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# **GUIDANCE FOR PROCURING, MANAGING, AND EVALUATING THE PERFORMANCE OF CONTRACTED TMC SERVICES**

## **DRAFT REPORT**



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# **Guidelines for Procuring, Managing, and Evaluating the Performance of Contracted TMC Services**

## **Executive Summary**

Transportation Management Centers (TMCs) are the hub where transportation operating agencies operate, manage, and maintain the transportation system. These centers use a combination of technologies, systems, and staff to perform their daily operation. The staffs of operating agencies are a precious resource. Many operating agencies are looking at operating strategies that will allow them to maintain or increase functionality with use of less staffing resources. One of these strategies is outsourcing or contracting for the staff services needed in a transportation management center.

This report provides guidelines for procuring, managing and evaluating the performance of contract TMC services. The purpose of this project was to develop a technical document that provides guidance and recommended practice to managers, planners, and operators of transportation management centers (TMCs) in making decisions related to outsourcing portions, or the entirety, of their operation to private contractors. Types of outsourcing examined include TMC operations staff, IT / networking support, maintenance of field devices, and service patrols.

**Executive Summary will be finalized after the draft report has been reviewed**

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## Chapter 1 – Introduction

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### Background

Transportation Management Centers (TMCs) are the hub where transportation operating agencies operate, manage, and maintain the transportation system. These centers use a combination of technologies, systems, and staff to perform their daily operations. The staffs of operating agencies are a precious resource, and many operating agencies are looking at operating strategies that will allow them to maintain or increase functionality with use of less staffing resources. One of these strategies is outsourcing or contracting for the staff services needed in a transportation management center.

### What is Outsourcing?

Outsourcing is a common tool used in business to reduce cost, increase productivity, improve the delivery of goods and services, and provide a more agile business readiness to changing market needs and opportunities. In business, outsourcing involves subcontracting a process, such as the design or manufacturing of a product to a third-party. (1)

Outsourcing can also include transferring the management and/or day-to-day execution of an entire business function to an external service provider. The client organization and the supplier generally enter into a contractual agreement that defines the transferred services. Under the agreement, the supplier acquires the means of producing a product (which may include the personnel, the equipment, the raw materials, and/or the technology) or performing a service. The client agrees to procure services from the supplier for the terms specified in the contract.

Notable functions outsourced by many companies include customer support and call center functions (like telemarketing), computer drafting, market research, parts manufacturing, design, and web development. Additionally, other functions commonly outsourced by businesses include information technology, human resources, facilities, real estate management, and accounting.

In the transportation industry, outsourcing can be defined as “contracting with either private or public sector vendors and service suppliers to obtain services that have traditionally been, or would otherwise be, performed by staff of the state or local transportation agency.”(2) The primary difference between outsourcing and other forms of securing services or accomplishing tasks is that the public agency retains ultimate responsibility for the quality, reliability, and cost-effectiveness of the services or activities provided, even though the contractor entity (i.e., a contractor) is responsible for performing the work activities.(2)

Outsourcing should not be confused with public-private partnership arrangements. With public-private partnerships, the private firm generally takes effective ownership of a facility and assumes control over it, usually for an extended period of time. (3) Public-private partnerships are often characterized by the sharing of risks, benefits, and financial responsibilities between a public agencies and a private entity. The term *privatization* is commonly used to describe public-private partnerships.(2) Generally, this type of arrangement is used with infrastructure-related projects (e.g., the construction and operation of a toll road), although public-private partnership arrangements have been used in constructing intelligent transportation system (ITS) communications networks.

One key to developing a successful outsourcing program is the use of performance-based contracts. With a performance-based contract, an agency expresses its needs for services and/or desired outcomes in terms of performance objectives rather than explaining how it wants the contractor to perform the work. Performance-based contracts include measurable performance standards such as response time or customer satisfaction measurements and may include monetary and/or non-monetary incentives to venders. The use of performance-based contracts will be covered in greater detail in Chapter 2 of this manual.

## TMC Services

Some of the more commonly outsourced TMC functions or services are shown in Table 1. Note that Table 1 is intended to provide a sampling of commonly outsourced TMC functions and services and is not intended to be all-inclusive. Many TMCs identify their own specific lists of functions and services to be supported through outsourcing.

**Table 1. Commonly Outsourced TMC Functions and Services**

Function	Specific Activities
<p><b>Daily Traffic Operations and Management</b></p>	<ul style="list-style-type: none"> <li>● Monitoring video and traffic surveillance systems to identify sources of recurring and non-recurring traffic congestion (incidents) on a part-time or full-time basis.</li> <li>● Adjusting traffic control device operations (ramp meters, lane control signals, etc.) to correspond with prevailing traffic conditions and in accordance to the standard operating procedures defined by the agency.</li> <li>● Posting of emergency (e.g., Amber Alerts), incident, and other transportation-related information on dynamic message signs, highway advisory radios, agency websites, etc.</li> <li>● Notifying emergency service and response personnel responsible for responding to and clearing traffic incidents and emergency.</li> <li>● Developing, maintaining, and updating standard operating procedures and operations documents</li> <li>● Providing classroom and on-the-job training for new operators, supervisors, and agency personnel.</li> <li>● Developing routine and special reports documenting the operations, responses, and performance of the TMC.</li> </ul>

Function	Specific Activities
<b>Hardware and Software Support/Upgrades</b>	<ul style="list-style-type: none"> <li>• Performing upgrades, revisions, and custom enhancements to management and support software systems.</li> <li>• Developing, evaluating, and/or executing software development and testing plans and schedules.</li> <li>• Developing and maintaining system operations manuals and documentation.</li> <li>• Developing, populating, and maintaining various device, response, and administrative databases.</li> <li>• Providing system administration support for computer hardware and software systems including adding and deleting users, modifying user privileges, performing system backups, restoring system software after failures, etc.</li> <li>• Providing configuration management support for agency hardware and software systems.</li> </ul>
<b>Roadside Component/Device Maintenance and Repairs</b>	<ul style="list-style-type: none"> <li>• Developing an inventory of spares and managing the procuring of services and equipment in accordance with agency procurement practices and requirements.</li> <li>• Developing and coordinating the integration of new and developing technologies and components with existing and legacy equipment.</li> <li>• Developing specifications and standards for procuring new and/or replacement components.</li> <li>• Performing acceptance and conformance testing for new and/or replacement components.</li> <li>• Reporting, and/or diagnosing failed or malfunctioning field component and devices.</li> <li>• Executing emergency and/or responsive repairs and/or replacement of equipment that has unexpectedly failed or become damaged</li> <li>• Developing and/or performing preventative (or routine) maintenance at regularly scheduled intervals to ensure upkeep and continued operations.</li> <li>• Performing record-keeping tasks and developing equipment failure and repair logs.</li> </ul>
<b>Telecommunications Installation/Upgrade and Maintenance Support</b>	<ul style="list-style-type: none"> <li>• Providing technical guidance for communication planning, analysis, evaluation, and implementation.</li> <li>• Investigating and documenting current and proposed communications configurations of agency systems as well as conducting wireless and wireline site surveys.</li> <li>• Developing communication system architectures, including wide-area networking (WAN) and/or local-area networking (LAN) systems and technologies.</li> <li>• Developing and conducting acceptance testing to ensure device conformance to agency standards.</li> <li>• Evaluating and recommending products, services, and technologies to agency specifications.</li> <li>• Diagnosing communications failures and executing repairs and replacement of wireline and wireless communications systems.</li> <li>• Assisting in obtaining FCC licenses and other communications licenses.</li> </ul>
<b>Traveler Information/511 Operations</b>	<ul style="list-style-type: none"> <li>• Coordinating and disseminating roadways conditions and weather impacts on transportation services.</li> <li>• Responding to requests to the traveling public for information about road conditions, travel options, and transportation services.</li> <li>• Responding to requests and inquiries from the media.</li> </ul>

Function	Specific Activities
<b>Motorist Assistance/Service Patrol/Highway Helper Operations</b>	<ul style="list-style-type: none"> <li>• Providing dispatching of services and agency maintenance and motorist assistance personnel.</li> <li>• Coordinating and deploying agency resources in assets in response to incident and emergency conditions.</li> <li>• Procuring vehicles and equipment to support motorist assistance programs.</li> <li>• Providing staffing and training for service patrol/highway helpers.</li> </ul>
<b>Engineering Services</b>	<ul style="list-style-type: none"> <li>• Reviewing, commenting, and advising on design plans, specifications, and products for field and center devices.</li> <li>• Preparing, reviewing, and commenting on design and construction bid documents.</li> <li>• Assisting in the preparation of RFPs and RFIs for system development and expansion.</li> <li>• Evaluating contractor performance and on-site inspections of transportation management and communications devices and components.</li> <li>• Assisting in the development of policies and institutional agreements in support of agency operational goals and objectives</li> <li>• Developing response plans and procedures for managing traffic during incidents, weather emergencies, man-made disasters, etc.</li> </ul>

## Outsourcing Models

A number of approaches or models have been used for outsourcing TMC services or functions, including the following types.

### Complete Outsourcing

Complete outsourcing occurs when responsibility for performing an entire function or service is transferred to another group, agency, or private contractor. Under this model, the contractor is responsible for hiring, firing, and training operations personnel; making and executing command and control decision on traffic management devices; deploying agency resources; etc. In this structure the agency retains administrative and oversight responsibilities, but gives up supervision and control of the day-to-day operations of traffic management functions. This model for outsourcing is most appropriate when responsibility for performing a service or function can be easily segregated or isolated from other TMC functions (e.g., isolated 511 services from transportation management functions). This approach is often used to meet special legislative mandates, legal requirements, or policy initiatives, or to satisfy a particular requirement where a combination of workload and staff size prevents in-house staff from meeting the prescribed delivery schedule. This approach can also be used to perform tasks that are highly complex or require a high degree of specialization such as designing and implementing communications architecture.

### Partial or Blended Outsourcing

In partial or blended outsourcing, both in-house and outsource personnel share the responsibility of performing a function or service. This type of model is often used in TMC to augment existing in-house personnel because of limitation on adding new staff. This type of outsourcing is also used when new or innovative technologies and functions need to be integrated with existing and legacy systems.

### On-Call Operations

On-call operations mean that the contractor performs specific functions or services on an “as-needed” basis. This could be anything from short-term temporary tasks to emergency repairs to specialized training. This outsourcing approach is particularly well-suited to services or functions that require highly skilled personnel or equipment that traditionally may not reside in a transportation agency (e.g., repairs to fiber optic cable). This approach has also been used to perform services and functions that are temporary or periodic in nature. Some TMCs have used this approach to augment in-house staff during emergency or special situations.

Table 2 shows which outsourcing models have traditionally been used to perform different TMC functions and services.

**Table 2. Mapping of TMC Services and Functions to Outsourcing Models**

TMC Function or Service	Outsourcing Options		
	Complete	Partial	On-Call
Daily Traffic Operations and Management	✓	✓	-
Hardware and Software Support/Upgrades	✓	-	✓
Roadside Component/Device Maintenance and Repairs	-	✓	✓
Telecommunications Installation/Upgrade and Maintenance Support	✓	✓	✓
Traveler Information/511 Operations	✓	✓	-
Engineering Services	✓	✓	✓

## **Reasons for Outsourcing TMC Services**

Numerous reasons exist as to why a public agency may wish to outsource TMC operations, including the following circumstances.

### **Lack of In-House Staff**

According to a recent General Accounting Office (GAO) survey (3), the foremost reason most states use contracted services is the lack of adequate in-house staff resources to deliver their programs in a timely manner. In many areas, agencies find it difficult to increase staffing levels as coverage areas and new functionality are added to their TMCs. Using contracted staff allows an agency to expand the size of its workforce without necessarily having to add full-time personnel to staff.

### **Maintain Flexibility or Manage Variations in Department Workloads**

Outsourcing also allows shift personnel and resources to meet varying workload demands. As workload demands ebb and flow, many agencies find it easier, quicker, and more cost-effective to hire contract services than to add staff – especially when the tasks are temporary or have to be accomplished in a relatively short time frame.

### **Access Specialized Skills or Equipment**

Another common reason for outsourcing is to access specialized skills or equipment not readily available to a public agency. As computer and communications technologies continue to evolve, the complexity of the technologies and systems in the both the field and in the TMC are increasing. Furthermore, the need to integrate more complex and diverse systems make outsourcing an attractive option for expanding functionality in TMCs.

### **Increase Speed of Completion or Meet Specific Timeframes**

Sometimes special situations occur that require agencies to outsource unique functions or activities. Natural catastrophes such as floods, hurricanes, or winter storms may create a need to immediately mobilize forces and resources to execute repairs. In other cases, an upcoming major special event (e.g., political convention, summit, or sporting event) may force an agency to accelerate its time schedule for deploying field equipment or adding new functionality to a TMC. In these situations, outsourcing is one mechanism agencies have used to increase the speed at which new services and functionality can be added to their TMCs.

### **Meet Federal or State Legislative Mandates, Legal Requirements, or Policy Initiatives**

In some situations, agencies are motivated to pursue outsourcing as a result of either federal or state legislative mandates or through internal agency policy initiatives and directives. While day-to-day operations of TMCs by contracted services has never been mandated, traveler information dissemination services are becoming more privatized as additional private traffic reporting agencies begin to provide real-time information.

### **Obtain Cost Savings**

According to a recent GAO survey, cost savings is rarely cited by agencies as a major contributor in deciding whether to contract out services. In fact, the majority of the states surveyed listed cost savings as “of little importance” or “of no importance” in their decisions to contract out ongoing operations activities (note: ongoing operations include activities such as intelligent transportation systems management, toll collection, and signal and sign systems).

### **Disadvantages to Outsourcing**

The following are some of the perceived and potential disadvantages to outsourcing TMC services.

#### **Lack of Available Qualified Contract Forces**

If TMC service contracting is new to a geographic region, service contracts may need to allow for graduated start-up schedules that might not match agency needs. In addition, an agency may have experienced poor contractor performance for some of the outsourced activities (such as late-night callouts).

#### **Lack of Adequate In-House Staff To Oversee Contractor Staff**

Outsourcing does not relieve agency staff from their responsibilities to actively manage the contractor’s work. In today’s constrained fiscal environments many public agencies have assigned substantial workloads to existing staff. These workloads may make the management/oversight functions challenging.

#### **Potential Loss of In-House Expertise**

Some agencies cite that outsourcing can create a void of experienced in-house staff to assist with related operations or during special events. Assigning staff functions to an external agency can lead to a diminished career path for agency staff, and the salaries offered by the contractor may entice personnel away from the agency.

## **Cost**

Some agencies believe that the costs provided by a private firm exceed the costs for the public sector to provide equivalent services. In addition to the cost of services, the public agency has to account for the costs of administering and monitoring contracts.

## **Union and Other Labor Considerations**

Some union or labor rules may preclude the ability to outsource certain positions in a TMC.

## **Limits Innovation**

At least one research study suggests that outsourcing limits innovation.

## **Public Perception**

Public perception of outsourcing is not always favorable. Many individuals believe that outsourcing is synonymous with staff reductions or “reduction in force” efforts (i.e., taking a job from a state employee and giving it to private contractor). From a business perspective, the public often confuses “outsourcing” with “offshoring.” *Offshoring* is the process of transferring organizational functions to another country, regardless of whether the work is outsourced or stays within the same organization. (1)



## Chapter 2 – Procuring Contracted TMC Services

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### Chapter Overview

The purpose of this chapter is to provide guidance to an agency considering outsourcing current and planned TMC operations and maintenance services to private contractors. Based on an agency's self-assessment of its goals and desired outcomes in correlation with TMC services, guidance in this chapter provides considerations on procurement options relevant to outsourcing these activities. This self-assessment must be used to identify candidates for outsourcing for both current service areas that may not be performing optimally and future service areas that will be put into place as TMC functions grow and mature. After identifying which services are applicable for outsourcing, agencies must identify TMC business model structures that facilitate their ability to deliver the desired TMC functions.

This chapter will describe a variety of procurement methods and contractual models, including applicability of performance measures, incentives, and disincentives. Because of the potential impacts of a public-to-private transition, there will also be a discussion of staffing, insurance, and indemnification issues. In making public agency actions and decisions, administrators must be cognizant of political and institutional influences that can influence outsourcing of TMC services, so these concepts are discussed as well. The last section of this chapter provides strategies and evaluation criteria for contractor selection when outsourcing TMC services.

Procurement is the first step after making the decision to outsource TMC operations and maintenance services. After the services have been put into in place, they must be both managed and evaluated to determine their effectiveness in achieving agency goals and objectives. These concepts are discussed in the following chapters. The last two chapters synthesize previously discussed information with lessons learned and recommendations as well as a discussion of case studies that follow procurement models described in this chapter.

Because it is implemented for a variety of reasons, the decision to outsource TMC services must often be made several years in advance of an anticipated contract start in order to conform to agency fiscal planning requirements and procurement timeframes. Outsourcing is a major decision that should be undertaken only when appropriate research has shown that it is the best means to satisfy the agency's goals and objectives with regard to TMC operations and maintenance services. If the procurement process is not set up appropriately, the management and evaluation of the contracted TMC services may be considerably more difficult.

This research, which will be discussed in the following sections, can be broken down into detailed analyses of:

- Operations research to define goals, desired return on investment, and operational capabilities;

- Self-evaluation research to identify areas that are not meeting their best capabilities and could benefit from external experience; and
- Procurement research to identify which procurement method(s) may provide the services needed to achieve overall goals and objectives.

This research can then be used to develop a decision matrix to compare service models to determine which alternative best meets outsourcing objectives. This comparative analysis is critical because key operational functions are outsourced that transfer complex operational functions and significant decision-making authority to the private sector.

