

Organizing for Reliability: Prep Kit

This “Prep Kit” has been prepared in support of the joint FHWA / AASHTO deployment of SHRP2 Organizing for Reliability, with the stated goal of which is “to help agencies assess their improvement needs and progress, and initiate some of the action steps required to measurably transform their organizations to being more operations and reliability-focused”. The Prep Kit provides an overview of the various activities and expectations over the course of the Implementation Assistance Program, including the following information:

- Background information, including the purpose of this effort and the overall context
- The four phases that comprise the Implementation Assistance Program:
 - Outreach
 - Assessment
 - Development
 - Implementation
- Next steps after the Implementation Assistance Program

BACKGROUND

The SHRP2 research has found that for state and local transportation agencies to reach the full potential of their operations¹ program, specific supportive processes and institutional arrangements must be put in place and managed, just as has typically been done for other formal core programs such as construction and maintenance. One of the keys to having a successful operations environment is to integrate or “mainstream” operations strategies into the agency’s institutional framework and corresponding business processes. In order for this to happen, planning, funding, design, contracting and implementation, and on-going management and maintenance must consider and include operations in daily activities across all divisions of the agency, and at all stages of the process.

The SHRP2 L01 and L06 products provide a formal procedure to integrate and mainstream operations into an agency’s program. These products focus on orienting and improving key business processes within the agency in order to facilitate effective management and operations programs and projects.

- *Integrating Business Processes to Improve Travel Time Reliability* (L01) identified and evaluated how agencies integrate business processes to improve travel time reliability, as applied to traffic incident management, work zone management, planned special events, road weather management, and traffic control/ operations. The L01 effort identified successful practices and compared operational processes with programmatic processes. The products from the L01 study include a guidance document that provides assistance for process mapping, integration benefits and challenges and alignment with other institutionalized processes in an agency.
- *Institutional Architectures to Advance Operational Strategies* study (L06) resulted in an institutional capability maturity model (CMM) framework that identified all the elements needed to continually improve activities one level at a time for business processes, systems and technology, performance management, culture, organization and workforce, and collaboration.

¹ The term “operations” is used throughout this Prep Kit as a short descriptor for “Transportation Systems Management and Operations;” also often abbreviated as TSMO or TSM&O. TSMO is defined in MAP-21 as “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.” The term encompasses several strategies and activities.

The L06 project developed a process whereby transportation agencies can self-assess their capabilities and identify actions to continually improve their operations-related activities.

An initial list of background resources are identified below as recommended reading as part of the assessment and development activities.

- The FHWA Primer, [Creating an effective Program to Advance Transportation System Management and Operations](#), which provides high-level guidance focused on key program, process, and organizational capabilities that are essential to the development of more effective operations strategy applications.
- The [AASHTO Systems Operations and Management Guidance website](#), which provides both a custom-tailored self-evaluation and a one-minute version; plus guidance for reaching increasing levels of capability maturity for various aspects (i.e., “dimensions”) of operations.
- A list of reliability solutions and associated references on the FHWA SHRP2 website (<http://www.fhwa.dot.gov/goshrp2/Solutions/Reliability/List>.) In particular, the link to [Organizing for Reliability Tools \(L06/L01/L31/L34\)](#), provides links to the aforementioned L01 and L06 documents (as well as others), and provides information on the Implementation Assistance Program.
- Organizing for Reliability (L01) Primer and Workshop, this provides an overview of the SHRP 2 L01 research and frames how L01 research principles can be applied to address non-recurring congestion as well as management and operations issues for regions, corridors, and networks. (These resources will become available in 2014)

OVERVIEW OF IMPLEMENTATION ASSISTANCE PROGRAM

The Implementation Assistance Program (IAP) is designed to help transportation agencies begin to deploy new products developed under the second Strategic Highway Research Program (SHRP2). Twenty seven “lead adopters” were selected for the first round of assistance opportunities for the SHRP2 Organizing for Reliability (refer to the aforementioned FHWA SHRP2 solutions website for a full list of the selected sites). Twenty of the lead adopters will receive full financial and technical assistance. The remaining seven lead adopters will receive limited assistance consisting of technical assistance only.

The overall goal of the SHRP2 Organizing for Reliability effort is graphically shown in Figure 1. Each lead adopter will assess where they are currently in terms of mainstreaming operations, identify areas for improvement, develop an Implementation Plan with

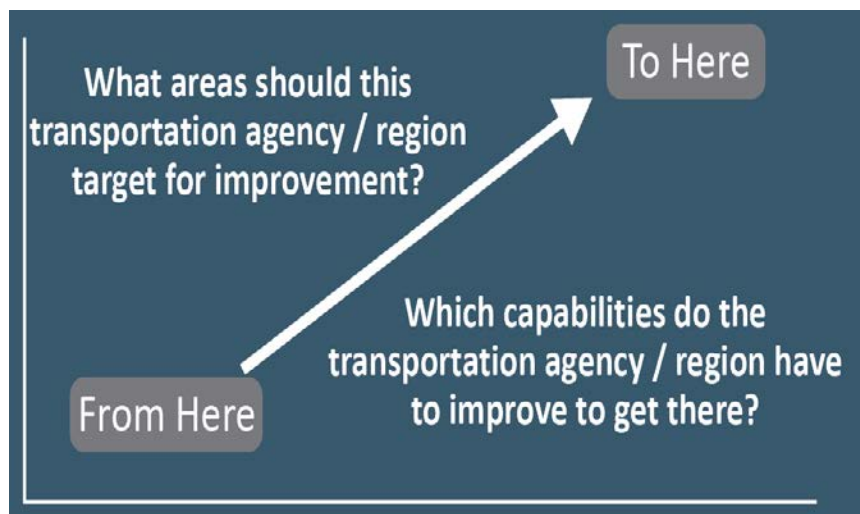


Figure 1 – The Path to Excellence in Operations for Transportation Agencies – Individually and from a Regional Perspective

specific action items, and then accomplish several of the corresponding activities over a two-year period to move their respective processes, programs and institutional frameworks along the path (designated by the arrow) “from here” closer to the ultimate goal of “to here” in support of improved operational capabilities.

