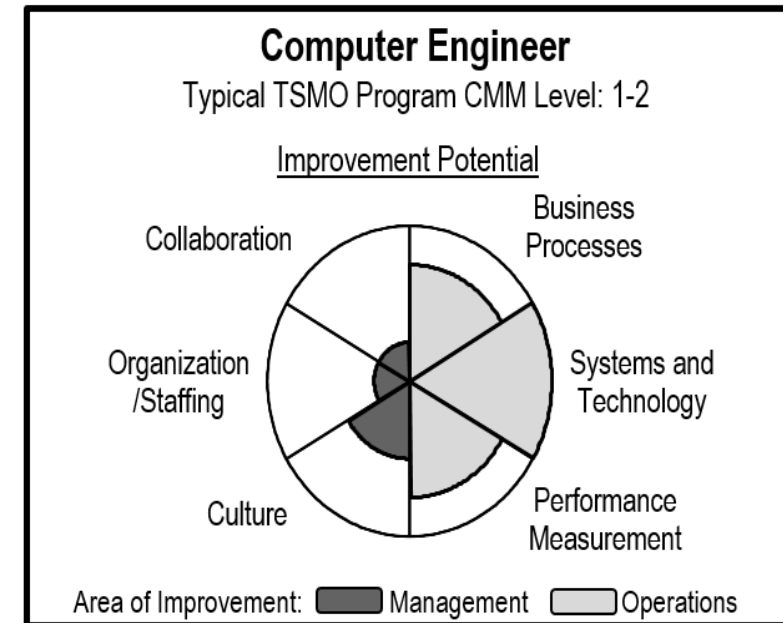
Scenario for the Position of Computer Engineer

*The Key Questions for a TSMO Organization
seeking to hire this position*

- When is a Computer Engineer Needed?
- What Knowledge Skills and Abilities are Required?
- Where and How should Agencies Recruit for this Position?

Position - Computer Engineer

- When is a Computer Engineer Needed?
 - Specific motivation for hiring a Computer Engineer include:
 - The need for in-house IT expertise required specific to emerging technologies and hardware; traditional or external IT support becomes insufficient.
 - Multiple systems/applications require continual integration and change management.
 - The program is responsible for staying abreast of mobile, cloud, or edge computing.



Position - Computer Engineer KSAs

Knowledge

- Knowledge of Computer Science, Engineering, Software Engineering
- Knowledge of Relevant Coding Languages
- Knowledge of Microsoft Office Programs
- Knowledge of TSMO Systems (hardware and architecture)
- Knowledge of Local Agency Procedures

Skills

- General Computer Skills
- Communication Skills, Written/Verbal
- Analytical, Mathematical, or Problem-Solving Skills
- Interpersonal Skills
- Technical Communication, Report Development Skills
- Time and Task Management Skills

Abilities

- Ability to Collect, Enter, or Analyze Data
- Possess Professional Judgment
- Ability to Work Well on a Team

Position - Computer Engineer

- Where and How should Agencies Recruit for this Position?
 - Candidates come from, other transportation agencies, consulting firms, software industry, academic and research institutions
 - Recruiters will be somewhat helpful
 - Incentives that could be considered are:
 - Flexible work schedule, remote work options and professional organization involvement

What does a successful Guidebook achieve: The hoped-for outcome

- *The Guidebook seeks to provide a Strategic Management Framework for identifying new positions, recruiting and retaining TSMO staff.*
- *Please sign up for the NOCoE Newsletter to keep apprised of the launch and display of content on the NOCoE Website.*



THANK YOU