## **TMC Services Assessment**

This section will discuss the use of self-assessment tools within transportation operations. Self-assessments are used to evaluate whether an agency is achieving its desired outcomes for a specific set of circumstances relative to stated goals and objectives. There are usually broad goals and objectives defined for the organization as a whole that speak to the agency's overall vision and mission. These goals and objectives are then drilled down to the appropriate level and become quite specific in terms of defining the expectations of a particular office or unit within the organization.

For a meaningful TMC service assessment, the agency must evaluate how the services provided (either currently or in the future) correlate with the agency's broader goals and objectives. This exercise will allow the agency to identify TMC core functions that must be kept within the agency and functions that may be accomplished by other means such as outsourcing. Transportation departments are often concerned with high-level concepts such as safety, mobility, commerce (freight movement), and environmental preservation ("green" issues). These concepts are then defined more narrowly to map to the goals and objectives of a particular office or subunit of the organization. For example, specific TMC goals that can be mapped to an agency's more general strategic goals could be:

- Decrease incident response times by a defined number of minutes and reduce secondary crashes by predetermined percentage goal (safety);
- Clear incidents within a defined number of minutes and restore normal roadway operations within a defined number of minutes (mobility);
- Decrease costs for fuel, goods, and services (commerce); or
- Decrease vehicular emissions and improve air quality (environmental preservation).

The first two areas, safety and mobility, offer both the most typically available data as well as the clearest correlation to TMC services.

A drill-down into how these goals are being met will identify TMC operational capabilities and defined actual versus desired returns on investment. This work forms the foundation of the details that describe how TMC functions will be carried out.

For example, an important component of incident response is time availability. Most transportation agency personnel typically work during weekday office hours. Some operations personnel may be available with on-call status for nights, weekends, holidays, and special events such as emergencies, but this is more the exception than the rule. Most agency staff work Monday through Friday only. Incidents, however, occur at all times, regardless of staff availability. Transportation agencies have an opportunity to consider whether to model themselves after emergency responders, who are available at all times and have related operations, or to follow a reduced services model using some type of hybrid staff approach if non-office-hour response capability is desired. This hybrid could involve designation of off-hour personnel or transfer of response services to another incident response agency. The transportation agency should begin with an evaluation of 24-hour operations to define personnel and resource needs for optimal TMC service coverage. Then, based on how the agency wishes to meet its incident response goals, it can identify solutions to supplement its systems and staff in whatever response availability scenario is selected. Numbers and skill levels of personnel as well as supporting resources and equipment can be determined for numerous combinations of work week, holidays, weekends, nights, and special events. These data can then be compared with available staff, equipment, and other resources, and the difference can be evaluated with solutions such as outsourcing for how to address the shortfalls.

Provision of TMC services requires a major financial commitment, whether the operations are outsourced or run in-house, because the personnel and infrastructure deployment, operations, and maintenance costs must be considered essentially in perpetuity. The agency must therefore consider its performance expectations, or what return on investment (ROI) it desires. A public agency does not typically consider profit, so its ROI can compare the dollars invested in TMC services compared with the benefits of the services provided. One level of achievement is possible within existing conditions; anything to supplement the baseline services must be justified, funded, and implemented in order to reach a greater ROI. Again, the agency must look to its general and specific goals to determine whether it can go beyond baseline TMC services and then make the determination of whether to do so with its own or outsourced resources.

Finally, within the context of TMC service assessment, any consideration for outsourced personnel or resources must be made in a way to supplement rather than duplicate existing conditions. Agencies typically outsource more in the operations area, particularly in ITS. ITS and its associated functions in the TMC require specialized skill sets that may not readily be found in-house to the degree needed. Outsourcing can then provide a flexible means to obtain these specialty skills and build upon existing core transportation operations functions and assets.

## **Evaluation of Current TMC Services**

This section discusses methodologies for agencies to evaluate their current and future TMC services, particularly if TMC services are not performing to expected capability. Reasons for underperformance may be internal (i.e., staffing, training, etc.) or external (i.e., funding, policy changes, etc.) to the TMC. This section also discusses how future services (i.e., services that are not in operation yet at the TMC) should be evaluated with respect to decisions regarding outsourcing.

Typical TMC services include:

- Traffic monitoring;
- ITS field device control;
- Maintenance, repair, and troubleshooting;
- Information dissemination;
- Data analysis;
- Personnel management;
- Interaction with the public and media;
- Procedural and equipment upgrade recommendations and implementation;
- Coordination with other incident responders; and
- Coordination with other public entities such as other transportation agencies, law enforcement, and fire-rescue departments.

These services may exist partially or completely, depending on the makeup and maturity of the TMC and its relationship with other incident responders.

This evaluation should be used to compare how components of the operation are performing with their designed capability requirements. It can also support why existing operations function as they do and identify which areas of expertise are lacking that need to be addressed. The evaluation tools may also consider how TMC services may change, grow, or contract over time in response to operational requirements, support of other facilities, special events/emergencies, etc.

Various tools are in place to determine the adequacy and sufficiency of TMC structure and operations. They look at TMC administrative structure, numbers and definitions of staff, skillsets and opportunities for job sharing, work requirements and schedules, and other elements

of TMC services and functions. These tools, collectively described as “work analysis” in *Transportation Management Center Staffing and Scheduling for Day-to-Day Operations* (x), are critical in looking at how TMC services are performed and include:

- Job analysis to define work elements and staff attributes needed to successfully fulfill job duties; these may change depending on conditions at a specified time (peak hours versus middle of the night);
- Workload analysis to determine and optimize employee performance requirements; considers how human factors are impacted by workload and attention requirements within the TMC environment;
- Task allocation for specific work assignments; considers whether a particular employee can successfully perform assigned tasks; and
- Demand analysis to determine scheduling requirements based on anticipated work patterns and historical patterns.

When considering outsourcing, there is usually a sensitivity to cost. However, evaluations of cost-effectiveness of outsourced to in-house activities can be difficult to quantify accurately. Should the agency compare direct costs for labor, equipment, and overhead between the private and public sectors? How should life-cycle costs (which include current and long-term costs) be considered? The private sector allows for staffing flexibility, but public sector positions and their associated costs are generally permanent. Time for project delivery may also be a factor since the private sector can add and remove resources to meet deadlines where the public sector does not usually have this flexibility. Cost is certainly a factor, but there may be no other way to deliver the project services: the benefit of outsourcing is the ability to meet workload and schedule requirements as well as the access to special skills and equipment more readily available in the private sector.

The key to effective and successful outsourcing relies on how clearly the project goals and objectives match up with the procurement type to be used and which contractor is selected. Another important factor is the ability of agency personnel to manage the contracted staff.

There is no set formula for how many employees or resources are needed in a TMC; the number is determined based on judgment of how to most effectively run the TMC facility and provide the desired services. The various functions supported by the TMC and their associated workload have a great influence on staff and resource levels. Factors that can influence TMC staffing and resource requirements include budget, hours of operation, coverage areas, reliability and complexity of field devices, and facility standardization for control equipment (e.g., TMC software) as well as amount and complexity of technologies used, type and stability of communications systems, integrated versus nonintegrated systems, information sharing requirements and other institutional arrangements with other agencies, operational strategies

desired, amount of data collected, response time requirements, existence of response plans, and presence of maintenance support systems. Accommodations must also be made for staff absences, vacations, and turnover as well as provisions for incident/emergency events.

When looking for candidate areas for outsourcing, those TMC services associated with required levels of expertise may include:

- Information technology systems hardware (servers, desktop hardware, projection equipment, switching equipment, network equipment);
- System software support (enterprise software support such as database, firewall, compilers, inter-process communications, etc.);
- System software applications (web applications, user interfaces, libraries, data acquisition applications, etc.);
- Communications systems (call distribution, automated answering systems, desktop hardware, field infrastructure, switches, etc.);
- Field infrastructure (changeable message signs, cameras, detector systems, environmental sensor stations, signal equipment, ramp meters, etc); and
- Operations support (console operators, telephone operators, shift supervisors, emergency responders, etc.).

The availability and presence of desired services must be balanced with the ability to obtain the staffing and resources needed to actually provide the services. Constraints such as timing, funding, availability of skilled staff and resources, and external policy/administrative decisions can impact whether TMC services will be provided in-house or through some contracted mechanism. The projected outcome needs to include a discussion of whether the selected scenario (in-house or contracted services) will successfully meet the TMC's performance requirements in a way that is cost-effective and provides maximum performance.

## **Business Models**

As described in detail in the *TMC Pooled Fund TMC Business Planning and Plans Handbook* (x), the business planning process is an effective management tool, commonly used in the private sector, whose principles have been translated for use in the planning and management of TMCs. Core components include:

- Business concept;
- Set of strategies;

- Value proposition;
- Organization and management structure; and
- Financial plan.

Different business model options are available for a TMC depending on which organizational/functional structure is selected in order to best meet the needs of the agency(ies). The TMC business model is developed around the combination of:

- Geographic coverage (single, multiple, regional, and statewide jurisdictions), which depends on the transportation management needs of the area:
  - Single jurisdiction is typically limited to political boundaries of owning jurisdiction; likely to coordinate with other TMCs but still have a fairly limited focus.
  - Multiple jurisdictions can cover greater areas without consideration of political boundaries; TMCs are typically larger than single jurisdiction TMCs and provide a more coordinated approach to traffic management.
  - Regional jurisdictions encompass facilities outside the metropolitan area to include urban, suburban, and rural facilities, allowing the entire transportation network to be managed in an integrated fashion.
  - Statewide jurisdictions are typically managed by state departments of transportation; may have collection of multiple state agencies; levels of centralized control can include ITS devices in rural facilities and those in areas without their own TMCs.
- Number and types of partner agencies (single and multiple agencies; departments of transportation, public works, and public safety):
  - Single transportation agency control typically limited to a given city or county; multiple transportation agency control when covering a larger geographic or metropolitan area.
  - Multiple agencies share common facilities, jurisdictional area, and incident response goals.
- Operating mechanism (staffing and operations plans):
  - Originally staffed by owning jurisdictions, but as complexity and size increased, specialized disciplines came to be needed that were normally found outside

transportation/traffic engineering departments; organizational models can vary in effectiveness from one region to another.

- Public agency staffed and operated, requires operating agency to have skills in-house as well as budget and training to support these specialized skills; does provide uniform staffing system and maximizes fulfillment of transportation objectives; however, recruitment and retention of staff can be difficult. For the best chance of success, TMC positions need to be created as new positions rather than being carved from existing personnel and operating budget allotments and thereby being forced to compete with existing operations needs.
- Private sector staffed and operated, either entirely or in part with public agency supervision. Allows specification of staff qualifications and places hiring/training burden on the private contractor; monies for contracted staff may be more easily found than monies for operations activities. There are, however, contractual issues to be dealt with as well as administrative oversight and contractor performance measurement.
- Operating versus capital dollar availability for decisions on contracted services must be made when comparing contracted with in-house TMC services. Operating and capital funds come from different sources within agencies and therefore have implications on staff availability and development. These are different sources of funds that can be used to pay for TMC services that may be influenced by a state’s financial position.

Table 3 presents examples of organization models commonly found around the country.

**Table 3 Examples of Organizational Models (taken from Chapter 4 of the TMC Pooled Fund TMC Business Planning and Plans Handbook)(8)**

<i>Traffic Management Center</i>	<i>Geographic Area</i>	<i>Number and Type of Agencies</i>	<i>Operating Mechanism</i>	<i>Unique Attributes</i>
<b>City of Anaheim, Anaheim, CA</b>	Single jurisdiction in large metro area	1 Agency City of Anaheim	Public sector operated	<ul style="list-style-type: none"> <li>● Special events with Disneyland, Anaheim Angels, Ducks etc.</li> <li>● Great working relationship with pvt. sector and event promoters</li> <li>● Adaptive signals</li> <li>● Arterial DMS and CCTV</li> </ul>
<b>City of Tucson, Tucson, AZ</b>	Multiple jurisdictions in metro area	6 Agencies City of Tucson, City of South Tucson, City	Public-Private Partnership	<ul style="list-style-type: none"> <li>● Concessionaire agreement</li> <li>● Single traffic signal</li> </ul>



<b>Traffic Management Center</b>	<b>Geographic Area</b>	<b>Number and Type of Agencies</b>	<b>Operating Mechanism</b>	<b>Unique Attributes</b>
		of Marana, Town of Oro Valley, Pima County, ADOT		<ul style="list-style-type: none"> <li>system and freeway management system operated by city</li> <li>• After hours to ADOT TOC</li> <li>• Arterial CCTV</li> </ul>
<b>INFORM, Long Island, NY</b>	Regional	1 Agency NYS DOT	Contracted operation	<ul style="list-style-type: none"> <li>• Freeway and expressway</li> <li>• Highway “HELP” Vehicle Dispatching</li> </ul>
<b>FAST, Clark County, NV</b>	Regional in metro area	6 Agencies NDOT, Cities of Las Vegas, North Las Vegas, Henderson, Clark County, Highway Patrol	Separate public sector operating entity	<ul style="list-style-type: none"> <li>• Cost sharing between agencies</li> <li>• Freeway and arterial management</li> <li>• Single signal system</li> <li>• Co-located with Nevada Highway Patrol</li> </ul>
<b>Caltrans, District 12, Orange County, CA</b>	Regional in large metro area	2 Agencies Caltrans, CHP	Public sector – DOT	<ul style="list-style-type: none"> <li>• SHOWCASE priority corridor interconnectivity</li> <li>• Freeways only</li> <li>• Regional TMC’s statewide (peer-to-peer)</li> </ul>
<b>Caltrans, District 5, San Luis Obispo, CA</b>	Regional in rural district	2 Agencies Caltrans, CHP	Public sector – DOT	<ul style="list-style-type: none"> <li>• Rural TMC</li> <li>• Regional TMC’s statewide (peer-to-peer)</li> </ul>
<b>ADOT, Phoenix, AZ</b>	Regional and Statewide	1 Agency ADOT	Public sector – DOT	<ul style="list-style-type: none"> <li>• Private sector collocation</li> <li>• Daytime, freeways – regional; after hours – statewide, state routes</li> </ul>
<b>Transtar, Houston, TX</b>	Regional	TXDOT, Houston Metro, Harris Co., , City of Houston,	Public sector – Consortium of all 4 agencies	<ul style="list-style-type: none"> <li>• Transit agency is a partner and key contributor</li> </ul>
<b>MNDOT, Minneapolis, MN</b>	Statewide	2 Agencies MNDOT, MSP	Public sector – DOT	<ul style="list-style-type: none"> <li>• Freeway management, State Police, and Arterial management co-located</li> </ul>

## Procurement Strategies

Once the decision to outsource TMC services has been made, there are various strategies available by which to procure the contractor. These include request for qualifications (RFQ), request for information (RFI), invitation to negotiate (ITN), invitation to bid (ITB), and request for proposals (RFP). These strategies are not necessarily exclusive; that is, they may sometimes be used in combination to initially begin and then narrow the focus of the contractor selection process. Some of the considerations that need to be addressed when selecting the procurement method include time of contract, included services, relationships to other contracts that support TMC, flexibility of contract to add new services once in place, and costs over time.

Qualifications-based selection (QBS), established by Congress in 1972 as part of the Brooks Act, is a process that federal agencies can use for the selection of architectural and engineering services for public projects. This competitive contract procurement process allows the procuring entity (“Owner”) to evaluate and select the most qualified firm and then negotiate project work, schedule, budget, and fee. QBS has been adopted by most states and by many state, county, and municipal government agencies. QBS is appropriate for TMC outsourcing procurements because of the technical expertise, innovation, and technologies required to solve TMC challenges.

One advertisement type in the QBS process is a RFQ, usually followed by some type of final technical submittal or oral presentation. Interviews tend to take less time and are less costly for both parties than if an RFQ has not been issued. They allow for interaction with key staff, but they do rely heavily on the communication skills of the contractor. Conversely, a technical proposal allows the contractor to focus in detail on his technical approach. Final contractor selection is based on the perceived ability of the submitting firms to best achieve the most desired outcome. RFQ can be used for the selection of professional services when the services are not well defined and depend on the contractor’s ability to identify and address problems and issues. Key things to know for the advertisement are:

- Project description/location;
- Budgeted costs;
- Specific disciplines sought;
- Contract terms;
- Description of qualification package; and
- Rating criteria.

As a precursor to RFPs, RFIs can be used to collect written information about the capabilities of various contractors as the first step in gathering basic information; An RFI will have enough

information to indicate the scope of the project and will provide contact information for full RFP or other RFQ document.

An RFP is an invitation to submit proposals on a specific commodity or service that may include a bidding process. The winning contractor will have the responsive proposal with the combination highest technical score and (weighted) price. While longer than other processes, the RFP process allows input from a greater variety of technical experts so that all proposal components, risks, and benefits can be understood by the procuring agency's project team. RFPs typically involve information on project approach and technical capability in addition to price information, contractor financial information, and project references. Final selection is based on proposed services or goods as well as cost. The RFP process is often used when services or goods are not well defined, and it allows for some creativity in responses from the contractors.

ITBs allow for a final selection based on cost only and are best for the purchase of commodities or well-defined services. The lowest price responsive bid is the winning proposal. Unless every detail of TMC operations is known and defined, ITB is not an effective procurement method given the unknowns in TMC services as well as the technical expertise required.

An ITN is an expression of willingness to negotiate; that is, the procuring agency advertises the invitation to receive offers, and the contractor providing the most desirable outcome becomes the leading contender for the contract unless the negotiations fail. At that point, the procuring agency would look to the second-rated contractor, and so on. The "most desirable proposed outcome" is from the vendor who provides the highest overall value based on objective factors that include price, quality, design, and workmanship. Contractors generally have to go through a qualifications process to show they have the necessary qualifications, experience, and capabilities to meet the project requirements as described by the project's scope of services. Oral presentations or technical proposals may or may not be required, and upon selection of the lead contractor, the negotiation process may begin. The negotiations take place until either an acceptable contract is agreed upon or it is determined that an acceptable agreement cannot be reached, in which case negotiations begin with the next-ranked vendor until an agreement is reached.