Program Context – Institutional Framework

The focus of this effort is on improving business processes and the institutional architecture in support of more effective operations. It is not directly geared to the various operational strategies and supporting technologies themselves. The SHRP2 L06 product – *Institutional Architectures to Advance Operational Strategies* – identifies the following six dimensions of organizational capability:

- **Business Processes** – formal scoping, planning and programming, and budgeting (resources)
- **Systems and Technology** – use of systems engineering, systems architectures, standards (and standardization) and interoperability
- **Performance** – defining measures, data acquisition and analytics, and utilization
- **Culture** – technical understanding, leadership, outreach, and program legal authority
- **Organization / Staffing** – programmatic status, organizational structure, staff development, recruitment and retention
- **Collaboration** – relationships and partnering among levels of government and with public safety agencies, local governments, MPOs and the private sector

For each of these six dimensions, four levels of maturity have been defined – where the term “maturity” is related to the degree of formality and optimization of these processes in support of effective operations – as follows:

- **Level 1: Performed** – Activities and relationships largely ad hoc, informal and champion-driven – substantially outside the mainstream of other activities within the transportation agency.
- **Level 2: Managed** – Basic strategy applications understood; key processes and support requirements identified; key technology and core capacities under development; but limited internal accountability and uneven alignment with external partners.
- **Level 3: Integrated** – Standardized strategy applications implemented in priority contexts and managed for performance; operations-related technical and business processes developed, documented, and integrated into the agency and the regional transportation planning process; partnerships aligned.
- **Level 4: Optimized** – Operations addressed as a full, sustainable core agency program, established on the basis of continuous improvement with top level management status; part of the region-wide program and planning process with formal partnerships will all involved agencies.

More details regarding the six dimensions of organizational capability and the associated maturity levels are provided in the Appendix. Additional information can be found on the ASSHTO System Operations and Management website at <http://www.aashtosomguidance.org/> and the FHWA SHRP2 website at <http://www.fhwa.dot.gov/goshrp2/Solutions/Reliability/List>.

IMPLEMENTATION PROGRAM ACTIVITIES AND EXPECTATIONS

The Implementation Assistance Program is a 2 to 3 year endeavor involving several activities as graphically shown in Figure 2.

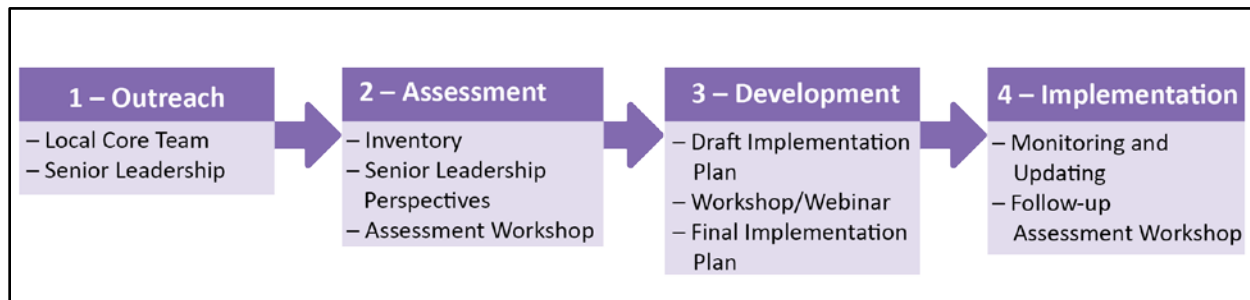


Figure 2 – Overview of Activities: Joint FHWA / AASHTO Implementation Assistance Program

An FHWA/AASHTO Management Team – consisting of the individuals identified in Table 1 – has been established with the overall responsibility for managing all these Implementation Assistance Program activities and for meeting the goals, outcomes, and results.

Name	Affiliation	Email	Phone
Joe Gregory	FHWA	Joseph.Gregory@dot.gov	202-366-0610
Daniel Grate	FHWA	Daniel.Grate@dot.gov	404-562-3912
Ralph Volpe	FHWA	Ralph.Volpe@dot.gov	404-562-3637
Steve Clinger	FHWA	Stephen.Clinger@dot.gov	202-366-2168
Grant Zammit	FHWA	Grant.Zammit@dot.gov	404-562-3575
Gummada Murphy	AASHTO	gmurthy@aaashto.org	202 624 8913

Table 1 - FHWA/AASHTO Management Team

Before discussing these specific activities, it is worth mentioning a few key concepts and guidelines that are relevant to the overall Implementation Assistance Program:

- While the process and activities (i.e., “inputs”) are similar for each lead adopter, the resulting products (i.e., “outputs”) will likely be very different for each site, reflecting the unique and location-specific goals, current operations activities and needs, and the stakeholders and their respective organizational frameworks. In essence, the Implementation Plan and the resulting actions must reflect your “operations story”.
- This is a “bottoms up” approach – a process that starts with initial meetings and discussion, followed by an assessment of the current organizational maturity within the aforementioned six dimensions, the development of an Implementation Plan for enhancing this maturity (moving from the current level to the next level and the one(s) after that), and initiating actions to achieve these next levels. It is best not to start with any preconceived notions as to what the Implementation Plan and associated actions will look like. Let the process help you determine the end game.
- At the same time, it is recommended that an overall vision and mission statement be developed at the start of the process. As the program progresses, the vision can be refined as may be

appropriate, with the addition of goals and objectives for the implementation phase (as documented in the Implementation Plan).