There are various types of contracting mechanisms that may be used to procure TMC services. Items to consider are price, type/complexity of project requirements, urgency of requirements, period of contract performance, and agency procurement history. The desired outcome often becomes the driving force for which contracting mechanism is used. When contracting with a private entity, they may involve some combination of contractor costs, fees, profit, and incentives. TMC services may also be procured through "voluntary" arrangements such as agreements with other public agencies, volunteer services, or student internships.

Contract and agreement types include:

- Firm-fixed-price contract – contractor is fully responsible for performance costs and enjoys (or suffers) resulting profits (or losses). There is no adjustment for contractor cost during the performance of the contract. This is also known as a lump sum contract in which the contractor gives one price based on single-unit quantities. Firm-fixed-price contracts are appropriate when quantities can be accurately determined and there is a well-defined statement of work. When quantities are unknown, the element of risk for the contractor is higher, and higher prices may ensue. These types of contracts are less typical for professional service procurements.
- Fixed-price incentive contracts – the final contract price and profit are calculated based on a formula that relates final negotiated cost to target cost; these may be either firm target or successive targets. One such example would be a construction project that pays based on quantities but also offers an incentive for early finish (either milestone or the entire job) and disincentives/penalties for exceeding deadlines.
- Fixed-price contracts with award fees – may be used to motivate a contractor when contractor performance cannot be measured objectively, making other incentives inappropriate. This unique incentive structure allows the owner to reward the contractor for above-average performance.
- Cost-reimbursement incentive contracts – may be used when fixed-price contracts are inappropriate due to uncertainty about probable costs. These may be either cost-plus-incentive-fee or cost-plus-award-fee. This type of contract allows for an adjustment of profit and establishes the final price via a relationship between final negotiated cost to total cost. When incentives are included on technical performance/delivery, the incentives can have a meaningful impact of the contractor's management of the work.
- Cost-plus-fixed-fee contract – allowable incurred costs are reimbursed and the negotiated fee (profit) is fixed; this allows the definition of a budgetary ceiling that the contractor may not exceed without the owner's approval. These contracts are used when uncertainties in contract performance do not permit costs to be accurately estimated and are common with professional services contracts where there is no fixed deliverable (as is the case when providing staffing rather than a product).
- Agreements with other entities/volunteers/students – depending on the circumstances, TMC services may be provided by other agency staff (through some type of inter-agency agreement). This is common in TMCs that have co-located staff. Personnel may serve on a voluntary basis, or they may be present as students through a co-op arrangement with a university or other technical learning center. In any event, duties and

commitments must be formalized through legally binding agreements so that all roles and responsibilities are clearly understood, defined, and agreed to.

- Sole source contracts – a specific vendor or service provider is desired with a specific unique skill that is not readily available from others. Contracting agencies need to follow a strict process to keep this type of procurement fair as other contractors may protest. Sole source contracts are done very carefully and not often; they are usually reserved for specific circumstances such as training.

Performance ratings can also be used to assess contractor performance for various TMC-related services. For an FDOT TMC Operations contract, for example, the contractor is responsible for maintaining appropriate and verifiable data supporting performance rating criteria such as:

- Staff and schedule – adherence to staffing and schedule hours; the performance criterion is the monthly average of all staff positions being filled in accordance with the schedule.
- TMC control room operations performance, event management, training, and reporting – TMC operator errors, DMS usage, service patrol dispatching; event confirmation, response plan utilization, notifications, training and certification, and report production; the performance criteria relate to percentage of use, time of event detection/confirmation, timeframes related to defined days/dates.
- Contract management services – Review of contractor invoices and performance; the performance criteria relate to timeframes related to defined days/dates.
- Information technology services – Defines responsibilities for administration of all ITS systems related to the TMC; the performance criteria relate to uptime requirements and service times related to equipment/system outages.
- Support services - Administration of key TIM activities such as meetings and all related items, updates to critical documentation, and annual reporting requirements; the performance criteria are related to defined days/days.

Each criterion has associated requirements and financial penalties for non-performance. More information can be found in FDOT's procurement document, RFP-DOT-07/09-6089DS (July 27, 2007). For each outsourced component, a specified, pre-determined, and mutually agreed upon set of operational standards is in place as part of the contract documents. Their intent is to guarantee a level of reliability and service quality. The performance requirement, evaluation criterion, and penalty are clearly stated in the contract so that at the time of contractor invoicing there is no ambiguity about the service terms.

The Federal Highway Administration's (FHWA's) *TMC Performance Monitoring, Evaluation, and Reporting* handbook (x) describes how performance measurement concepts can be applied to

TMCs in light of their functions and responsibilities. For example, a TMC is typically responsible for freeway operations. Functions associated with the TMC will include traffic surveillance, traffic control, incident management, special events management, information sharing/dissemination, and implementation of response plans. Support for these various functions may be outsourced and therefore need to be measured with specific time and performance criteria as described in the FDOT RFP document.

At times a contractor may work side-by-side with public sector staff within a TMC. The contractor then needs to be aware of civil service requirements in force at that location. They will not apply to contracted staff; however, because contracted personnel work alongside public employees, the contractor will need to be cognizant of these different requirements.

Agency standard agreements usually define liability insurance requirements for their vendors. The contractor is required to carry and keep in force a general liability insurance policy during the term of the agreement for specified amounts for bodily injury and property damage occurrences.

## **Political and Institutional Influences**

The structure and organization of a TMC may be influenced by the institutional, political, and economic considerations of the region needing TMC services. Areas that are often considered include cost, quality of service, administrative/institutional arrangements, and contractor quality/history of success. Costs may not necessarily go down when contracted services are procured; however, the monies for the services in question may come from different budget sources (capital versus operating), which can reflect a reduction on one side of the overall agency budget and an increase on the other.

Several states have contracted different operations services for significant portions of their systems. For example, Virginia has contracted services for 23% of its Interstate system, but cost savings have been difficult to verify. Organizationally, outsourcing may be tied to increased workloads or decreased staff levels, leading to the need to fill specialty staff positions. The need to outsource often has a strong tie to overcoming staffing constraints either in availability or specialty skillsets – something that is critical in a TMC, given the profusion of specialty services and advanced technologies.

Political influences on the decision to outsource are usually manifested in some legislative requirement or policy mandate to reduce public staff or operating budgets. Outsourcing becomes the means to continue with the provision of services when required by legislative or executive mandates or when state resources are limited or reduced. Florida was mandated to execute an employee reduction plan that resulted in privatization to cover activities that were eliminated. South Carolina enacted specific legislation requiring the state to perform more activities with contracted forces.

Often agency staffing levels do not increase, but work programs and responsibilities continue to increase from prior funding levels. For example, the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) took national appropriations level to \$30B, 50% greater than prior funding levels, but most with a decline in public agency staffing levels, there has been a greater reliance on the private sector for project or program service delivery. Legislative and executive officials developed greater expectations as states received more money, even if these dollars did not account for the addition of new employees.

Outsourcing may become an attractive option for expansion of services when a region has experienced a successful history of contracted services, facilitating the continuation of this practice. Basic services can be provided in-house, but enhancements can be outsourced. Agencies are often concerned with policy issues and may end up making the decision to outsource based on staff constraints or the need for specialty skills and equipment. Rather than being an issue of cost, the consideration becomes one of how to most effectively spend the monies that are available.

## **Selecting the Right Contractor**

This section provides guidance on the strategies that can be used for selecting the right contractor for providing TMC services. It also discusses the use of oral presentations, evaluations of past performance, and other strategies that agencies can use in the selection process. This section suggests potential evaluation criteria that agencies can use to assess a contractor's ability to perform the services requested, including how such evaluation criteria need to be developed to reflect an agency's mission statement and operational objectives. It discusses strategies for "weighting" different (and sometimes competing) selection criteria and presents examples of both good and poor evaluation criteria.

Traditionally, highway agencies have used contracting practices that specify exactly what is to be built and how it is to be built and maintained. These methods may minimize contractor risk in knowing exactly what the desired end result may be, but they do require great administrative involvement by the agency. Moreover, they do not translate well to operations-type projects that require provision of staff to serve as an extension of the agency in highly specialized services. Contracts that allow consideration of best value through some combined weighting of services and price have become viable options for contracting TMC services.

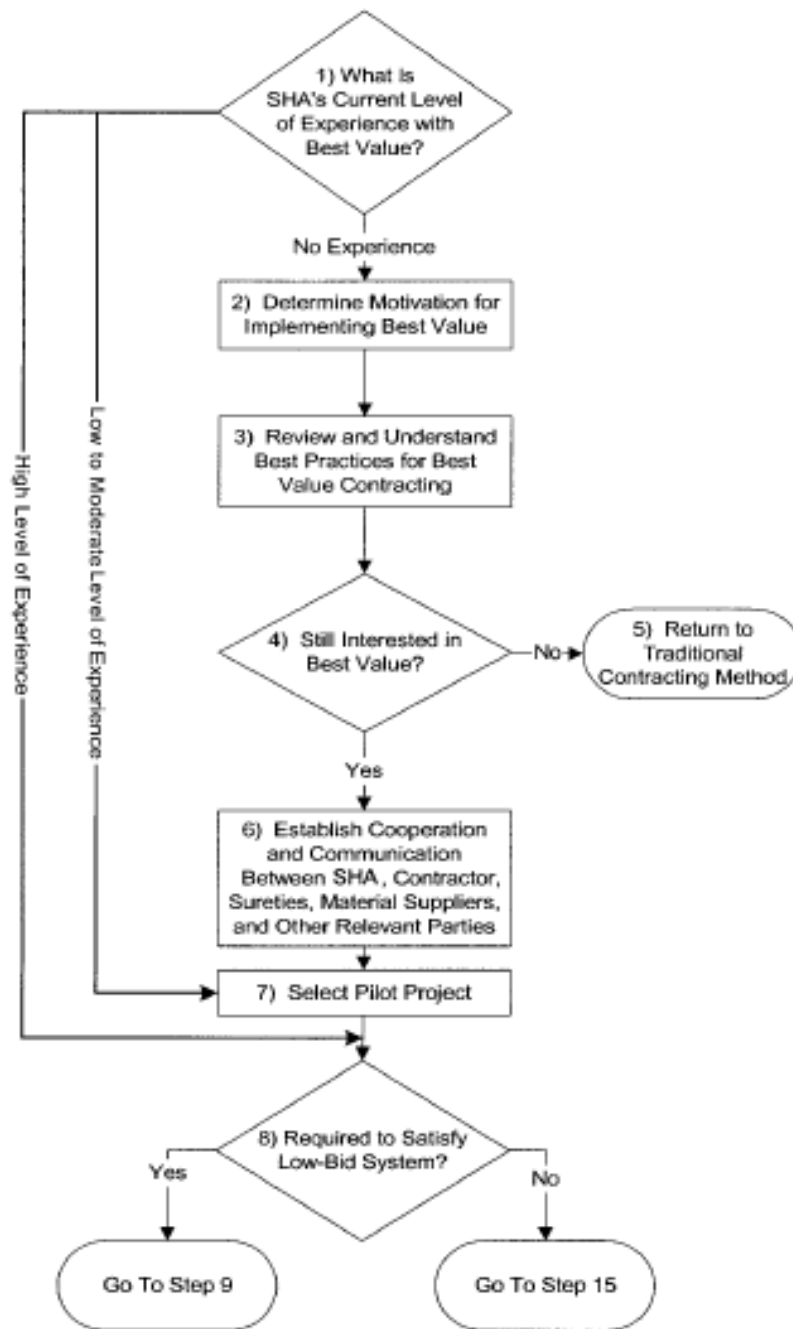
The 2001 report, "Guidelines for Warranty, Multi-Parameter, and Best Value Contracting," (National Cooperative Highway Research Program Synthesis 451) (x), identifies general implementation issues when applying new contracting methods, as shown in Table 4. These issues must be resolved before new contracting methods are considered since there may be impacts on both the agency and the contracting community.

**Table 4 General Implementation Issues for Applying New Contracting Methods**

General Issue	Major Considerations in Implementation
Fit Within Low Bid System	<ul style="list-style-type: none"> <li>• Method meets existing statutory requirements for low bid system</li> <li>• Special requirements for implementation to ensure contract method fits within low bid system (prequalification)</li> <li>• Requires enabling legislation for implementation because method will not meet low bid laws</li> </ul>
Impact on Budget, Schedule, and/or Quality	<ul style="list-style-type: none"> <li>• Increase, decrease, and/or no impact on project cost and/or project time</li> <li>• Enhances long-term performance of finished product</li> </ul>
Impact on Agency Personnel Resources	<ul style="list-style-type: none"> <li>• Increase, decrease, and/or no impact on number of agency personnel required for project</li> <li>• Increase, decrease, and/or no impact on project work hours required of agency personnel for project</li> <li>• Requirement for new knowledge, abilities, skills, and experience of agency personnel</li> </ul>
Selection of Appropriate Project for Application	<ul style="list-style-type: none"> <li>• Factors that drive use of method must be understood and evaluated in decision to implement on specific project</li> <li>• Characteristics of projects must be congruent with agency objectives/requirements for implementing contract methods</li> </ul>
Affect on Bonding	<ul style="list-style-type: none"> <li>• Additional requirements for bonding</li> <li>• Impact on surety companies and contractors</li> </ul>
Allocation of Risk to Each Project Participant	<ul style="list-style-type: none"> <li>• Shift more risk to contractor in areas of cost, time, and quality</li> <li>• Impact of risk shifting on agency project development and execution process</li> </ul>
Ease of Implementation	<ul style="list-style-type: none"> <li>• Training requirements for successful implementation</li> <li>• Type of expertise/qualifications of personnel leading the implementation effort</li> <li>• Information system needed to support method requirements</li> <li>• Changes required in project development and execution procedures</li> </ul>
Acceptance by Industry	<ul style="list-style-type: none"> <li>• Impact on open competition—number of bidders and size of contractors bidding projects</li> <li>• Establishing industry cooperation and involvement in implementing new contracting process</li> </ul>
Impact on Legal Environment	<ul style="list-style-type: none"> <li>• Understanding legal ramifications of new contract method</li> <li>• Contract requirements with appropriate legal language incorporated</li> </ul>

Chapter 4 of *Guidelines for Warranty, Multi-Parameter, and Best Value Contracting* (x) provides an excellent description of the contracting award process that considers price and other factors that may include technical excellence, management capability, past performance, and personnel qualifications. While the chapter focuses on construction projects, the best value approach has merit when considering projects that require technical expertise and specialized services, such as the provision of TMC services. This approach reduces risk to the contracting agency by allowing consideration for the combination of technical and management merit as well as bid price. The chapter also provides flowcharts that may be used to lead an agency through the thought processes needed to implement this type of contracting; the high-level planning phase process model is shown in Figure 1.





**Figure 1 Planning Phase Process Model**

As discussed previously, there are various contracting methods available to procure TMC services. The decision to partially or completely privatize these services depends on the particular circumstances of the public agency and the TMC. When providing supplemental staff or services to an existing operation with public staff, a partial privatization of services may be the easiest method for supplemental or expanded services. However, when building an entirely

new facility with new services, the public agency has the option of full or partial privatization. This decision will most likely be driven by the combination of available public agency staff positions, resources, and funding. These include request for qualifications, request for information, invitation to negotiate, invitation to bid, and request for proposals.

The public agency needs to provide the parameters of what is desired in the bidding documents so that contractors can describe their approach and how they will bring best value to the contracted services. Encouraging competition fosters creativity and allows the contractors to propose their best ideas for how to meet the agency's goals and objectives, ultimately leading to a "best fit" of public and private partners working together to provide the TMC services.

A proposal often contains the following elements:

- Technical plan that describes the approach to the project, understanding of scope of services, and approach to quality control;
- Management plan that describes how contract compliance will be maintained, staff quality, experience, and availability, as well as relationships with subconsultants;
- Descriptions of past similar projects with references to gain insight on other clients' satisfaction with the contractor;
- Staff resumes;
- Agency forms; and
- Price proposal.

There may or may not be an oral presentation or question/answer session following the submittal of a written proposal. These are specified during the advertisement process and may be used to gain additional insights into the contractor's process and approach. It is also an opportunity for the contractor to introduce staff to the agency beyond the presentation of resumes, something that may be particularly useful when the proposed staff is not known to the project managers. These elements will have associated grading criteria that lead to a scoring matrix for contractor selection. Some additional scoring elements may include firm proximity to the project location, commitment to satisfy owner needs, past history of shortlisting for the owner, previous work including contract value for the owner, and disadvantaged/minority subconsultant commitments. A sample of evaluation criteria and weighting from an FDOT Operations Contract is shown in Figure 2.

<p>28.4 <u>Criteria for Evaluation</u></p> <p>Proposals will be evaluated and graded in accordance with the criteria detailed below.</p> <p>a. <u>Technical Proposal</u> ( <u>100</u> Points)</p> <p>Technical evaluation is the process of reviewing the Proposer's Executive Summary, Management Plan, Technical Plan and Work Plan for understanding of project, qualifications, approach and capabilities, to assure a quality product.</p> <p>The following point system is established for scoring the technical proposals:</p>	
<p>1. <b>Executive Summary</b>.....</p> <p>2. <b>Proposer's Management Plan</b>.....</p> <p style="padding-left: 20px;">i) Organization &amp; Management.....</p> <p style="padding-left: 20px;">ii) Professional Staff Experience.....</p> <p style="padding-left: 20px;">iii) Proposer Firm's Experience.....</p> <p>3. <b>Proposer's Technical Plan</b>.....</p> <p style="padding-left: 20px;">i) Technical Approach.....</p> <p style="padding-left: 20px;">ii) Proposal Requirements.....</p> <p style="padding-left: 40px;">a) SunGuide Transportation Management Center Operations.....</p> <p style="padding-left: 40px;">b) Contract Management.....</p> <p style="padding-left: 40px;">c) TMC Information Technology (IT) Services.....</p> <p style="padding-left: 40px;">d) Miscellaneous TMC Operations Support Services.....</p> <p style="padding-left: 40px;">e) ITS Public Outreach Services.....</p> <p style="padding-left: 40px;">f) ITS Utility Locates Services.....</p> <p style="padding-left: 40px;">g) Traffic Operations and ITS Engineering Services.....</p>	<p>2</p> <p>18</p> <p>5 of 18</p> <p>5 of 18</p> <p>8 of 18</p> <p>80</p> <p>12 of 80</p> <p>68 of 80</p> <p>30 of 68</p> <p>12 of 68</p> <p>15 of 68</p> <p>6 of 68</p> <p>2 of 68</p> <p>2 of 68</p> <p>1 of 68</p>
<p>c. <u>Price Proposal</u> ( <u>25</u> Points)</p> <p>Price evaluation is the process of examining a prospective price without evaluation of the separate cost elements and proposed profit of the potential provider. Price analysis is conducted through the comparison of price quotations submitted.</p> <p>The criteria for price evaluation shall be based upon the following formula:</p> <p><u>(Low Price/Proposer's Price) x Price Points = Proposer's Awarded Points</u></p>	

**Figure 2 Sample Evaluation Criteria**

For the evaluation criteria selected, the agency must take care to carefully choose those with relevance and importance to successfully executing of the work and meeting the goals and objectives. Placing a high value on price will make the cost the greatest driver in contractor selection; placing high values on criteria that do not necessarily relate to daily contract activities may skew the selection away from a contractor better able to meet agency goals and objectives. The evaluation criteria weighting must be carefully developed to get the best overall value from the various contractor proposals.

## **Chapter 3 – Managing Contracted TMC Services**

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### **Chapter Overview**

This chapter discusses the management of TMC services that are outsourced or contracted to a public or private entity. The management of the contract and management of the contracted employees are important to the success of an outsourcing relationship. How a contract for TMC services will be managed must be thoroughly investigated prior to procuring these services. This chapter outlines many of the issues to consider while establishing the management of the contracted services. This chapter also discusses the advantages of different management structures and tools for performance monitoring.

### **Management Structures**

As described in the previous chapter, there are some critical questions that should be asked by the agency planning to contract for TMC services. Answers to these questions will assist in establishing a framework or structure for managing a contracted services contract. These questions are as follows:

- What are the overall goals the agency is trying to accomplish? How do these goals relate to the agency's strategic plan or vision?
- What are our agencies core functions (in general and as they apply to a TMC)? Core functions can be considered those functions that must be conducted by the agency.
- What are the challenges facing the agency in terms of staffing and carrying out TMC functions?
- What are the relationships with other transportation agencies? How do these relationships impact TMC operations or a specific TMC function?
- What will be the responsibilities and roles of the agency in relationship to the agency/firm carrying out the contracted services?
- What physical resources are owned by the primary agency?

There are many effective management structures and techniques that can be applied to contracted TMC services. One structure is not necessarily better than another. A management structure should support the functions being conducted in the management center and reflect the relationship of the stakeholders or agencies involved in running the TMC. For the purposes of this chapter, it is assumed that there is a primary agency responsible for the TMC operation or a specific TMC function. Furthermore, it is assumed that the primary agency is considering contracting out for the performance of the TMC operations or a specific TMC function. The typical functions in a TMC are highlighted in Table 5. Consideration must be given to which

functions are being provided in the TMC, by which agency, and how contracted staff will interface with agency staff overseeing the TMC functions.

**Table 5. Management Center Functions**

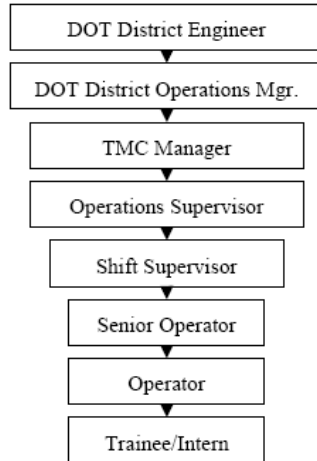
Function	Examples
<b>Daily TMC Operations</b>	Examples: freeway management, arterial management, incident management, dispatch
<b>Hardware / IT Support</b>	Examples: network, computer, server maintenance
<b>Software Development and Maintenance</b>	Examples: freeway management software, traffic signal system software
<b>Field Hardware Maintenance</b>	Examples: fiber network maintenance, DMS maintenance, detector installation and maintenance, utility installation
<b>Traveler Information</b>	Examples: 511 operation, traveler website operation
<b>Motorist Assistance</b>	Examples: courtesy patrol, motorist assistance patrol, wrecker service
<b>Public Information Dissemination</b>	Examples: briefings to media, press releases

A TMC may perform freeway traffic management, traveler information, and public information functions. There may be a different agency staff member managing each of these functions. And for example, the daily operations for the freeway traffic management may be contracted out to a private sector firm. Those contracted staff may report to the TMC manager at the primary agency. However, the public information officer may also need to interact with the contracted staff on a daily basis to obtain accurate traffic information to develop press releases and brief the media. Understanding these staffing relationships will assist in determining the best management structure.

Each management structure impacts the primary agency and the firm/agency providing the services differently. In addition to examining the functions being provided in the TMC, there are other staffing and resource considerations. In developing a management structure to meet organizational goals and needs, consideration should be given to the following:

- staffing requirements,
- facility accommodations,
- equipment requirements,
- infrastructure requirements, and
- cost impacts.

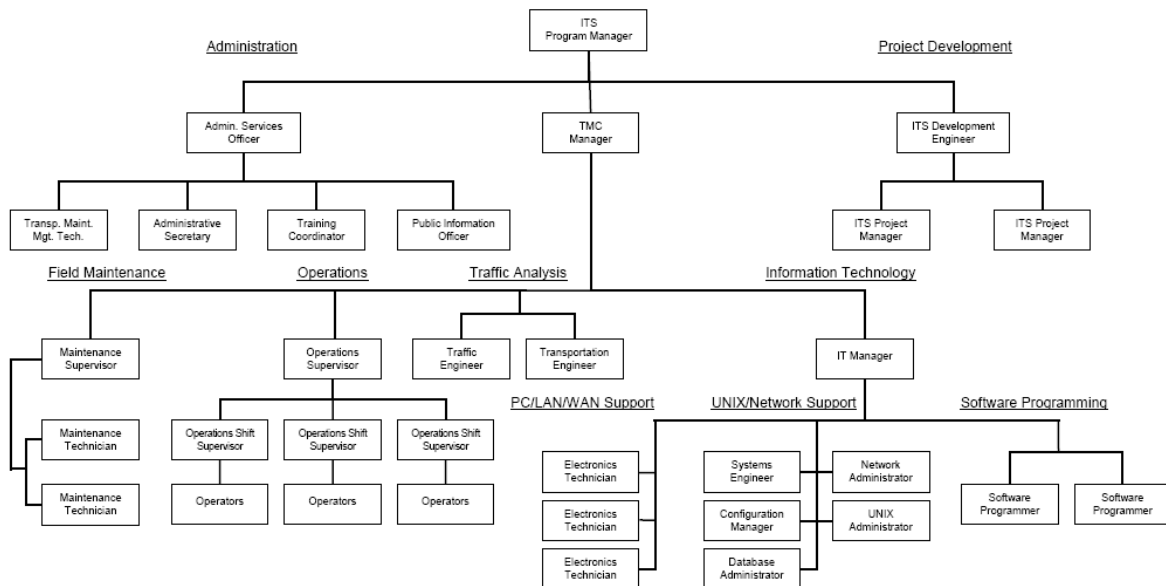
The management structure refers to both the staff at the primary agency that manages the overall contracted services as well as the supervision provided for the different hierarchical staffing levels. An example of staffing hierarchy that might exist in a TMC is shown in Figure 3.



**Figure 3. Staffing Hierarchy (y)**

The district management positions at the top of Figure 3 are most likely public sector agency staff. However, any of the boxes on the hierarchy chart below these management positions could be from other public or private sector agencies.

In a major urban area TMC where multiple TMC functions are being performed, the organization can become more complex. An example of one such organization chart from the Arizona Department of Transportation is shown in Figure 4.



**Figure 4. Example TMC Organization Chart – Arizona Department of Transportation (y)**

The number of agencies within a TMC also affects the management structure. There are different types of TMCs in terms of the number of agencies performing TMC operations. There are single-agency TMCs and joint -agency TMC. A single-agency TMC may be fairly straightforward where the agency is contracting directly with another firm/agency for TMC services. A joint-agency TMC is characterized by a coalition of several transportation agencies collaborating on multiple TMC functions. This latter type of TMC structure may have increased complexity resulting from the inter-relationships of the agencies. Understanding the roles and responsibilities of each agency is important to establishing how the management of the functions and staff need to be carried out.

One example of a multi-agency organizational structure is for the Houston TranStar TMC in Harris County, Texas (see Figure 5). Houston TranStar is a public-public partnership between the Texas Department of Transportation, Harris County, City of Houston, and Houston METRO transit agency. There is a TMC manager that is responsible for the management of the TranStar facilities. Each of the agencies in TranStar is responsible for different TMC functions (e.g., freeway traffic management, transit bus dispatch, arterial signal system control).



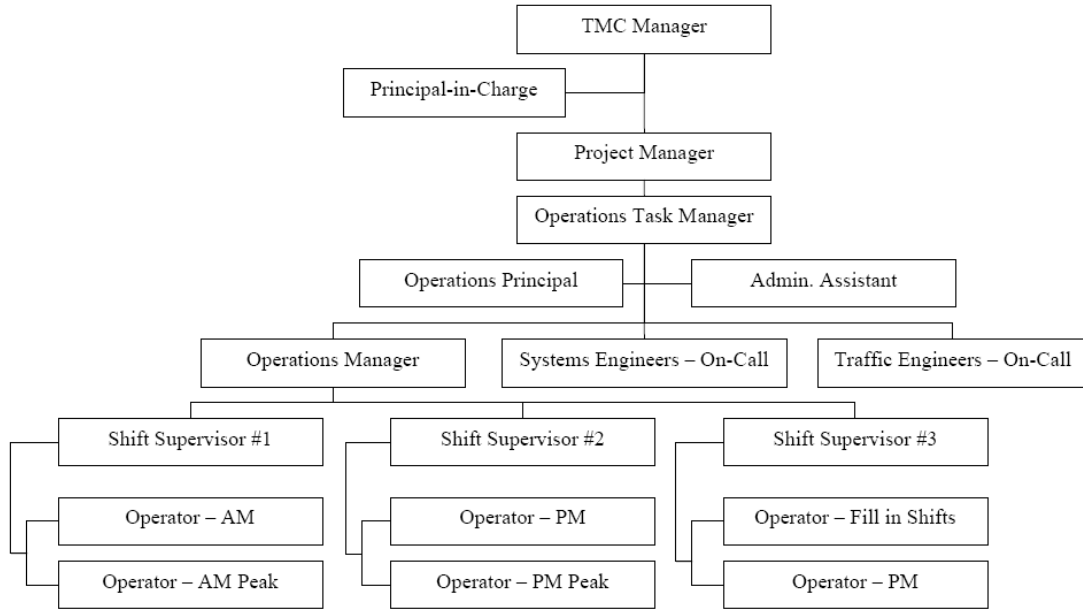
Figure 5. Example of TMC Organizational Chart – Houston TranStar

To highlight how the management structure may differ as the contracted staff is integrated into the management structure, some examples of the different structures for managing contracted services are presented as follows:

- Outsourced services managed by public sector:
  - the public agency holds the contract,
  - the public agency manages the day-to-day operation, and
  - contracted staff may be from a public agency or a private sector agency.
- Outsourced services managed by private sector with public sector oversight:
  - the public agency holds the contract,
  - the public agency oversees the contract, and
  - another public sector or private sector agency manages the day-to-day operation of a TMC or particular TMC function.
- Blended management and operation:
  - the public agency holds the contract,
  - the private sector agency manages the day-to-day operation, and
  - the contracted staff is from the primary public agency.
- On-call services:
  - the public agency holds the contract,
  - the public agency manages the day-to-day operation, and
  - the private sector agency brings staff or resources on an as needed basis to handle peak times or special events.

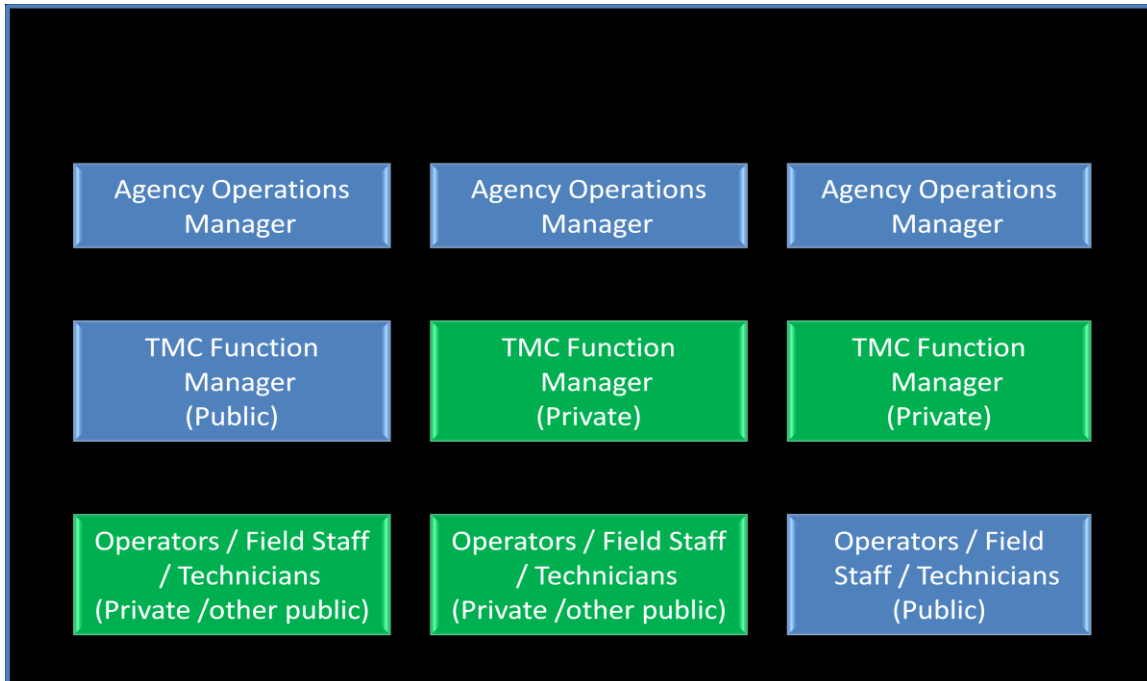
For on-call services, an example of how peak-period operations are supplemented with additional operators is shown in Figure 6. The agency may employ a core staff to cover minimum operations and look to contracting with a public or private agency for the peak operating times to have full staff functionality.





**Figure 6. Example TMC Organization Chart – Tennessee Department of Transportation (y)**

To further highlight the variation in the management structure with contracted staff, a high-level organization chart is presented in Figure 7. The primary difference between these structures is how the management of the day-to-day operations staff is handled. The public-agency managed structure provides the most oversight by the public agency. The privately managed structure gives more responsibility to the private sector firm. The blended management structure potentially creates the greatest challenges, as contracted staff are inserted between the public agency management and staff.



**Figure 7. Examples of Management Structure**

Once the management structure is determined, it is important to define the roles, responsibilities, and relationships between agency and contracted staff. With the contracted staff playing a significant role in the operation of the TMC, it is important to include the contractor manager in the management decision-making process. In addition to the management structure, consideration should be given to the agency oversight of the TMC operations and how those operations or functions are performing with contracted staff. Frequently an oversight committee exists for ITS or the TMC. This oversight committee should also be incorporated into review of the TMC performance.

### **Staffing and Scheduling**

Staffing is consistently cited as one of the primary reasons for outsourcing TMC services. Outsourcing staff allows a primary agency to bring in expertise that does not exist in-house, expand staff for peak operational times, and reduce the human resource administration required of in-house staff. Primary agencies should, however, maintain some staff members that are familiar with the breadth of the TMC functions so they can adequately manage the contracted services and represent the needs of the TMC to senior management and stakeholders. (w)

Staffing plans help determine the staffing resources needed for TMC operations or carrying out a TMC function over a given period of time (i.e., weekly, monthly, or annually). There are various methods of creating staffing plans ranging from simple spreadsheet analysis to more

sophisticated staffing estimation tools. FHWA's *Transportation Management Center Staffing and Scheduling for Day-to-Day Operations* report presents some of these tools.(y)

Some of the issues to consider in contracting for TMC staff are:

- Development and maintenance of a staffing plan, including periodic updates to adjust to growth needs or turnover in staff – The staffing plan should consider use of part-time employees, hours of operation (i.e., 24-7 operation), etc.
- Minimum number of staff for a function or service – Consideration should be given to the minimum number of staff needed for a TMC function. For example, how many operators are needed for night and weekend TMC operation? For safety and security reasons, an agency might want to require a minimum of two persons on each shift.
- Hiring and termination policies – Consideration should be given to minimum length of time to hire staff, relocation fees for new hires, and procedures for termination.
- Resignation and filling vacancy requirements – Consideration should be given on rules for how the contracted services are replaced to how fill contracted services.
- Pay rates – Consideration should be given to minimum and maximum pay rates of contracted staff. Minimum and maximum rates may be used to try to keep some equity between common staff located in a TMC; however, there should be some caution in not restricting other public or private agencies from meeting the staffing goals (both in terms of expertise or timeliness of hiring).
- Benefits and taxes to be paid to contracted staff – If contracted staff is from a private agency, the benefits are usually included within the overhead rate. Private firms may offer an “on-site” overhead rate that may or may not include the same items as the full overhead rate.
- Work rules for holidays, vacation, and sick leave (some agencies and firms will combine vacation and sick into a common leave category) – Consideration should be given to the rules for contracted staff to take holidays, vacation leave, or sick leave, especially for those holidays in common with both public and private agencies.
- Overtime pay / Compensation time – Consideration should be given to rules for overtime pay and compensation time. Working in a TMC environment requires reacting to emergency situations. These emergency situations have high variability in duration. It is easy for staff to accumulate extra time during these events.
- Duties during “essential employee” events (e.g., snow storms or hurricanes) – Consideration should be given to the “essential” nature of specific contracted staff.
- Qualifications, including computer expertise or specialized transportation management expertise – Consideration should be given to the minimum computer expertise needed for different TMC positions. For example, are word processing/spreadsheet skills or software development skills needed?
- Written and verbal language requirements – Consideration should be given to any minimum requirements for written and verbal communication.