- While the Implementation Assistance Program is a multi-year effort – with financial and staff support provided by FHWA and AASHTO for many of the 27 lead adopters during a 2-year period (following the completion and approval of the Implementation Plan) – the vision and mission statement, the Implementation Plan, and the initial actions must be undertaken with a long-term view. The process must not stop when this 2-year assistance and support period is completed. This effort should be viewed as just the start of a “continuous improvement in operations”, with additional future actions being undertaken (as identified in the Implementation Plan) to enhance the institutional architecture in support of operations, further moving along the path to the ultimate “to here” as shown in previous Figure 1.
- The Implementation Plan is intended to be a “living document,” which should be updated as an agency’s maturity level increases, with additional action items identified and documented therein as part of a continuous improvement process.
- As previously noted, the focus of the Implementation Assistance Program is to make permanent enhancements to the institutional framework. Enhancements to operations strategies and the supporting technologies may be a part of the Implementation Plan; but only to the extent that they help promote mainstreaming and an improved organizational structure.

OUTREACH – PHASE 1

The initial outreach phase includes establishment of and meetings with the local core team and initial engagement with the senior leadership of the involved transportation agencies.

Local Core Team

The role of an “operations champion”—particularly in the context of mainstreaming operations into the organizational framework and planning process – is too big for a single person. Moreover, implementing changes and enhancements to the institutional architecture includes formalizing relationships with other operations stakeholders² in the agency, and with others in the region including other transportation agencies, MPOs, and enforcement / emergency service entities.

Each region and lead agency have already designated a “local core team” to be responsible for coordinating all activities associated with the program and on-going liaison with the FHWA / AASHTO Management Team. Moreover, face to face meetings have been held with all the selected sites with the purpose of meeting with the local core teams and senior leadership to discuss roles and expectations. FHWA Division Office staff are also critical to the success of this program. They will be responsible for serving as a single point of contact to coordinate support from FHWA and AASHTO in the development and execution of the implementation plan. It is also possible that the make-up of the local core team may change (e.g., additional members) following the assessment phase so that the appropriate stakeholders are involved during the development and implementation phases.

Senior Leaders Involvement

Another responsibility of the local core team is to regularly engage with an agency’s senior leadership and decision makers (e.g., DOT Secretary / CEO, chief engineer, budget and programming director, maintenance head, other executive staff). The commitment and support of the senior leadership within

² A “stakeholder” may be defined as any person or group with a direct interest or potential impact (a “stake” as it were) in operations.

the agency, and from the other involved transportation entities in the region, is crucial to the success of the program. Not only can senior leadership provide valuable input to the process; but they are also the ones that must ultimately approve and subsequently promote any changes to the institutional framework – and the associated staffing and budgets – in support of enhanced operations.

ASSESSMENT – PHASE 2

This phase of the program focuses on assessing the agency's and / or a region's key organizational and procedural gaps and needs with the view to improving business processes and the institutional architecture in support of more effective operations. The product of the assessment will be a statement of the agency's needs and identification of potential strategies to address these gaps and needs. The assessment process will include an inventory of current operations practices, policies and processes, meeting with senior leadership to ascertain their perspectives, and a capability assessment workshop.

Inventory

An inventory and review of operations-related strategies and the associated programs and business processes will be conducted by the FHWA consultant team to gain an understanding of the current and near-term state-of-the-practice as it relates to operations. This will allow the subsequent assessment workshop to be tailored to the location-specific circumstances and needs. The Local Core Team will be requested to provide a number of documents for review, including (but not necessarily limited to):

- Overview of the transportation network, the involved jurisdictions and agencies, and their respective functions
- Key contacts
- Major agency documents (e.g., policies, programs, laws)
- Budget / expenditure information related to operations
- Operations-related material from MPOs or others (e.g., TIP / STIP, CMP)
- Systems engineering–related documentation and procedures, including Regional and Statewide ITS Architectures
- Operations project and program documentation and information (e.g., System, Corridor, and Regional Concepts of Operations; ITS Strategic / Master Plans; Procedural / process manuals or SOPs; Traffic Incident Management Plans)
- Operations-related Special Event and Emergency Management Plans
- Approach to performance measures (e.g., Performance Management Plans) including performance measures currently in use
- Recent training and workshops provided in the area of operations
- Agency organizational framework and charts indicating location of operations-related functions
- Operations staffing materials (e.g., position descriptions)
- MOUs and other collaborative agreements with other agencies in support of operations

Senior Leaders Perspective

FHWA/AASHTO Management Team and the supporting consultant team will work together with the Local Core Team to conduct a meeting with senior leaders to provide further background to the process and gain their perspectives on key agency issues, current strengths and weaknesses, challenges, and opportunities, and how these might impact the long term vision for mainstreaming operations.

Capability Assessment Workshop

A one-day workshop will be conducted based on the institutional capability maturity model (CMM) framework developed as part of SHRP2 L06 (*Institutional Architectures to Advance Operational Strategies*). The CMM framework identifies all the elements needed to continually improve activities for the aforementioned six dimensions (i.e., business process, systems and technology, performance, culture, organization and staffing, and collaboration). Four levels of capability are defined for each dimension as previously noted (i.e., “performed, managed, integrated, optimized”), with the process focused on improving one level at a time.

The capability assessment workshop is a self-assessment activity – “the answers are in the room!” Representatives from FHWA, AASHTO, and the supporting consultant team will provide background information regarding the six dimensions of organizational capability, what constitutes each of the four levels of capability maturity, and help facilitate the discussions among the participating stakeholders. This is not a FHWA / AASHTO / consultant evaluation of the participating agencies. Rather, the participants from the host agency and other regional stakeholders will identify the “here we are” component (refer to previous Figure 1), setting the stage for determining the “where we need to be” and the subsequent development of an Implementation Plan for “getting there”.