- Minimum education levels – Consideration should be given to any minimum requirements for education level (i.e., is a college degree, high school diploma, or GED required?).
- Training – Consideration should be given to training for the contracted staff. Training is important to continued skill improvement and staff retention. The responsibility for training must be identified and how time off to conduct training will be handled.

## **Accommodations and Equipment**

TMC services need varying office space, equipment, and access to vehicles. Planning for the management of contract services includes consideration of how to incorporate contracted staff within the TMC. Public agencies may provide different levels of support in terms of office space, computing equipment, phone access, storage space, and internet access.

Typically the TMC's operations room will be equipped with consoles or workstations that can accommodate contracted staff during their shifts. Further consideration should be given to the need for additional office space for those staff, including a work area that allows for taking calls, participating in conference calls, or filling out paperwork (e.g., timesheets, documentation, reporting). The consoles or workstations on the TMC operations floor may need necessary software packages or access to the Internet that would be required for filling in electronic timesheets or preparation of reports. In addition, contracted staff may need to communicate with their firm's management.

In this work area, consideration should be given to the providing the following:

- computers with appropriate software applications,
- printers,
- phones,
- desks other furniture, and
- office supplies.

If the contracted services are for TMC functions that require specialized equipment, then accommodations for these should also be considered.

## **Management Tools and Reporting**

### **Tools for Management**

Key resources in defining procedures for contracted TMC services include a TMC's operations manual, its service patrol manual, its high-occupancy vehicle manual, and other operational guides. The activities that are identified in those sources can serve as checklists, definitions of work, and performance indicators for the activities that TMC service providers could perform.

In addition to an agency’s own manuals and operational guides there are other reference documents that an agency might use in structuring their procurement offerings.

The Federal Highway Administration’s TMC Pooled-Fund Study maintains a website with sponsors and TMC-related material. (a) That website contains a *Handbook for Developing a TMC Operations Manual* that builds on the *ITE Annotated Outline* and provides more specific information. (z, zz) In addition to detailed checklists, it defines a process for writing a TMC operations manual that includes all phases of the systems engineering life cycle, including the procurement phase.

These policy and procedures documents for a TMC (or agencies working in a TMC) serve as tools for management of contracted services. Documents such as an agency’s strategic plan (including vision and goals) establish the purpose of a TMC and the function being carried out within a TMC. Operations-oriented documents such as a TMC’s operations manual can further serve as tools to help manage agencies and staff within a TMC. Some of the topics that are important to a TMC operations manual are highlighted in Table 6.

**Management of Staff through Performance Measurement and Reporting**

Performance monitoring is directly linked to quality (x). Monitoring performance influences both efficiency (cost) and effectiveness (quality) measures. It is important to establish performance measurement during the procurement phase in order to implement management strategies.

There are two different aspects of performance measurement: performance of the TMC or TMC function, and performance of those responsible for the TMC or TMC function. There are number efforts and literature on the measuring performance of an ITS system or TMC. In the context of measuring the staff responsible for the TMC function, performance monitoring appears to encapsulate three key areas:

- evaluating whether the contractor’s work is compliant with the terms of the contract,
- identifying the extent of variation in quality and its relationship to cost factors, and
- determining whether the primary agency is satisfied with the service.

**Table 6. Topics of a TMC Operations Manual (z)**

TMC Operations Manual Topic	Examples
<b>Agency</b>	Examples: Roles of the agency(ies) in a TMC, responsibilities of individual agencies
<b>Personnel</b>	Examples: Organization chart: supervisory, operators, maintenance, job descriptions, routine and emergency telephone/pager contacts.
<b>Hours of Operation</b>	Examples: Workdays, holidays, weekends, special

	events, emergencies.
<b>Staffing Requirements</b>	Examples: Workdays, holidays, weekends, special events.
<b>After-Hours On-Call Roster</b>	Examples: Routine and emergency voice/fax/pager contacts.
<b>Remote Operation</b>	Examples: Procedures for operation from remote terminal.
<b>Security Procedures</b>	Examples: Access to control system interfaces, equipment, etc.
<b>Maintenance</b>	Examples: Routine checks for office and/or field equipment operation.
<b>Startup/Shutdown</b>	Examples: Emergency shutdown, planned shutdown, restart, cold start.
<b>Failure Recovery</b>	Examples: Automated and manual failure recovery procedures and capabilities.
<b>Agency/Jurisdictional Contacts</b>	Examples: Routine and emergency voice/fax/pager contacts.
<b>Notification Procedures</b>	Examples: Routine and emergency media/agency/jurisdiction notification.

There are a number of tools that can be used to measure the performance of TMC contracted services. Some examples are as follows:

- meetings and meeting minutes,
- checklists,
- inspections,
- contractor reports,
- client performance reviews of contractor,
- contractor records and files,
- client complaints,
- client surveys, and
- customer complaints.

Several of these tools are contractor generated. Meeting minutes, contractor reports, and similar documentation is prepared by the contractor and submitted to the primary agency. Some of the tools are initiated by the primary agency. These might include the inspections and performance reviews. A third set of tools aim at getting input from outside users such as a survey of primary agency staff that interacts with the contractor or even feedback from customers (i.e., the traveling public.)

## **Relationship of Management Structure, TMC Function, and Contract Type**

There are several variables that may influence which management practices are appropriate for the various TMC services being outsourced. This section provides a discussion on the relationships of management structure, TMC function, and contract type. Each of the TMC functions is presented with guidance on management structure and contract types.

### **Daily TMC Operations**

- Management Structures
  - Could be handled by any of the structures: public managed, private managed, blended management, or on-call. On-call contracts would be most appropriate for handling peak staffing loads.
- Contracting Types
  - Performance-based contracting would be more amenable to private managed structure, as it provides the private sector more authority over the resources needed to meet performance goals. Could also be accomplished through time and materials, cost-plus, or fixed-fee types of contracts.

### **Hardware / IT Support**

- Management Structures
  - Could be handled by any of the structures: public managed, private managed, blended management, or on-call.
- Contracting Types
  - The type of contract would be dependent on how much control the contracted agency/firm has over the equipment and network. Performance-based and fixed-fee contracting would be difficult if the contracted agency/firm did not have control over this. With the uncertainty of problems that would arise (i.e., hardware failures, communication failures, etc.) time and materials or cost-plus may be more appropriate.

### **Software Development and Maintenance**

- Management Structures
  - Could be handled by public managed, private managed, or blended management structures. Not appropriate for on-call structure.
- Contracting Types
  - The type of contract would be dependent on how well software requirements were written to reduce the risk in software design and development. Performance-based and fixed-fee contracting would be difficult if the contracted agency/firm

did not have well defined requirements and expectations. Where software will be developed in an iterative approach with the public agency, time and materials or cost-plus may be more appropriate.

### **Field Hardware Maintenance**

- Management Structures
  - Could be handled by any of the structures: public managed, private managed, blended management, or on-call.
- Contracting Types
  - Could be handled by any of the contracting types.

### **Traveler Information**

- Management Structures
  - Could be handled by public managed, private managed, or blended management structures. Not appropriate for on-call structure.
- Contracting Types
  - Performance-based contracting has successfully been used for this TMC function. Performance measures and goals need to be established in the procurement process. Could also be accomplished through time and materials, cost-plus, or fixed-fee types of contracts.

### **Motorist Assistance/Wrecker Service**

- Management Structures
  - Could be handled by public managed, private managed, or on-call structures. Probably not appropriate for a blended management approach.
- Contracting Types
  - Some motorist assistance programs are set up through a public-public or public-private partnerships. A fixed-fee contract may be most appropriate with performance goals established.

### **Public Information Dissemination**

- Management Structures
  - The public information dissemination is likely to be retained as a public agency function. The information provided to public information departments or officers often comes from the TMC staff. The public managed, private managed, or blended management structures all could produce information for this function.



The on-call structure is most likely not appropriate for the timely dissemination of information.

- Contracting Types
  - Because of the high degree of variability in public information needs, time and materials or cost-plus contracts would be most appropriate.

## **Chapter 4 – Evaluating Contracted TMC Services**

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### **Chapter Overview**

There's an old adage that says you can't improve what you don't measure. Measuring progress or status is a critical element in answering the question of "How do I know it's good when I get it?"

This chapter allows the reader to develop an understanding of the performance measurement process as well as its application to the evaluation of contracted TMC services. A key to understanding these concepts is that performance measurement should be a systematic and ongoing component for evaluating these types of contracts. Although there are challenges to establishing and maintaining a performance measurement process, agencies can obtain substantial benefits in terms of improved service, cost savings, and efficiencies by using performance measures to evaluate contracted TMC services.

The purpose of this chapter is to introduce and briefly explain the concepts of performance measurement as they relate to the task of evaluating the outsourcing of services or tasks that take place for TMC operations. As explained previously, a key to outsourcing is establishing performance based contracts. Previous chapters have focused on the key questions of "What do I need?" and "How do I get it?" This chapter focuses on the final key question, which is "How do I know it's good when I get it?"

The answer is through the use of performance measurement. This chapter introduces the use of performance measurement for evaluating outsourced operations, establishes a performance measurement process, examines topics pertaining to the ensuring quality in the performance measurement program, and presents a small set of sample measures.

The reader new to the concept of performance measurement is referred to Appendix A to this report. The Appendix presents a more complete introduction to the topic of performance measurement, starting with a brief history, and covering topics such as benefits, challenges, common classification schemes, and guidelines for selecting appropriate measures.

### **The Use of Performance Measurement for Outsourcing**

Performance measurement allows decisions to be made based on data gathered via a scientific approach. It employs a methodology where data are gathered to determine progress towards specific objectives that the organization has set. Using a consistent methodology allows an agency to collect and evaluate information for the purpose of achieving multiple goals, such as increasing efficiency and meeting customer expectations. Tracking these measurements, both

over time and compared to the overall goals, shows agency progress as well as setting accountability criteria for judging and paying on performance related contracts.

While performance measurement can and has been applied to many areas of transportation, the focus on outsourced operations is the critical focus for this discussion. As time has progressed, the use of outsourcing has increased as a method for accomplishing many of the traditional tasks within a TMC. Outsourcing has also been utilized as a means of maintaining quality while reducing costs. The question or concern has always been how to maintain or even increase the quality of the service while accomplishing management and/or reduction in costs. The development and use of a stringent performance monitoring program can help in both objectives, by providing for measurable goals, objective analysis of the supporting data, and a continuous evaluation process for improving the service in question.

As discussed in Chapter 1, typical outsourcing functions could include

- daily TMC operations,
- hardware and software support/upgrades,
- roadside component/ device maintenance and repairs,
- communications installation/upgrade and maintenance,
- traveler information / 511 systems,
- preventative maintenance, and
- motorist assistance.

The use of outsourcing, by definition, means that an evaluation process of contractor work efforts should take place. Basing this process on performance measurement allows an evaluation to take place on a consistent and rigorous manner, regardless of the TMC employee conducting the evaluation. It allows for consistency over time, improvements over time, trend analysis, and also forces the TMC to analyze the goals of their services and develop specific, measureable, objectives.

### **Types of Services to Monitor**

This chapter will not detail which specific services or activities a TMC should monitor. With each TMC having some element of uniqueness in terms of the area it serves, the type of travel, and the methods it employs to accomplish its daily activities, specifying exactly what services should be monitored is simply not feasible. Those are decisions best left for each individual TMC in the implementation of their program.

What is possible, however, is to provide general guidance for the TMC in terms of how to implement performance monitoring to support outsourcing.

The overall TMC goal for monitoring contracted services should be to ensure quality and to manage/reduce costs. Monitoring can also be used to establish result-based payment schedules. In essence, a monitoring program supports the determination of the following 'big-picture' questions in assessing contractor performance.

- Are we accomplishing the desired end result from this contract?
- Are they meeting the performance goals established for the contract?
- Are tasks being carried out with an appropriate level of quality, timeliness, and reliability?
- Are we meeting our contracting goals?
- Are we operating efficiently?
- Are we operating cost-effectively?

In general, when a good monitoring program is achieved occurs, a TMC can achieve the following:

- Increase their likelihood of meeting mission needs;
- Focus on the intended results, not the process;
- Provide better value and enhanced performance;
- Reduce performance risk;
- Provide for better competition and contractor flexibility in proposing solutions.

## **The Performance Measurement Process**

In terms of evaluating a contracted service, the overall evaluation typically will focus on three main areas:

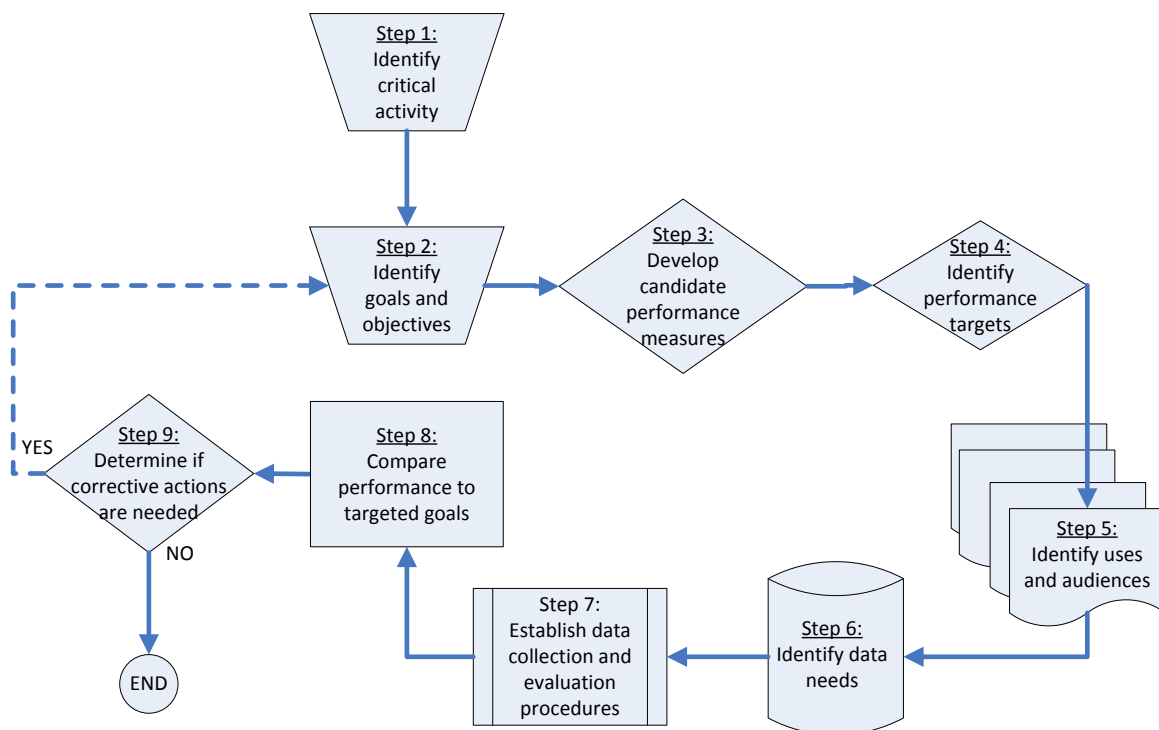
- Identifying compliance to the contract terms,
- Identifying variations in quality and the associated impacts, and
- Identifying if the contracting agency is satisfied with the service.

The underlying support mechanism to these evaluation points is the actual performance measurement process. Establishing the process is what allows the TMC to create a fair, rigorous,

and transparent evaluation mechanism for contracted services. The process can typically be formalized in nine steps, as identified below.

1. Identify the critical activity.
2. Identify the goals and objectives of the activity.
3. Develop a set of candidate performance measures.
4. Identify performance targets.
5. Identify uses of performance measures and potential audiences.
6. Identify data needs and requirements for analytical tools.
7. Establish data collection and evaluation procedures.
8. Compare actual performance to targeted goals.
9. Determine corrective actions or progress needed to achieve goals.

Figure 8 presents an overview of the program. The overall steps in the program are the same, regardless of whether the activity being evaluation is in-house or a contracted service.



**Figure 8. The Performance Measurement Process.**

Step 1 – The first step of the program is basically a selection tool. The concept is to select a single activity that a TMC performs, focus on establishing the on-going performance measurement process for that activity, then return to step 1 and repeat it for another activity.

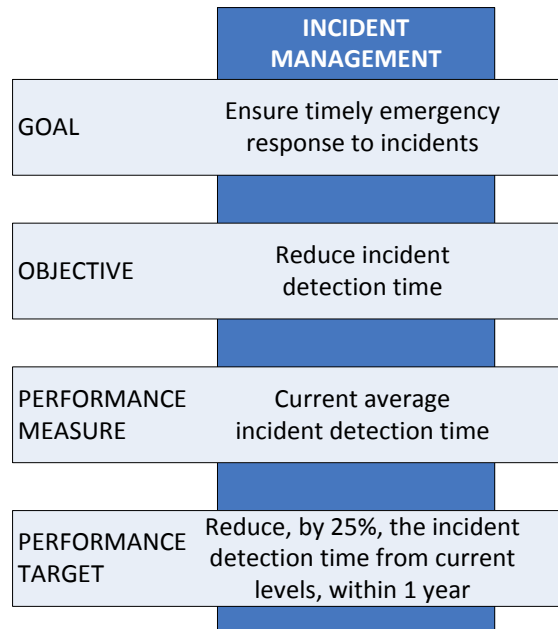
Step 2 – Every TMC activity has goals and objectives that can be defined. However, in the evaluation of contracted TMC services, careful consideration must be given to what goals and

objectives are specified. As an example, if the activity is incident management, a typical goal may be to ensure the timely emergency response to incidents. While a corresponding objective for the TMC might be to reduce incident detection time, a corresponding objective for a contracted service may be that 95% of all incidents need to be detected within five minutes. In this case, the number of times the agencies goals were met represents the performance of the contractor.

Step 3 – The identification of performance measures follows directly from the goals and objectives. Continuing with the example from Step 2, a performance measure utilized in the evaluation of incident detection would be the current average incident detection time. Note that this measure could be stratified by type of incident, location, time of day or other variables that would provide a more detailed understanding of the system’s response.

Step 4 – The identification of performance targets goes hand-in-hand with Step 3 above. Continuing with the example of incident detection, a specific performance target could be to reduce, by 25% from current levels, the incident detection time, within a timeframe of one year.

Figure 9 provides a detailed illustration of Steps 1-4 and shows the logical progression from vision (Step 1) to detailed and measurable targets (Step 4)



**Figure 9. Setting Performance Targets. Adapted from Figure 2.3, Reference (1)**

Step 5 – Any performance measure could be used in a variety of settings, but there are certainly measures that are most appropriate to particular audiences. A measure that is time based is easily understood by a non-technical audience and can be presented in a variety of methods. On the other hand, measures that are based on rates, such as percent travel delay reduction per 100 million vehicles miles traveled (VMT), may be much more difficult to visualize and effectively display to a non-technical audience. The concept behind step 5 is to examine the list of measures and ensure that you will have information that can easily and quickly be understood by the target audience. In the terms of evaluating outsourced activities, the audience may be TMC management. It is also important to realize that in some cases, there may be multiple audiences, including such diverse groups as politicians and city leaders, the general public, agency management, planners and engineers. Each group has a different need for information and a different capacity for evaluating the information presented to them. Understanding those facets and how your performance measures support those presentations is the outcome of this step.

Step 6 – The concept, at this step in the performance measurement program, is to identify exactly what the data requirements are for any given measure. How much data? From what locations does it come? How often? Can it be used “raw,” or does it have to be processed? How must it be processed? Does the data need to be stored and for what period of time? What is the reliability of the data? These questions can be used to establish detailed technical requirements for the data needs to support performance measurement. This in turn, establishes reporting requirements for the contractor.

Step 7 – Following directly from Step 6, a solid plan for data collection is the result of this step. Whereas Step 6 identified the data need (e.g., 5-minute vehicle counts), this step identifies the source and mechanism for obtaining that data (e.g., automatic traffic counters at multiple locations along the freeway. Data stored in 5-minute bins in flat files and transmitted automatically, on a 24-hour cycle, to the TMC.) This step would also identify the specific tools and techniques that may be necessary to produce the final measure. These requirements may be placed on the contractor or the TMC, depending on the measure and the specific activity under evaluation.

Step 8 – Perhaps the simplest step in the program, this activity compares the actual results of the performance measure to the desired results, or goals, detailed in Step 4. An explicit categorization of the comparison results should be made, including date, time, overall result, measure, measure value, target, and difference between the value and target. This level of detail is an important input to Step 9 in the program. In terms of evaluation of contracted services, this activity would almost certainly take place at the TMC, as part of the evaluation process. It should be clear, however, to the contractor what the metrics, or performance targets, are in order to have a transparent and cooperative program.

Step 9 – Perhaps the most nebulous of all the steps in the program, Step 9 seeks to identify what (if any) remedial actions are needed to continue to advance the evaluation of contracted services

via performance measures. In essence, Step 9 becomes a planning or brainstorming exercise. Is the contract achieving the cost, schedule, and performance goals? How can contractor performance be improved? Are we, as the TMC, measuring the right items? How effective is the contractor's performance in meeting, or contributing to the agency's program performance goals? What additional information do we need? What data sources should be investigated? These and other questions can be utilized to analyze the overall program of using contracted services, evaluate shortcomings, and identify solutions to address those shortcomings. These activities could take place in-house, at the TMC management level, or they could be a collaborative discussion with the contractor.

A critical concept to understand is that even though Step 9 is the final step in the sequence, the program is an ongoing and iterative evaluation methodology. This is perhaps best illustrated by the feedback arrows in Figure 8, which direct the user back to other steps in the program, depending on the needs. If additional or corrective actions are necessary, the process returns to Step 2, to identify the goals and objectives. If no changes are required and the process is working as planned, the outcome of Step 9 is to return to Step 1, where a new activity is examined and the cycle starts again. Steps 1 through 9 will be repeated for all performance measures being considered or used in a contractual evaluation process.

### **Guidelines for an Effective Process**

Over time the implementation of any performance measurement program is going to result in some efforts that are a resounding success and others that will be deemed a failure. The key to a vibrant program is not to focus on the failures, but rather to use the successes to develop an agency specific "best practices" approach to performance measurement and using performance measures to evaluate the contracted services specific to the agency.

An agency specific best practices list can, however, take some time to develop. Presented below are several items from the literature which can form the principles for a beginning best practices approach for an agency moving into the evaluation of contract services.

- Utilize commercial / industry specific standards.
- Consider having the contractor propose or provide input into measures.
- Consider the use of incentive based contracts.
- Use meaningful measures.
- Regularly review performance.

While not every standard may be appropriate for determining performance targets, the use of standard language, terms, definitions, and data provides a meaningful method of comparing



performance outside of the specific TMC. Contractors may be able to provide additional expertise in this area, especially if they are familiar with standards efforts from other aspects of their business. Contracts that are written from an incentive-based aspect can move the relationship more towards a partnership than simply a supplier of services. If the incentives are cost-based, these types of contracts can have significant ramifications to the TMC budget, particularly if incentives are met, so the specifics should be developed carefully and with sufficient regard to budgetary considerations. Other types of incentives that could be used include contract length or scheduling adjustments.

Remember that performance measures need to have a purpose. Just because a TMC can collect data and create a measure doesn't mean they should. If there is no reason for a measure; it simply becomes a reporting exercise that nobody pays attention to. Use a small set of meaningful measures as opposed to a larger, more cumbersome collection which neither the contractor can afford to support and which the TMC doesn't use in the evaluation of contracted services.

Finally, the process and its implementation must be regularly reviewed. A TMC may want to refine their set of measures, refine incentives tied with the measures, or examine other aspects of the process. Using a pre-established periodic review allows the opportunity to examine the program, its impact, operations, and areas for potential improvements. Involving the contractors in the review process also provides increased transparency for both establishing and evaluating contracted services and also moves the contractors towards a partnership relationship.

## **Ensuring Quality in the Evaluation Process**

Apart from the selection of appropriate measures, there are many other aspects of the performance measurement process that can contribute to its success when used for the evaluation of contracted services. Data collection and analysis procedures are an obvious and relatively self-explanatory aspect. However, beyond the data needs, understanding the ramifications of other components of performance measurement, such as sampling procedures and reporting periods, is critical to writing contractual requirements that accomplish exactly what the agency wishes. Other aspects of contracted services deal with the resolution to problems or associated risks, where contract language can also be critically important.

## **Understanding Sampling Procedures**

The method of assessing the performance of various aspects of contracted services can vary significantly, depending on the type of service. An agency may want to look at the effectiveness of their maintenance contract or the quality of their courtesy patrol. Each of those evaluations will involve significantly different types of data and data sources. However, consistently collecting and analyzing all of the available data is typically a very expensive proposition. We can therefore use well-known sampling techniques to take a few measurements from a process

and make statements about the behavior of that process. Understanding the fundamentals of how to sample the data to obtain insight into the contractor performance is a key aspect of any evaluation. A key aspect of any sampling strategy is a comparison to ensure that the sample is representative of the entire population. Without this check, results based on a sample may not be representative of the results of the entire system. Typical sampling methods are described below and Table 7 shows example areas where different types of sampling may be used in conjunction with the evaluation of contracted services.

Typical sampling methods can include:

- Random sampling – While the statistical methods for performing a random sample are beyond the scope of this text, the process involves taking a number of independent observations from the entire population and using the performance of that group as a measure of the performance of the whole.
- Periodic (systematic) sampling – in contrast to the technique above, where only a subset of the entire population is examined, systematic sampling selects elements at regular intervals. These data are then used in the evaluation.
- Strata sampling – another kind of sampling that is useful is strata, where individual samples are taken within classifications. An example would be speed readings from individual classes of vehicles, such as passenger cars, buses, and trucks. In this type of sampling, it is very important to ensure that the properties of the individual strata are the same, which may mean that more samples have to be taken in one stratum than another.
- Trend analysis – trends are changes over space or time. This type of sampling utilizes repeated observations of the same subset of the population to identify changes that may occur. Changes may be spatial if the data producers are moving (such as vehicles) or temporal if the data producers are stationary (such as traffic recorders).
- Customer feedback – the use of surveys is a standard technique in sampling customers to obtain their feedback, score, or opinions on various services that a contractor might be performing, such as courtesy patrol.
- Third party audits – third party audits are conducted by hiring an outside company to examine records of the contractor and assess their adherence to a performance metric. These could be human resource related items, such as pay and promotion, operational aspects such as data collection, record keeping, and TMC floor operations, or satisfaction measures, such as courtesy patrol complaints.

**Table 7. Typical application areas for various sampling techniques.**

Sampling Method	Types of contracted services(s) where sampling could be used
<b>Random</b>	<ul style="list-style-type: none"> <li>• Hours of operation</li> <li>• Staffing</li> <li>• Response time</li> <li>• Complaint handling</li> </ul>
<b>Systematic</b>	<ul style="list-style-type: none"> <li>• Equipment health and availability</li> <li>• Web site availability</li> <li>• Data reporting</li> </ul>
<b>Trend Analysis</b>	<ul style="list-style-type: none"> <li>• Changes in response times</li> <li>• Changes in queues from non-geometric conditions</li> </ul>

	<ul style="list-style-type: none"> <li>• Changes in usage statistics (web, 511, courtesy patrol)</li> <li>• Changes in TMC floor operations (responsiveness, accuracy, etc)</li> </ul>
<b>Customer Feedback</b>	<ul style="list-style-type: none"> <li>• Courtesy patrol</li> <li>• 511 systems</li> <li>• Web site information,</li> </ul>

## Reporting Methods and Periods

A previous section detailed the types of sampling that may occur with typical TMC data. In the case of evaluating contracted services, any action taken by a contractor can be contractually required to be reported. It is important that contracts detail specific requirements of expectations for various tasks, so as not to become a point of contention between the agency and the contractor.

The contract can specify the exact requirements for reporting data or it can be stated to be self-reporting. In many cases, systems that record and relay data from devices are essentially self-reporting. Caution should be taken however to ensure that the appropriate level of detail is employed. While an operations manager might want 15-minute speed numbers from roadways, it is unlikely that TMC management would want to see that level of detail. A firm understanding from both contractual parties as to what type and level of aggregation needs to be employed is very important.

Almost by definition, contract language which specifies a reporting period is going to be specific and definitive. In this regard, there should be no contention between a TMC and a contractor unless language such as “periodically” is used when discussing performance periods.

In the sampling of actual contracts, a significant majority of the contractual language specified a discrete reporting period and provided a clear expectation for the contractor. Typical wording includes terms such as ‘annually’, ‘monthly’, ‘weekly’, ‘daily’, ‘by 10am of every Tuesday’, ‘within seven days of award’, etc. Findings from the contract review where less specific wording was used included examples such as “...and other plans, and technical reports, as required...” (TMC Support Scope of Work RFP, RiDOT).

A time issue that goes hand-in-hand with reporting periods is the retention period for data used in the reports. Depending on the type and the frequency of generation, data can rapidly accumulate. Many professions have utilized a data aging progression where after a certain period of time, data are aggregated. After another time period, data may be taken off-line and stored on retrievable media. Depending on the terms of the agreement, data may be aged as part of the contracted services, although it is more likely to be turned over to the TMC which would then follow the agency’s record retention policies.

These decision/time points are presumably based on published policies and more likely to affect TMC operations as a whole and may not come into consideration for many contract situations

dealing with only a portion of TMC services. If however, a contract is awarded for TMC operations, data storage, retention, and aging, as well as reporting, become critical considerations, particularly if any hardware expansion cost is the responsibility of the contractor.

### **Writing Specific Contractual Language**

A sampling of actual contracts found a number of statements pertaining to record keeping procedures. Samples include the following.

- “Patrol drivers shall record actions taken for each incident and motorist assist. A monthly activity report will be submitted by the service provider to the NDOT program manager.” (*Freeway Service Patrol RFP, Reno, NV*) –This is not a particularly well-written statement since it does not specify what actions should be recorded and what activities should be reported. Stating that all activities related to motorist assistance will be reported is impractical, as that potentially makes a contractor responsible for reporting activities such as activations of the brakes and turn signals—items that have little to no bearing on the performance.
- “The service provider shall respond in writing to any complaints received by NDOT regarding the Freeway Service Patrol program within 10 working days of the complaints. This report must include the purpose of the complaint, name of patrol driver and the name and phone number of the motorist. Any action taken in response to this complaint must be included in the report.” (*Freeway Service Patrol RFP, Reno, NV*) –This statement is more precisely written in this it specifies a timeframe and the minimum amount of information that should be included in the report.
- “The cost of providing secretarial services for typing of correspondence, reports, and records shall be included in the Consultant’s overhead.” (*Operation of TMC in Capital Region RFP, NYSDOT*) –This statement is a contract requirement and not a performance goal. It would be difficult to judge a contractor’s performance on this item.
- “The consultant shall keep records of all reports of traffic signal malfunctions and shall record the maintenance calls that verify their receipt of the maintenance request.” (*Operation of TMC in Capital Region RFP, NYSDOT*) –This statement is very vague (all reports) and doesn’t actually tell a contractor what performance is being examined or how the contract is being evaluated.
- “At any time of the day or night and any day of the week, the Consultant shall receive requests from Department personnel regarding problems with these programs, respond to those requests in accordance with NYSDOT and CRTMC Standard Operating Procedures, and keep records of all reports of these requests and shall record the details of how those requests were handled.” (*Operation of TMC in Capital Region RFP, NYSDOT*) – This statement specifies receiving reports at any time, but doesn’t state how reports are to be received (phone, fax, email, etc.). In addition, the statement says that all records and details should be recorded but doesn’t provide specificity in what attributes of the response are actually being evaluated, such as timeliness, customer satisfaction, correctness of response action, etc.

## **Enforcing the Terms of the Contract**

With respect to contracted services, there is usually a focus on implementing the services as per the contractual terms, or enforcing the terms of the contract. A sampling of contracts revealed several areas of enforcement that received widespread attention, including

- response to motorist complaints,
- provision of adequate numbers of trained staff to handle operational needs,
- provision of trained and polite courtesy patrol workers,
- establishment of good working relationships with management,
- establishment of good working relationships with external partners, such as other agencies, cities, and state,
- compliance with equal opportunity obligations,
- quality control programs to reduce equipment failures,
- Access restriction of contractor personnel to designated areas,
- TMC operator error monitoring, and
- posting of the required bond provisions.

In accordance with general good practice in contracting procedures, it is recommended that contracts spell out explicitly what type of situations must be monitored, on what basis, what corrective actions are expected if parameters are exceeded, and what penalties will be assessed.

## **Mitigating Contractual Risks**

Risks are an inherent part of the contracting process. It should be recognized that risks occur on both sides of the table. From the contracting agency perspective, a significant risk is that the contractor will not perform to the stated requirements. Contractual language should be based on requirements, not expectations. Agency expectations, if present, must be translated to requirements, with precise language, reporting needs, and a carefully considered set of metrics (performance measures) from which to perform an evaluation of the contracted services.

From the perspective of the contractor, risk also is an inherent part of the contracting process. If performance requirements cannot be met with the estimated personnel, significant cost overruns can occur, leading to financial difficulties. Under estimating the needs for tasks such as data collection, reporting, and other background work can impose a significant hidden penalty on the workforce necessary to perform the contracted service.

The opposite of risk is reward. The reward of a well-written contract is a process that ensures that agency needs are being met in a cost-effective manner, which facilitates improvement in the system performance and agency efficiencies, as well as demonstrating good stewardship of agency resources. One aspect to keep in mind throughout contract development is that in some

instances, additional efficiencies may be realized if the contractor has a say in developing the evaluation strategy. This essentially elevates the contractor to a partner, which can be a significant, but intangible, inducement for excellence in the performance of the contract.

## **Evaluation Measurement Matrix**

The sections above detail how performance measurement can be used to assess contracted TMC services. While not every facet of performance measurement is discussed, enough significant detail is presented that should allow agencies to develop an overall performance measurement framework for assessing contracted services. In addition, information was presented about the development of good measures, major stumbling points within the process, and how to incorporate aspects of performance monitoring such as data collection needs into contractual language.

This final section of the chapter provides a few examples of typical measures that can be considered as part of the family of evaluation measures. These examples are not meant to be representative of the entire set of measures a contract should use, but rather illustrative of the wide range of measures that could be developed specific to an agencies needs and type of contracted service.