The supporting consultant team will send out “read ahead” materials prior to the workshop, prepare the workshop agenda, and develop a summary report that documents the information collected during the workshop. The FHWA consultant team will also provide support to the Local Core Team with respect to workshop logistics and in identifying participants. Depending upon the goals and objectives of the agency / region, it is envisioned that this may include operations, planning, design, finance, and capital programming and public affairs staff from the host agency; similar individuals from the MPO(s) in the region; and representatives from local government, transit, law enforcement, emergency service providers, traveler information providers, and other entities involved in operations. In other words, the participants should be individuals (i.e., mid-level management from the various involved entities and operations stakeholders) who can contribute to the assessment process and who have a stake in one or more of the 6 dimensions. The results of this assessment will be documented in a draft assessment summary report prepared by the FHWA consultant support team, and submitted to the Local Core Team for review and comment prior to finalization.

There will be variations in the assessment phase activities for some of the lead adopters, specifically in using the FHWA supporting consultant team to facilitate the capability assessment workshop. Some lead adopters were trained to conduct their own capability assessment workshop and will do so with support from the FHWA resource center. This will allow them to conduct multiple workshops in their State and recognize variations between regions/districts. Some lead adopters plan to have agencies conduct individual self-assessments using the AASHTO web site and then conduct a collective internal workshop to discuss individual scores. This will allow them to reach out to many more local agencies and get their perspectives on the operations program for the entire region.

DEVELOPMENT – PHASE 3

The product of this step is to develop specific action steps that the agency / region may take to become more operations-focused. The “Capability Improvement Implementation Plan” will be developed on an iterative basis, involving on-going cooperation between the local core team and the FHWA / AASHTO Management Team, as follows:

- Following the assessment activities, the results are converted into a set of draft Implementation Plan development templates. A template (refer to Table 2) will be prepared for each major action (or group of actions) as identified during the assessment to be the highest priority for

getting to the next levels of capability. For the lead adopters with full assistance, these initial templates will be prepared by the FHWA consultant team. For the lead adopters with limited assistance, the initial templates will be prepared through an internal FHWA support team.

- The FHWA / AASHTO Management Team will establish an internal FHWA support team for each of the 27 lead adopters to work with the local core team to develop the detail the tasks and actions required to implement the priority items identified in the initial templates. The completed templates will constitute the draft Implementation Plan.
- A workshop / webinar will be conducted for the local core team to review and discuss the draft Implementation Plan and to resolve any outstanding issues regarding the tasks, action items, and requirements. The workshop/webinar may include additional people beyond local core team members as appropriate, and will be facilitated by the FHWA support contractor (full assistance) or FHWA internal support team (limited assistance).
- Based on the results of the workshop / webinar, the Implementation Plan will be finalized by the FHWA support consultant (full assistance) or FHWA internal support team (limited assistance). Once finalized, the local core team is responsible for vetting the Implementation Plan with their senior leadership. The two year implementation period starts once finalized and accepted by leadership.

<ul style="list-style-type: none"> • Capability dimension • Current assessed level • Identified weaknesses related to action (as identified during the assessment) • Products / desired outcomes • Relationship of desired outcomes to overall goals and objectives • Identification of key tasks • Responsibilities (management and support) • Estimated level of effort • Senior leadership support actions • Collaboration actions / requirements / support from external entities • Relationship / continuity (if any) with other actions • Technical issues • Potential risks, likelihood of occurring, resulting impacts, and associated mitigation measures • Resource requirements • FHWA / AASHTO support resources and contacts • Start / end date • Indicators of completion / success • Next step(s)
--

**Table 2 – Implementation Plan Template Items
(For each Action Item or Groups of Actions)**

The assessment phase will identify a number of potential strategies with short-term, mid-term and long-term timeframes. The Implementation Plan will focus on the short to mid-term action items that advance the operations program to the next level of capability. The key items are those strategies that have a direct impact on those CMM dimension(s) that are holding the State/region back (i.e. the CMM dimensions with the lowest scores), and are doable within the 2 year time frame. The local core team

will be encouraged to look for opportunities to pursue many of the mid-to longer term strategies that can be included in longer range transportation systems management and operations (TSM&O) strategic plans or within an agencies capital and transportation improvement programs.

It is emphasized that the action items should focus on repeatable processes and arrangements that will further “mainstream” transportation systems management and operations and the enabling ITS-based technologies into the “institutional architecture” of the agency and / or region. The focus should be improvements to existing programs and process, such as changes in existing practices, creation of new partnership arrangements, establishing performance measures, workforce development, etc. that will ultimately make the transportation system safer and more reliable.

The Implementation Plan should be more than just a series of completed templates identifying specific action items. The Plan also requires an introductory section that states the overall vision, goals, and objectives for the mainstreaming program; and not just for the next two years, but for the long term. As such, in addition to the specific action items as defined in the templates, the Implementation Plan should include a narrative describing the proposed activities to be undertaken following completion of the various action items (including updating the Implementation Plan), thereby providing a continuous improvement path. Moreover, while risks are identified for each action item, the introductory section should address the broader operational risks should the overall mainstreaming effort fail for whatever reason(s).

IMPLEMENTATION – PHASE 4

This phase of the Program focuses on the realization of the action items as identified and described in the Implementation Plan, and the on-going monitoring of the progress over a 2-year period. FHWA and AASHTO will provide technical support to the lead adopters during this implementation phase, examples of which include the following:

- Training – targeted training will be delivered to increase staff proficiency in a range of technical and organizational topics, and to nurture and grow new operations “champions”
- Workshops and working meetings – bringing together professional staff to advance specific activities of the Action Plan
- Peer Exchanges – targeted in person and virtual exchanges will expose staff to new ideas and concepts as well as share experiences with State and local peers to tactically share proven practices
- Technical Assistance – targeted technical assistance will advance programmatic and project priorities to achieve the desired outcome of the Action Plan
- Collaboration – building on the strong organizational framework of AASHTO, numerous Subcommittees will be instrumental in fostering the successful transformation of organizations to advance Operations. The FHWA will partner in this effort to channelize resources and provide support throughout.
- Tactical Assessments - tactical reviews to explore and enhance process associated with one or more dimensions
- Follow up briefings for senior agency leaders to help sustain momentum

The lead adopters with full assistance also received a SHRP2 funding incentive to accomplish the above support as well as other activities identified in the Implementation Plan. In general, the program funding from FHWA is not meant to be used for the procurement and deployment of additional ITS hardware and system features; although such enhancements can be included in the overall Implementation Plan (e.g., “Next Steps) if they can be shown to further promote mainstreaming

process. The lead adopters with limited assistance will be supported with internal FHWA resources available to accomplish activities identified in the Implementation Plan.