In Table 8, the following definitions are used for the column headings:

- Area – this is a listing of classification or function that is being outsourced.
- Desired outcome – This column answers the question of “What do we want to accomplish as an end result of this contract?”
- Required service – This column answers the question of “What task must be accomplished to produce the desired outcome?”
- Performance standard – This column answers the question of “What benchmarks should be established for monitoring the activity in terms of areas such as completeness, accuracy, reliability, satisfaction, etc.?”
- Monitoring method – What type of monitoring is appropriate for this benchmark? How can we determine that success has been achieved?

**Table 8. Example Performance Measures.**

Area	Desired outcome	Required service(s)	Performance standard(s)	Monitoring method(s)
<b>Staffing</b>	TMC must be able to maintain full staffing levels during weather and other emergency events.	<ul style="list-style-type: none"> <li>The contractor shall provide qualified operators to adequately staff TMC during emergency events.</li> </ul>	<ul style="list-style-type: none"> <li>TMC shall have a full complement of operators during 95% of all emergency events.</li> </ul>	<ul style="list-style-type: none"> <li>Review of operator times sheets.</li> <li>Random sampling during weather events.</li> </ul>
<b>Courtesy patrol</b>	Courtesy patrol is regarded as helpful, polite, and a useful expenditure.	<ul style="list-style-type: none"> <li>The contractor shall provide courtesy patrol drivers who are trained to handle minor roadway emergencies in a safe manner while being respectful and polite.</li> <li>Procedure for handling courtesy patrol complaints.</li> </ul>	<ul style="list-style-type: none"> <li>Complaints from assisted users should number 5% or less of total assists.</li> <li>Complaints shall be addressed in 5 working days, based upon TMC resolution standards, with written response to complainant and TMC courtesy patrol manager.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly review of all complaints, with resolutions, with contract manager.</li> <li>Follow-up customer surveys with courtesy patrol users to assess quality of the services, and politeness of the drivers.</li> </ul>
<b>TMC operations</b>	TMC operators manage incidents in a timely and accurate fashion.	<ul style="list-style-type: none"> <li>The contractor shall provide TMC operators who are trained in incident management.</li> <li>The contracted operator staff will handle all incidents in accordance with established TMC operations manual.</li> <li>Operators will handle initial incident response within prescribed time requirements.</li> <li>Operator actions will be logged, with time stamps, in an agreed-upon format.</li> </ul>	<ul style="list-style-type: none"> <li>100% of operators employed by contractor must complete approved incident management training within 30 days of initial employment.</li> <li>Operators will respond to minor incidents within 5 minutes of detection by automatic systems.</li> <li>Operators will respond to major incidents within 2 minutes of detection by automatic systems.</li> <li>95% of the time, operators will utilize the correct response scenario and messages as prescribed by the TMC incident scenario database.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor training and certification records.</li> <li>Periodic sampling of operator logs and comparison to automated system alert times.</li> <li>Periodic sampling of operator response messages.</li> </ul>

Area	Desired outcome	Required service(s)	Performance standard(s)	Monitoring method(s)
<b>Roadway monitoring systems maintenance</b>	TMC equipment used to monitor roadways must be functioning, accurate, and well maintained, with maintenance needs being addressed in a timely manner.	<ul style="list-style-type: none"> <li>• The contractor shall provide calibration records of all roadside equipment.</li> <li>• The contractor shall receive reports of routine equipment failures on a 24/7 basis using an information entry tool.</li> <li>• The contractor shall receive reports of critical equipment failures via a paging or manned telephone system on a 24/7 basis.</li> <li>• The contractor shall address reports of malfunctioning equipment to assess options for repair or replacement.</li> </ul>	<ul style="list-style-type: none"> <li>• Calibration procedures will be performed on 10% of all deployed equipment per month, on a rotating basis.</li> <li>• A web-based system with a 99% uptime performance will receive and record all routine equipment failure reports and disseminate that information to managers on the contractor staff.</li> <li>• A telephone or paging system will be employed which delivers critical failure reports to contractor managers within 5 minutes of report.</li> <li>• Contractor will assess routine equipment failures within 5 working days of failure notification.</li> <li>• Contractor will assess critical equipment failures within 4 hours of failure notification.</li> <li>• For the duration of the contract, the contractor will maintain on-staff at least 2 crews cross-trained in assessing and repairing equipment failures on the roadside monitoring devices in use.</li> </ul>	<ul style="list-style-type: none"> <li>• Review of contractor hiring records</li> <li>• Review of work request logs received through automated system.</li> <li>• Review of work request logs and response times.</li> </ul>



## Chapter 5 – Lessons Learned

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### Chapter Overview

The purpose of this chapter is to synthesize the lessons learned from the review of current and recommended practices described in earlier chapters and the lessons learned from a survey of practitioners. A description of the survey and its results are provided in the following sections prior to a listing of the lessons learned. Chapter 5 combines findings from Chapters 2, 3, and 4 as well as findings from the project survey described in this chapter.

### Findings from TMC Agency Survey

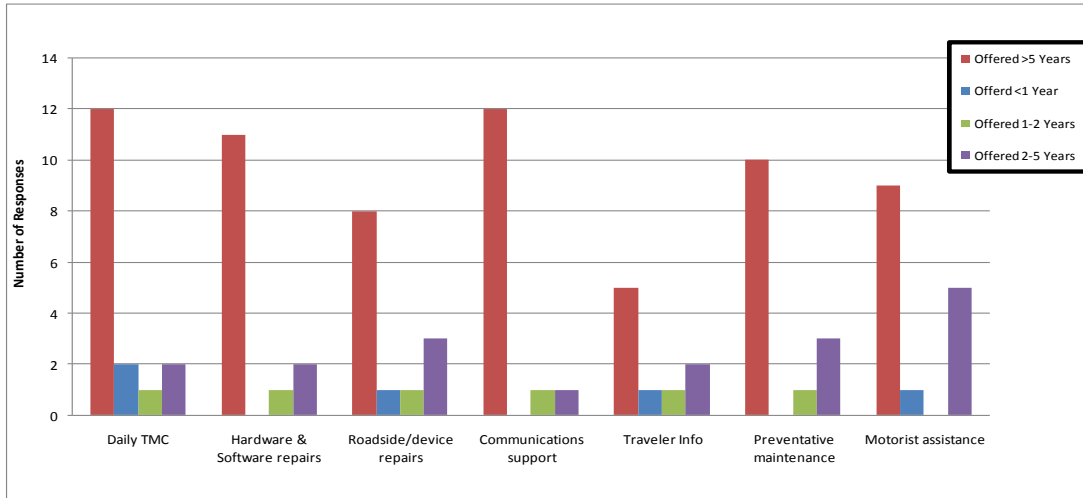
As part of this TMC services project, the research team conducted a survey of TMCs to determine their experiences with outsourcing. The electronic survey was created and administered by TTI with invitations to participate sent by FHWA.

The survey characterized the type and level of outsourcing in use by various TMCs. Respondents were first asked to identify their TMC by name and indicate the area it covers. Information specific to the individual respondent was not requested, thereby making the survey anonymous. However, an option was provided at the end of the survey to provide contact information for follow-ups as necessary.

After the identification section, a question was asked to determine if the TMC was operated by a single agency or a consortium. The respondents were asked to identify which types of functions or services were currently in operation. The survey also asked how long these functions/services had been in place, with the following choices available for a response:

- Not offered by TMC,
- Offered <1 year,
- Offered 1-2 years,
- Offered 2-5 years, and
- Offered >5 years.

TMCs had additional response opportunities available to describe any additional services not in the list provided. Figure 10 illustrates the responses to the questions.



\* NOTE: Seven responses listed “Other Functions/Services Offered by your TMC”, but no descriptions/duration times were given.

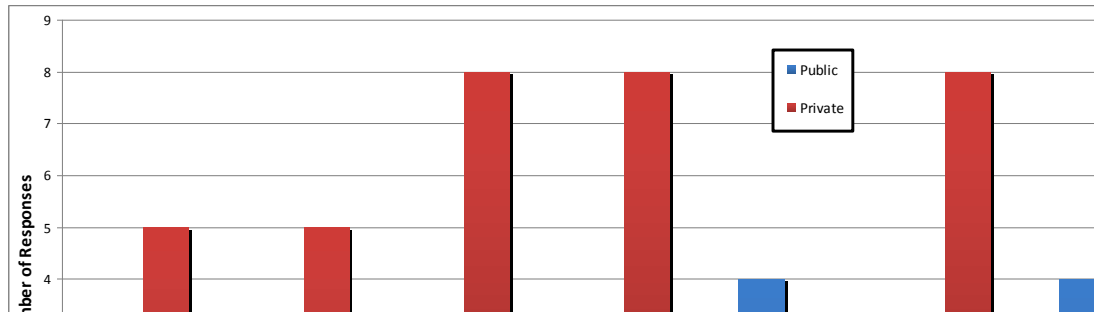
**Figure 10. Functions and Services of TMC**

With the background information complete, the survey moved directly into questions regarding outsourcing. The first question was “Does the TMC *currently* outsource any function or service?” to which nearly 90% of the respondents indicated “yes.” Next, the respondents were asked to identify what types of services they outsourced (see Figure 11), with the following available choices:

- Freeway/arterial/transit operations/management,
- Hardware and software support/upgrades,
- Roadside component/device maintenance and repairs,
- Communications installation/upgrade and maintenance support,
- Traveler information/511 operations,
- Preventative maintenance, and
- Motorist assistance program/service patrol/highway helpers.

In some cases the outsourced agency supplying the work is a public agency. For instance, motorist assistance services might be outsourced to an agency with experience and resources to conduct patrols, such as sheriff’s department. Therefore, a subsequent question asked whether the service agency was public or private. Responses showed:

- Of the 19 participants responding, 17 currently contract/outsources functions/services from TMC operations.
- The graph in Figure 12 indicates which functions were contracted/ outsourced by another private or public company.

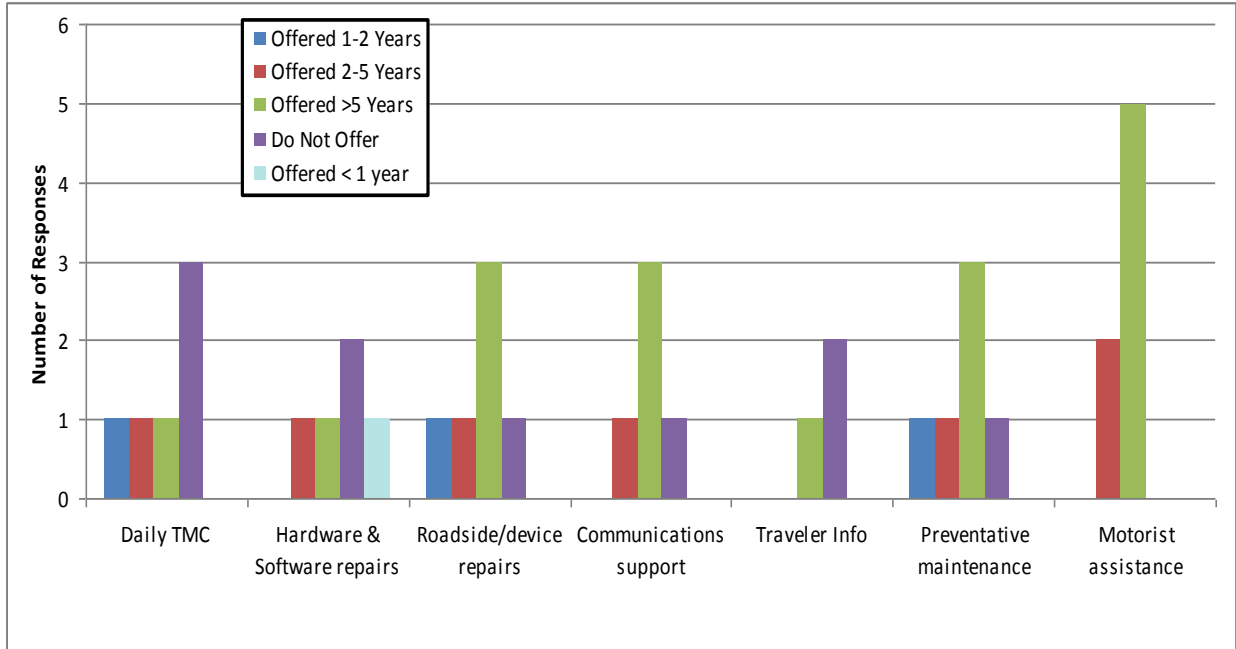


**Figure 11. TMC Functions Currently Outsourced**

Responses were specific to both the length of time that a service was outsourced and to whom (another agency or a private company). For each of the items shown in Figure 11, the following responses were available.

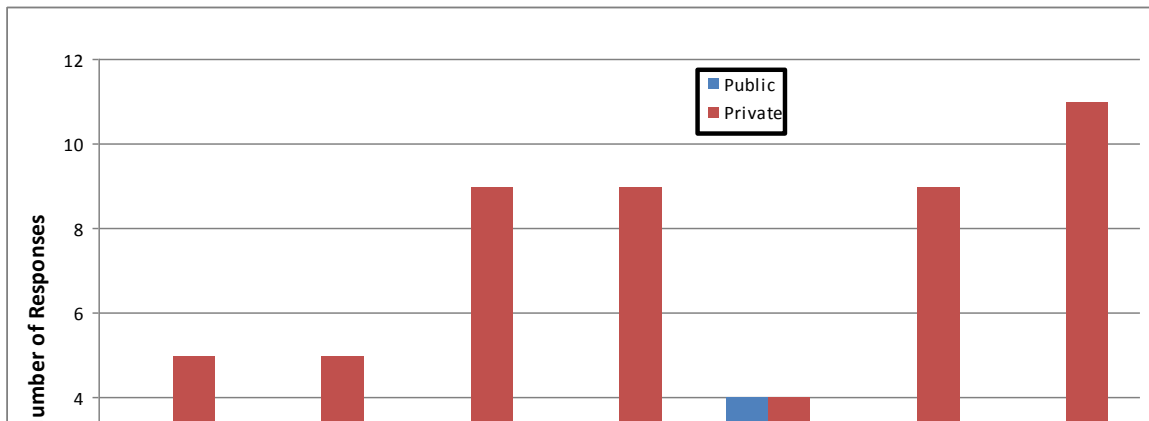
- Do not Contract/Outsource,
- Contract/Outsource to another public agency for < 1 year,
- Contract/Outsource to another public agency for 1 - 2 years,
- Contract/Outsource to another public agency for 2 - 5 years,
- Contract/Outsource to another public agency for > 5 years,
- Contract/Outsource to a private company for < 1 year,
- Contract/Outsource to a private company for 1 - 2 years,
- Contract/Outsource to a private company for 2 - 5 years, and
- Contract/Outsource to a private company for > 5 years.

The same set of questions was then asked for services that the TMC has outsourced *in the past* to see if the trends have changed over time (see Figure 12). Finally, the TMCs were asked to answer if they would outsource the same set of services in the near future, and if they would do so to a public agency or a private company.



**Figure 12. Previously Outsourced Functions**

Of the 19 survey participants, 8 are considering outsourcing in the future. Figure 13 shows which functions/services participants wish to contract/outsoure and if they intend to contract/outsoure to another public agency or to a private company (respondents were allowed to list more than one function).



**Figure 13. Is Your Agency Considering Outsourcing within the Next Few Years?**

The middle part of the survey included several questions related to the specifics of outsourcing decisions and mechanisms. For example, respondents were asked to identify the reasons for outsourcing TMC services. Table 9 shows the primary reasons given in the responses. Staffing issues pertinent to skill sets, hiring, and training influenced the majority of the decisions. The choice “limitations on operating funds” was the second most important reason, especially in cases where capital project funding was available.

**Table 9. Survey - Reasons for Outsourcing**

Primary Reasons	Number of Responses
Cost Savings	4
Lack of qualified or skilled personnel in-house	7
Desire to maintain staffing level (or inability to add FTEs)	10
Efficiencies in the staffing process (i.e., easier to find "consultant" qualified personnel than to hire/train in-house staff)	7
Flexibility to change with conditions over time, e.g., dynamic technologies	4
Funding considerations (e.g., ability to purchase services within capital project versus ongoing operation procedures)	6
Regional policy or institutional policy	1

Respondents were also asked to identify the type of contracting mechanism. The primary type of contract was a firm, fixed-price contract (see Table 10).

**Table 10. Types of Contracting Used to Procure TMC Services**

Types of Contracting Mechanisms	Number of Responses
Firm, fixed-price contract	8
Fixed-price with incentives contract	2
Fixed-price with award fees	0
Cost-reimbursement contract	2
Cost-reimbursement with incentives	1
Cost plus fixed fee	4
Other	2

An important piece of information requested from the TMCs was how the TMCs managed their outsourcing contracts. Table 11 shows the procedures used most frequently. The majority relied

on staff-intensive activities: action lists, submission and review of progress reports, and on-site monitoring.

**Table 11. Survey - Tools Used**

Tools Used	Number of Responses
Progress reports	8
Action item list	10
Service tag processing	2
Weekly staff meetings with contracted staff	4
Software tools/applications	5
On-site monitoring	8
Review of invoices	9
Other	2

The TMCs were asked what methods they used to assess performance. There was a wide range of methods used by the respondents. Table 12 shows the methods given in responses.

**Table 12. Survey - Methods Used**

Methods Used	Number of Responses
Random sampling/inspection/ monitoring of logs by agency	0
Periodic sampling/inspection/ monitoring of logs by agency	3
Contractor generates performance report after event or service (self-reporting)	3
Contractor generates performance report periodically (self-reporting)	3
Customer surveys	2
Third-party audit of performance	0
Contract incentives or penalties	1
Other	2

## Lessons Learned

The following three sections identify key lessons learned from the review of existing practices and the stakeholder surveys. The information is organized into three categories: procurement, management, and evaluation.