The progress of the implementation phase (i.e., status of each action item) will be tracked by the local core team, including FHWA Division office staff, and the FHWA/AASHTO Management Team. Several awareness and outreach events involving the 27 lead adopters are anticipated throughout the 2 year implementation phase, including presentations at national meetings such as TRB, AASHTO, ITE, etc. as well as workshops, webinars, peer exchanges, and electronic media discussion groups to capture case studies and common challenges/issues.

At the end of the two-year implementation period, a follow-up capability assessment workshop will be conducted to ascertain the level of maturity for each dimension and how these levels compare to the results of the workshop conducted during the assessment phase of the project. This information will help FHWA and AASHTO assess progress measured by maturity level in a CMM dimension(s), and in particular what training, resources, enhanced processes, etc. attributed to this progress.

NEXT STEPS

It is once again emphasized that this 2-year endeavor is only the start of an on-going process to fully mainstream operations into the institutional and organizational framework of every state DOT and MPO in the country. This means continuing the process started under this program to move to the next levels of maturity for each and every dimension until the final “to here” is reached. It is also envisioned that the lead adopters will become independent champions for the power and value of the product and the process, serving as mainstreaming advocates to your peers. In this way the SHRP2 products will be transformed from the confines of reports and PowerPoint presentations into widespread adoption and daily use; and continue to be applied long after the SHRP2 effort has been completed. This, in turn, will ultimately result in the following improvements in operations on a nationwide basis:

- Mainstreaming operations in DOT “culture” as a formal program
- Institutionalizing continuous measurement and improvement of operational performance and the business processes supporting it
- Integration of operations into the formal planning/programming processes
- Sustainable funding mechanisms and processes)for operations
- Commitment to organizational clarity and associated staff capabilities for operations
- Formalization of partnerships between all stakeholders in support of operational strategies and the supporting ITS technologies.

APPENDIX A – ADDITIONAL INFORMATION ON THE CMM DIMENSIONS

This appendix provides additional guidance on the six dimensions for mainstreaming operations into the institutional framework, the associated levels of maturity, examples of locations where a high degree of maturity has already been accomplished, and potential action items for inclusion in the Implementation Plan. These are provided only as an example; they are not meant to be prescriptive or limiting in developing your site-specific Implementation Plan. Moreover, several potential action items will likely benefit multiple dimensions; not just the ones identified herein.

BUSINESS PROCESSES

Business processes include formal planning, scoping, programming and budgeting processes for operations strategies and the enabling technologies, and the on-going operation and maintenance activities. These technical and business processes are an essential capability for establishing a stable and replicable basis for continuous improvement by identifying incremental improvements, determining the needed resources (capital, staffing, etc.), and establishing a standardized approach to implementing operations projects and programs. Use of the appropriate processes for design and implementation of systems will ensure that the needs of the region are appropriately addressed, that systems are implemented in an efficient manner, and interoperability with other systems is achieved.

Maturity Levels for Business Processes

Level	Capability
1 – Performed	Each jurisdiction doing its own thing according to individual priorities and capabilities. Resources are often ad hoc and external for occasional major projects
2 –Managed	Consensus regional approach developed regarding operations goals, deficiencies, benefit / cost, networks, strategies and common priorities. Resource allocation at project level.
3 – integrated	Regional program integrated into jurisdictions’ overall multimodal transportation plans with related staged program. At the agency level, long-term/annual budget commitments made and driven by transparent criteria on lifecycle needs basis.
4 – Optimized	Operations and associated strategies integrated into agencies’ and region’s multi-modal and multi-network plans and programs, based on a formal continuing regional planning process. Operations is a formal, visible, sustainable line item in each agency’s budget

Examples

Several agencies and MPOs are implementing the concepts addressed in the FHWA initiative “Planning for Operations,” which encompasses a variety of activities that lead to improved transportation system operations, including the consideration of operations strategies in the transportation planning process. Examples of MPOs that are using an objectives-driven, performance-based approach to planning for operations within a metropolitan area include the Delaware Valley Regional Planning Commission (DVRPC) and the Metropolitan Planning Organization for the Portland region (“Metro”), just to name a few. Their activities include the inclusion of goals within the Metropolitan Transportation Plan (MTP) that focus on the efficient management and operation of the transportation system; developing regional operations objectives for the MTP; using a systematic process to develop performance measures, analyze transportation performance issues; and selecting operations strategies (e.g., documented in a Master Plan) within fiscal constraints to meet operations objectives.

Common Strengths and Weaknesses

As is often the case, one agency’s / region’s strengths is another one’s weakness when that particular feature does not exist. The list below is a sample of strengths and (often corresponding) weaknesses as identified during the initial CMM workshops conducted prior to this Implementation Assistance Program.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Overall statewide strategic plan /operations plan / ITS plan in place • Individual agencies’ strategic plans, operations plans exist • Line item budget for operations / operations spending known • Top management / policymaker / decision maker appreciation of operations benefits/justification • Local/regional plans with operations components coordinated/integrated into statewide plan • Major events capitalized upon to elevate visibility and importance of operations 	<ul style="list-style-type: none"> • Lack of overall statewide strategic plan /operations plan / ITS plan • ITS / Operations plan(s) out of date, need updating • No operations budget line item / ITS & operations spending not well known • Policymakers lack full appreciation of benefits, better communications needed for justification • Lack of integration of ITS/operations into strategic plan, STIP, capital plan, congestion management plan, regional or local plans • Lack of local or regional input into plans / planning exercises

Potential Tasks / Action Items

- Convene or utilize an integrated/inclusive working group/planning committee (including representation from local jurisdictions, public safety community, other modes, etc. as appropriate) to undertake planning activities (setting a vision, policies, strategies, work program, etc.) to promote operations
- Based on existing state of play, identify key priorities and develop initial statewide/ district or regional plan(s) for operations infrastructure and real-time operations
- Incorporate operations into local and regional plans, and build/expand on success of corridor level planning
- Develop a multiyear budget (capital, staffing, maintenance) for operations
- Develop and include operations-oriented goals and objectives into the regional transportation plan
- Joint workshops and training for agency operators and planners (e.g., operations academy)
- Implement a system, software, or reporting mechanism that streamlines an existing process
- Identify recommended changes / updates to the region Congestion Management Plan to incorporate operations.
- Develop a process that ensures inclusion and specificity for operations / ITS at all stages of transportation project development
- On-going outreach to decisions makers on the benefits that can accrue from an operations program.

SYSTEMS AND TECHNOLOGY

The systems and technology dimension includes regional and statewide systems architectures, interoperability between systems, standardization and the associated documentation. Use of these and other processes for design and implementation of systems help ensure that the needs of the region are appropriately addressed, that systems are implemented in an efficient manner, and interoperability with other systems is achieved.

Maturity Levels for Systems and Technology

Level	Capability
1 – Performed	Ad hoc approaches to system implementation without consideration of systems engineering and appropriate procurement processes
2 –Managed	Regional Concepts of Operations and architectures developed and documented with costs included; appropriate procurement process employed
3 – integrated	Systems & technology standardized and integrated on a regional basis (including a corridor management focus) with other related processes and training as appropriate
4 – Optimized	Architectures and technology routinely upgraded to improve performance; systems integration/interoperability maintained on continuing basis

Examples

Transcom (in the NYC metro area) and DVRPC (in the Philadelphia area) have long promoted and proactively supported the inter-agency coordination of construction activities and responses to major incidents and other emergencies (such as the 9-11 attacks and, more recently, Hurricane Irene and Superstorm Sandy). Automated information and video sharing between numerous public agencies in the NYC metro area is provided (in real time) via Transcom’s “Open Reach” system; with the same platform also being used by DVRPC to support information and video sharing in the Philadelphia area. Using the same platform means that information can be readily exchange between public agencies throughout the New York and Philadelphia metropolitan areas and beyond as circumstance may dictate.

Common Strengths and Weakness

As is often the case, one agency’s / region’s strengths is another one’s weakness when that particular feature does not exist. The list below is a sample of strengths and (often corresponding) weaknesses as identified during the initial CMM workshops conducted prior to this Implementation Assistance Program.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Current statewide ITS architecture/ConOps in place and coordinated with regional architectures • Projects implemented using systems engineering process on an individual basis / on a statewide basis • Interoperability/standardization among systems in place • Multiagency method/platform for access to data sources / shared data • Supportive / embedded IT staff ease procurement/approvals processes • Flexible/best value procurement processes used 	<ul style="list-style-type: none"> • Statewide ITS architecture/ConOps out of date • Systems engineering process not applied to all projects • Interoperability challenges among regions/jurisdictions/modes (e.g., standards, communications, operational protocols) • Lack of data sharing (state-regions-local) / data sharing not formalized / dependent on champions • IT department approvals process challenges / insufficient IT resources • ITS implementation typically added on to capital projects leading to ITS infrastructure fragmentation / are first to be cut / lack shared understanding

Potential Tasks / Action Items

- Developing standard project scoping, implementation and design procedures based on the principles of systems engineering
- Developing an asset management system for ITS components
- Update the statewide / regional ITS architectures to accommodate enhanced regional collaboration in support of operations; also use such a platform to identify issues/solutions at integrated corridor level
- Review national best practices and/or conduct a peer exchange on technologies/software/protocols/procurement processes as appropriate
- Establish/formalize a data-sharing platform and protocols
- Engage and build relationships with IT personnel on the purpose and benefit of operations projects; identify strategies for better communication

PERFORMANCE MEASURES

Performance Measures are indicators that provide the basis for evaluating the transportation system operating conditions and identifying the location and severity of congestion and other problems. Performance measures provide the basis for evaluating the transportation system operating conditions and identifying the location and severity of congestion and other problems. Performance measurement is essential as the means of determining program effectiveness, determining how changes are affecting performance, and guiding decision-making. In addition, operations performance measures demonstrate the extent of transportation problems and can be used to “make the business case” for operations within an agency / region and to decision-makers and the traveling public, as well as to demonstrate to them what is being accomplished with public funds on the transportation system. Performance measures are often categorized as follows:

- *Input measures* look at the resources dedicated to a program;
- *Output measures* look at the products produced;
- *Outcome measures* look at the impact of the products on the goals and objectives of the agency / region.

Operations primarily rely on outcome measures, focusing on the degree of improvement rather than the just the direction of improvement. The method that governs this outcome-based approach for investment decisions can be characterized by the following acronym: S.M.A.R.T. – Specific, Measurable, Agreed, Realistic, Time-Bound.

Maturity Levels for Performance

Level	Capability
1 – Performed	Some outputs measured and reported by some jurisdictions
2 –Managed	Output data used directly for after-action debriefings and improvements; data easily available and dashboarded
3 – integrated	Outcome measures identified (networks, modes, impacts) and routinely utilized for objective-based program improvements
4 – Optimized	Performance measures reported internally for utilization and externally for accountability and program justification

Examples

Washington DOT (WSDOT) has made a strong and transparent commitment to performance measurement as evidenced by the quarterly Gray Notebook, which tracks performance based on five legislative goals for WSDOT, including mobility/congestion, and includes regular updates on progress in applying operations strategies such as incident management and HOT lanes. Other states that show operations activity data on external dashboards include VA, GA, MN, WI, MO, and OR. Additionally, some states (NH, MI) use performance measurement on specific major projects such as corridor improvements.

MAP-21 addresses operations-oriented performance measures. Per the legislation, goals are to be established for Safety, Infrastructure Condition, Congestion Reduction, System Reliability, Freight Movement and Economic Vitality, Environmental Sustainability, Reduced Project Delivery Delays. USDOT is developing performance measures with States, MPOs, transit agencies and stakeholders, with FHWA promulgating a rulemaking establishing performance measures and standards by April 1, 2014.

Another example is the SHRP2 program itself and the emphasis on “reliability” and associated measures

Common Strengths and Weakness

As is often the case, one agency’s / region’s strengths is another one’s weakness when that particular feature does not exist. The list below is a sample of strengths and (often corresponding) weaknesses as identified during the initial CMM workshops conducted prior to this Implementation Assistance Program.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Performance measures in place (output and ideally outcome); reported regularly to public, /upper management / policymakers • Collaborative forum/program/working group permits rationalization of performance measurement approach and data sharing • Performance measures used in analysis and evaluation of several operations programs (incident management, arterial signals), and used to improve service • Third party data available / use planned 	<ul style="list-style-type: none"> • Performance measures, data collection, utilization implemented only on ad hoc or project basis / no comprehensive program • Non-existent/inadequate external performance reporting/dashboard ; no customer-focused performance measures • Challenge of finding common performance measures across multiple jurisdictions; performance measures not applied evenly across multiple regions/jurisdictions/modes • Weak/no linkage between what’s measured and what actions are taken; no incentive/disincentive process for meeting performance goals

Potential / Tasks Action Items

- As a starting point, review and capitalize upon MAP-21 performance measure requirements and/or review peer state best practice regarding performance measures and their application
- Develop goals and objectives for both output and outcome measures to be used to support internal (corporate) management activities, making the business case for operations (to leadership/decision makers as well as the public), and customer service (public) functions
- Review existing/identify applicable performance measures by audience, mode, and system-wide (i.e., mode-neutral performance measures)
- Review existing/identify performance measure data sources (including 3rd party), identifying gaps and needs
- Establish common terminology, definitions, measures, and analytics
- Develop and implement an operations – oriented performance management plan, including specific outcome measures, metrics, data collection procedures, and presentation of the results (e.g., dashboards).

CULTURE

Culture is the combination of values, assumptions, knowledge and expectations of the agency in the context of its institutional and operating context, and expressed in its accepted mission and related activities. It also includes recognition, understanding, and commitment to operations by senior leadership within the agency. Outreach to the traveling public (i.e., the agency’s “customers”) is another aspect.

Maturity Levels for Culture

Level	Capability
1 – Performed	Individual Staff champions promote operations– varying among jurisdictions
2 –Managed	Jurisdictions’ senior management understands operations business case and educates decision makers/public
3 – integrated	Jurisdictions’ mission identifies operations and benefits with formal program and achieves wide public visibility/understanding
4 – Optimized	Customer mobility service commitment accountability accepted as formal, top level core program of all jurisdictions

Examples

Operations has rarely achieved formal core program status at the same level as the legacy programs. Nevertheless, many DOTs have obtained the needed legislative authorities related to incident management (Move it, Quick Clearance).

MPOs in several states (AZ, CA, NJ, NY, PA, OR) include operations in their planning activities and programs – for example, DVRPC in the Philadelphia area has taken the lead in developing a Transportation Operations Master Plan, updating the Regional ITS Architecture, and establishing a Transportation Operations Task Force; the latter serving as the focal point for regional operations and ITS coordination, and responding to federal initiatives.

Common Strengths and Weakness

As is often the case, one agency’s / region’s strengths is another one’s weakness when that particular feature does not exist. The list below is a sample of strengths and (often corresponding) weaknesses as identified during the initial CMM workshops conducted prior to this Implementation Assistance Program.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Strong top management/legislative/governor support for operations strategies and program • Widespread agency understanding of operations strategies and program (e.g. among design, maintenance staff) • Agency has customer service orientation internally (e.g. work zones) / externally (e.g. traveler information) • Agency has good reputation/customer service feedback 	<ul style="list-style-type: none"> • Lack of understanding/appreciation from legislature/governor for operations strategies/program • Lack of understanding/appreciation for operations strategies and program within agency / among regional and local partners • Lack of publicity/outreach promoting operations benefits / agency actions • Focus on capital project delivery and outcomes; capital projects dominate agency public outreach/publications/website

Potential Action Items

- Develop both internal and external visions or “stories” of operations benefits, leveraging past successes (specific strategy applications, projects, major events) and/or national best practice and research findings
- Develop a strategy for conducting internal and external operations outreach by identifying and evaluating media outlets and dissemination opportunities including marketing, branding, and terminology
- Update the agency’s mission statement, website, etc. to include operations and ITS as a core activity
- Develop agency brochure on operations
- Conduct workshops for senior management to facilitate their understanding operations and promote their on-going support
- Introduce operations into DOT/MPO policy, planning, programming and budgeting as a focus
- Capitalize on existing collaborative forums to promote operations and make a recurring agenda item

ORGANIZATION / STAFFING

Efficient execution of processes supporting effective operations programs requires appropriate combination of coordinated organizational functions and structure, and technical qualified staff with clear management authority and accountability. Workforce capability development is a related consideration.

Maturity Levels for Organization / Staffing

Level	Capability
1 – Performed	Operations added on to units within existing structure and staffing -- dependent on technical champions
2 –Managed	Operations-specific organizational concept developed within/among jurisdictions with core capacity needs identified, collaboration takes place
3 – integrated	Operations Managers have direct report to top management; Job specs, certification and training for core positions
4 – Optimized	Operations senior managers at equivalent level with other jurisdiction services and staff professionalized

Examples

Several state DOTs have been consolidating previously fragmented responsibilities at both the statewide and regional levels and creating new operations divisions with direct report to the chief operating officer (including TN, NJ, NC, NV, NH, WI, MI). In Maryland, operations has a formal program status by way of a standalone division; whereas Washington has aggressively managed the integration of operations into other activities.

Decentralization is the rule in the larger states (such as VA, CA, TX, NY, PA). Districts often have their own TMCs, where the coordination and focus takes place, often together with collocated partners. Several of these states (e.g., PA, NY) are developing and implementing a single state-wide traffic management software package for all TMCs, thereby promoting consistency in operations and TMC staffing requirements.

Common Strengths and Weakness

As is often the case, one agency's / region's strengths is another one's weakness when that particular feature does not exist. The list below is a sample of strengths and (often corresponding) weaknesses as identified during the initial CMM workshops conducted prior to this Implementation Assistance Program.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Operations manager at high level in org chart / reports to commissioner/secretary • High-level decision-making body / board / collaborative group related to operations program • Extensive cross-communication among staff / many opportunities for contact and collaboration • Operations staffing needs being met / planned for / acknowledged • Operations job specs in place / being created • Succession plans in place / being created • Core training in place / being developed • Experienced and knowledgeable staff / strong institutional knowledge/capabilities • Staff sharing / rotation applied internally / externally among partners • Outsourcing used appropriately / in-house capabilities vs. outsourcing balanced 	<ul style="list-style-type: none"> • Operations manager many levels down the org chart • Fragmentation of operation activities / responsibilities / capabilities among agency staff/divisions • Operations program dependent on staff champions / personal relationships • Insufficient staff / staff have multiple responsibilities • No formal operations position descriptions / operations KSAs do not match standard state titles • No succession plans • Limited/no formal training / training programs outdated/need improvement • No clear career paths for TSM&O / inability to promote due to legacy organization/specs/hiring practices • Outsourcing opportunities limited (unions, regulations, etc.)

Potential Tasks / Action Items

- Evaluate organizational structure (HQ, divisions, key partner relationships) with respect to operations capabilities/program and create an inventory of existing/needed skills
- Develop / update steps in an operational process through a procedural manual (and making the process available to others)
- Evaluate job description credentials/experience requirements for current applicability and develop new / update existing position descriptions that satisfy needed operations core capabilities (potentially using national best practice)
- Develop strategies and requirements for acquiring skills through appropriate means/sources (reassign, hire, outsource), supported by appropriate cost-benefit analysis or justification of staffing levels/paths
- Support the business case for increased staffing by indicating benefits and payoffs; illustrate the consequences of staffing shortfalls
- Develop training and certification requirements for operations staff, and implement the training / certification process, such as the Operations Academy.
- Develop and document a career path for operations staff
- Develop succession plans for key staff and individuals

COLLABORATION

Being a cross-cutting activity, the development and implementation of operations requires a collaborative approach. The effectiveness of most operational strategies is dependent on improving the coordinated performance of each partner. Collaboration requires partnerships between different departments within a transportation agency, and among multiple agencies, levels of government and with public safety agencies and the private sector.

Maturity Levels for Collaboration

Level	Capability
1 – Performed	Relationships ad hoc, and on personal basis (public-public, public-private)
2 –Managed	Objectives, strategies and performance measures aligned among organized key players (transportation and public safety agencies) with after-action debriefing
3 – integrated	Rationalization/ sharing/ formalization of responsibilities among key players thru co-training, formal agreements and incentives
4 – Optimized	High level of operations coordination among owner/operators (state, local, private)

Examples

Significant levels of collaboration exist throughout the US in the areas of incident management and special event management; with effective MOUs between DOTs and law enforcement, and active incident management and special event task forces (incorporating de-briefing sessions) that include multiple transportation agencies along with law enforcement, fire and rescue, etc. Incident Management training, itself, has often played a key role in bringing law enforcement, fire and emergency services together with DOTs. TMC collocation (e.g., statewide TMC in NJ) has also led to stronger collaboration.

Recent FHWA initiatives – such as the Urban Partnership Agreements in Minnesota and Washington, and the Integrated Corridor Management model deployments in Dallas, TX and San Diego, CA – have required significant levels of collaboration.

Common Strengths and Weakness

As is often the case, one agency's / region's strengths is another one's weakness when that particular feature does not exist. The list below is a sample of strengths and (often corresponding) weaknesses as identified during the initial CMM workshops conducted prior to this Implementation Assistance Program.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Formalized, good relationships with state police / protocols/MOU in place • Good working relationships / sharing of resources, data, experiences (e.g., TMC collocation, collaborative forum / committee, specific travel corridor focus, recurring major event) • Multiagency incident management teams utilized / meet regularly / conduct after-action debriefs / conduct training • Inter-jurisdictional agreements and protocols in place regarding signals • Multistate collaboration / data sharing • Incentive/disincentive towing and recovery program in place • Good relationship with local/state educational institution 	<ul style="list-style-type: none"> • No formal agreements / out-of-date agreements with state police / fire departments / local police / other emergency service providers • Challenge of many local jurisdictions/entities; lack of collaborative participation from non-DOT service providers (e.g. transit) with data/technology sharing • Informal/ad hoc operations / incident management meetings • Signal timing collaboration needed between DOT and locals / among locals in a region • Multiple layers of bureaucracy for data sharing / formal agreements required • Lack of incentive/disincentive program for towing and recovery / rotation towing used

Potential Tasks / Action Items

- Formulate new, review, or renew existing partnership agreements and agree on their specificity and application
- Formalize an inter-jurisdictional collaboration forum, committee, or program
- Develop / update MOUs between stakeholders for one or more operations-related activities (e.g., incident management, work zone management, traveler information, special event management).
- Develop local jurisdiction and law enforcement notification protocols for incidents, operational changes, etc.
- Develop a Regional Concept of Operations, with sign off an commitment by all regional stakeholders
- Promote and provide joint training on specific operations activities