### Procurement

- The availability and presence of desired service providers must be balanced with the desire/need to obtain the staffing and resources for TMC services.
- In some rural locations it may be challenging to encourage private sector organizations to provide services if there are not opportunities to conduct other related business in the region. In other circumstances, such as when the economy is in a downturn, it might be possible to obtain high-quality services at beneficial prices because of a highly competitive marketplace.
- Contracts that allow consideration of best value through some combined weighting of services and price have become viable options for contracting TMC services.
- When incentives are included in contracts relating to technical performance, the incentives can have a meaningful impact on the contractor's delivery of the work.
- Duties and commitments must be formalized through legally binding agreements so that all roles and responsibilities are clearly understood, defined, and agreed to.
- Encouraging competition fosters creativity and allows the contractors to propose their best ideas about how to meet the agency's goals and objectives, ultimately leading to a "best fit" of public and private partners working together to provide the TMC services.
- A well-written contract identifies outcomes that ensure agency needs are being met in a cost-effective manner. This facilitates improvement in system performance and agency efficiencies, as well as demonstrates good stewardship of agency resources.

### Management

- Outsourcing can provide a flexible means to obtain specialty skills and to build upon existing core transportation operations, functions, and assets.
- Recruitment and retention of employees is linked in part to career path opportunities. A TMC agency may not be able to offer adequate career opportunities for specialty skilled employees. A contractor with a broad base of clients may be more successful at providing career path incentives and/or salary opportunities than a public sector funded agency.
- A benefit of outsourcing is the ability to meet workload and schedule requirements. Another benefit is access to special skills and equipment more readily available in the private sector.
- Keys to effective and successful outsourcing are how clearly the project goals and objectives align with the procurement type to be used, which contractor is selected, and the ability of agency personnel to manage the contracted staff.

- When using agency staff to supplement or manage contracted services, TMC positions should be created as new positions rather than being carved from existing personnel and existing operating budget allotments.
- Positions to supplement or manage contracted services should not compete with existing operational needs.
- In accordance with good practices in contracting procedures, contracts should spell out explicitly what type of situations must be monitored, on what basis, what corrective actions are expected if operational parameters are exceeded, and what penalties will be assessed.
- The contract should identify what activities are required and what performance measures are enacted and suspended during exceptional events, such as hurricane evacuation.

## **Evaluation**

- Examine the list of performance measures and ensure that you will have information that can easily and quickly be understood by the target audience.
- The key to a successful program is to not rely on any single type of measure.
- In any family of measures (classification scheme), there will be multiple measures of each type used in an ongoing TMC program. The goal of performance measurement is to identify measures that help the TMC to better manage, control, and improve its outsourcing operations.
- It might be advantageous to include collection of some performance measures in the scope of work to be performed by the TMC service contractors.
- Legislative and executive officials develop greater expectations as states and public agencies receive more funding, even if these dollars do not account for the addition of new employees.
- Rising expectations of existing staff are especially felt during periods of economic recession. However, in general there is a trend toward greater accountability and transparency for all public agencies and services. These rising expectations emphasize the utility of performance measures to provide high-quality and meaningful communications to policy makers, public officials, and travelers (see Chapter 4 for additional information on TMC performance measures).
- Comparisons of the cost-effectiveness of outsourced versus in-house activities can be difficult to quantify accurately.
- The agency must carefully choose measures with relevance and importance to successfully executing the work and meeting the goals and objectives. The evaluation criteria weighting must be carefully developed to get the best overall value from the various contractor proposals.
- Performance measurement should be a systematic and ongoing component for evaluating TMC services contracts.
- Using a consistent methodology enables an agency to collect and evaluate information for the purpose of achieving multiple goals, such as increasing efficiency and meeting customer expectations. Tracking these measurements, both over time and compared to



overall goals, shows agency progress and sets accountability criteria for judging and paying on performance-related contracts.

- Performance indicators that are explicit and easily understood are important to effective contracted services management.
- No one, neither the contractor nor the TMC operating agency, benefits when performance measures that are used as tools for contract evaluation or used to convey operational effectiveness to policy makers and travelers can be easily misconstrued.
- The challenges of establishing goals, objectives, measures, targets, and identifying and collecting data are intrinsic parts of any performance measurement system and should be viewed more as steps in a system than as challenges to be overcome.
- The information gained from ongoing focused evaluations allows refinements. These refinements can be planned for and accomplished with greater accuracy and efficiency than would be possible without a performance management system. Additionally, the availability of a solid basis for future plans may lead to an increase in dollars available for operational improvements.
- The implementation of any performance measurement program is going to result in some efforts that are a resounding success and others that will be deemed a failure.
- Performance measures need to have a purpose – there has to be a reason for measuring something. If there is no reason, then it becomes “just a reporting exercise that no one looks at.” The use of a small but meaningful set of measures is vastly preferred to a large and cumbersome collection.
- Understanding the fundamentals of how to sample the data to obtain insight into the contractor performance is a key aspect of any evaluation. A key aspect of sampling strategies for performance measures is a comparison to ensure that the sample is representative of the entire population. Without this check, the results may not be representative of the entire system.

## Chapter 6 – Case Studies

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### Chapter Overview

Thirteen solicitations for contracted TMC services were reviewed during the preparation of this document. Three of the requests for proposals (RFPs) were selected for inclusion in Chapter 8 – Chapter 8 includes solicitations for the New York State Department of Transportation, the Florida Department of Transportation, and the Virginia Department of Transportation. Those and RFPs from other agencies are examined in this chapter; however, the New York, Florida, and Virginia solicitations are highlighted.

In the New York example, the contractor provides operations staff for two TMCs in Albany. In the Florida example, the contractor provides operations of the SunGuide TMC and other services such as public outreach and utility location. Similarly to the Florida example, the Virginia TMC services contract requires the contractor to operate a TMC and to provide other services such as public outreach and utility location.

The three highlighted examples illustrate a range of contracting options. New York asks for contractor-supplied TMC staff members that work at the direction of the sponsoring agency. In Florida and Virginia examples, the contracts seek a more turnkey operation where the contractor provides staff resources to meet performance objectives. In these last two cases, the contractor will decide on the total quantity of employees and the compensation package for its workers. Virginia adds incentives to the performance-based concept.

### Key Features

Table 13 provides a snapshot of key features from the statements of work for the three solicitations in New York, Florida, and Virginia. In some cases, the appropriate section number from the statement of work has been noted in the table. The complete statements of work are located in Chapter 8 – Example Requests for Proposals.

**Table 13. Key Features of Statements of Work**

	New York State DOT	Florida DOT	Virginia DOT
<b>Type of contract</b>	Standard contract with hourly rates	Indefinite quantity agreement (Section 6.1)	Fixed-cost reimbursable with incentive fee basis
<b>Performance based contract</b>	No	Yes (Section 6.7, 6.8)	Yes
<b>Performance criteria (when applicable)</b>	NA	<ul style="list-style-type: none"> <li>• Staff and Schedule</li> <li>• TMC Operations Services</li> <li>• Contract Management Services</li> <li>• TMC Information Technology (IT) Services</li> <li>• Miscellaneous TMC Operations Support Services</li> <li>• ITS Utility Locates Services</li> </ul> (Section 1.0)	Operations & Maintenance <ul style="list-style-type: none"> <li>• FTMS</li> <li>• Maintenance</li> <li>• Education &amp; Outreach Programs</li> </ul> (Section 3)
<b>Proposal Structure</b>	Cost proposal and sample contract (Section IV)	None listed	Fixed cost reimbursable (Section 4.1)
<b>Term</b>	3 years, can be renewed depending on performance. (Section I. E.)	5 years. Can be renewed. (Section 6.2., 6.3)	3 years with two optional 2-year extensions (Section 1.5)
<b>Evaluation of proposals</b>	Section V.	None listed	Technical approach, schedule, qualifications (Section 7.1)
<b>Evaluation of price</b>	Section VI. E.	None listed	Formula (Section 4.3)
<b>Areas included in the RFP</b>	<ul style="list-style-type: none"> <li>• System operations</li> <li>• Roadwork information &amp; lane closure coordination</li> <li>• System computer network and hardware/software support</li> <li>• Training</li> </ul> (Section II. A., Section III.)	<ul style="list-style-type: none"> <li>• TMC Operations Services</li> <li>• Contract Management Services</li> <li>• TMC Information Technology (IT) Services</li> <li>• Miscellaneous TMC Operations Support Services</li> <li>• ITS Public Outreach</li> </ul>	<ul style="list-style-type: none"> <li>• IT</li> <li>• Transportation Management</li> <li>• Program Control, Oversight, and Coordination</li> <li>• Public Outreach and Communication</li> </ul> (Section 1.4)

		Services • ITS Utility Locates Services (Section 1.0)	
<b>Number of firms selected</b>	None listed	None listed	Select two or more offerors (Section 7.2)
<b>Training</b>	Yes	Yes, the consultant is responsible for providing training (Sections 4.1, 4.3, 4.7, 4.8.2.4, 6.9)	Yes, (Section 2.2.9.3, Section 2.3.5.5, 2.3.5.6)
<b>Incentive fee</b>	None listed	None listed	Yes. Incentive fees are calculated using a point system that awards points for performance against the specification. (Section 4.2)
<b>Payment schedule</b>	Monthly, Section VI. E.	Sections 4.8.1, - 4.8.5,	Section 8.1, 12, 13
<b>Cost ceiling</b>		Section 6.6.	Yes, for each task
<b>Software development</b>	Yes	Yes, (Sections 3.1- 3.5, 4.1.2, 4.3)	Yes (Section 2.2.2.4, 2.2.13.1, 2.3)

## Contract Features

The following sections provide examples of the key features identified in Table 13 based on the review of the 13 solicitations reviewed.

### Types of Contract

There are several types of contracts used to secure TMC services. Of the 13 documents reviewed, the following contract types were used. This range of contracts indicates that local procurement and contracting laws should not be a substantial impediment to contracting for TMC services:

- Cost plus fixed-fee basis (Rhode Island DOT)
- Fee proposal with hourly costs (Reno, NV)
- Cost estimate (Rhode Island DOT)
- Standard contract with hourly rates (New York State DOT and California DOT)

- Fixed-fee basis (Michigan DOT)
- Hourly rates based on time and materials (California DOT)
- Indefinite quantity agreement (Florida DOT)
- Fixed-cost reimbursable with incentive-fee basis (Virginia DOT)

### **Performance-Based Contracts**

Performance-based contracting allows an agency to acquire services via contracts that define what is to be achieved, not necessarily how it is done. (xx, GovPro) Ten of the thirteen documents reviewed referenced performance measurements and incentives in the contract for at least some aspects of the work. The documents came from the following agencies (some agencies had multiple documents): Rhode Island DOT, Connecticut DOT, New York State DOT, California DOT, Florida DOT, Virginia DOT, and Texas DOT. Some of the criteria used to evaluate performance in these contracts include: adherence to staffing, response to incident identification within five minutes, percent of on-time deliverables, and staff retention. See Section 3.1 of the Virginia DOT request for further examples.

### **Performance Criteria**

The Rhode Island DOT, Connecticut DOT, New York State DOT, California DOT, Florida DOT, Virginia DOT, and Texas DOT listed performance criteria in their contracts. Florida and Virginia had the most extensive performance criteria of the 13 contracts reviewed for this report. For example, the Virginia DOT listed the following categories of criteria: staff and schedule, TMC operations services, contract management services, TMC information technology services, miscellaneous TMC operations support services, and ITS utility locate services.

### **Term**

Most agencies have minimum contract periods of performance of at least three years, and they frequently have options for renewal and extension of time. For instance:

- The Rhode Island DOT specified a three-year period of performance with renewal options for an additional two years.
- The New York DOT identified a contract period of three years.
- The Florida DOT specified a five-year period of performance.
- Virginia DOT required three years with two optional two-year extensions for a total of seven years.

## Evaluation of Proposals

The type of contract and applicable laws will often dictate the procedures used to evaluate proposals. However, in most cases there will be provisions to evaluate proposals based in part on factors other than price. The following examples illustrate this approach.

- Excerpted from a Rhode Island RFP:

*Firm's Suitability to Project:* As part of the evaluation process, RIDOT will take into consideration the size and scope of the project proposed in determining the technical suitability of a firm to provide the requested services. RIDOT will assess each firm's technical capacity and relative firm size in relationship to the level of project complexity.

- Summarized from a New York State DOT RFP:

Proposals are evaluated based on the technical and cost criteria. Technical and Management represent 65% and include experience, organization and staffing, approach and scope of services. Cost and contract proposal represents 35% of the points scored. See Part V "Criteria for Evaluation of Proposals" of the New York scope of services for additional information.

- The Virginia DOT identified the following factors applicable for evaluation of proposals: technical approach, schedule, and qualifications (in Section 7.1 of their RFP).

## Evaluation of Price

How offering price is evaluated depends on the local laws and statutes and the type of contract used. As an example, the Virginia DOT evaluated an offeror's price using a formula that looked at the ratio of the lowest price offered compared to the price of the offer being evaluated.

## Number of Firms Selected

The public agency sponsors frequently asked for the flexibility to award to more than one firm. For instance, TxDOT indicated it could proceed with a single or multiple award decision as follows.

- Single Award: One purchase order awarded to a single vendor.
- Multiple Awards: A multiple award is the award of multiple purchase orders for the same line item(s) from a single solicitation to two or more vendors to provide the same or similar goods or services.

## Training

Several of the documents include training responsibilities.

- Rhode Island DOT:

*Technical Guidance/Program Development:* Develop, implement, and maintain new tools or identify existing tools to be used to capture, monitor and report on system performance and benefits data; provide training in all areas showing a need; all training is to be provided under RIDOT direction. Assist in the implementation of RIDOT Service Patrols and when implemented, establish performance measures and track incident data.

- New York State DOT:

*Training Special Provisions:* The CONSULTANT will provide for the maintenance of records and furnish periodic reports documenting their performance under this Training Special Provision.

- Caltrans:

Provide monthly safety training to all staff. Provide a monthly report of the content and a list of all staff attended this safety training.

- VDOT:

The contractor shall ensure all staff has the required training.

- Florida DOT:

In this contract, the consultant is responsible for all training. Specific references to training are found in Sections 4.1.1, 4.1.3, and 4.3 of the Florida DOT contract.

## **Incentive Fee**

- Virginia DOT:

*Incentive Fee Program Overview:* VDOT has chosen to let this contract on a fixed cost reimbursable with incentive fee basis for the O & M work scope. The contractor cost proposal will establish the cost reimbursable ceiling amount. Contractors will be awarded incentive fees in addition to their cost to perform work under this contract. The fees are calculated using a point system which awards points for performance against the specification contained in Section 3. . . .The contractor will apply for their **incentive** fees on a quarterly basis. VDOT has opportunity to challenge the contractor's incentive fee request. In the event there is a dispute, the Management Team will determine the point allocation for the award fee calculation.

## Payment Schedule

- New York State DOT:

Monthly progress payments will be made based on actual allowable costs incurred during the period. Bills are subject to approval of the State's Representative. A percentage of the Consultant's Fee will be paid with each payment.

- Virginia DOT:
  - See pages 104, 106-108 of the contract

## Cost Ceiling

Since the amount of work requested from the contractor could vary over the 3+ year life of the contract, agencies and contractors benefit from a mutual understanding of the maximum work that will be performed. Here is excerpted wording from Florida's RFP in Section 6.6:

The Budgetary Ceiling of this Agreement shall be the winning Proposer's Price Proposal. Should the winning Proposer's Price Proposal exceed the Department's Procurement Budget, the Department shall reserve the right to only award parts of the Agreement. Services categorized as "Basic" in **Exhibit "C", Price Proposal** shall have preference for award. Services categorized as "Discretionary" shall be awarded when additional funding is made available.

## Software Development

Software is frequently a component of TMC service contracts. To verify software competence offerors can be asked to describe their software development methodology in their proposal. Section 2.2 of the Virginia DOT statement of work includes details about software management, documentation, testing and other activities to verify competency. In addition it requires a contractor lead session that demonstrates understanding of the agency's software. The applicable text is as follows:

To ensure that there is full understanding concerning the system requirements, VDOT expects the Contractor to lead a session for requirements review, requirements clarification, and, if appropriate, requirements "scrubbing" to support the development of the Software Development Plan. This session shall take place no later than 2 months after initiation of this task. A draft of functional requirements, with changes noted, shall be submitted to VDOT for review at least two weeks prior to the meeting. The final version of the functional requirements shall be included in Software Development Plan.



## Key Messages from Case Studies

The case studies illustrate that there is no single contracting strategy to secure TMC services. As the terms of the documents illustrate, there is not even a single definition of the types of services that can be provided. Instead, a wide variety of services can be provided through contract. Each agency should examine their environment and select the contracting approach that meets their needs. Generally:

- Most agencies include some performance-based elements in their contracts.
- A few agencies use incentive fees to reward performance.
- Contract terms are three or more years. They typically have the option for extension.
- Agencies evaluate proposals using cost and other factors. Cost is not the exclusive decision criteria.
- Many agencies retain the option to award to multiple firms. This can allow the agency to more expeditiously provide services if multiple TMCs are involved. It may also allow them to partition some work to ensure quality. For instance, one firm may develop software and the other may perform software testing.
- Services can include management of other contractors. The prevailing example at this time tends to be motorist patrols that help push stalled motorists to the side of the road, assist with traffic control at accident scenes, and provide other roadside mobility activities. But management activity could also include other contractors such as those that provide wrecker dispatch, ITS device maintenance, roadway lighting services, sign maintenance, and striping.
- TMC-related software is a service that is being provided in TMC service contracts.

## Chapter 7 – References

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## **TMC Outsourcing Contracts**

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## **Chapter 8 – Example Requests for Proposal**

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This chapter contains three sample solicitations from the New York State Department of Transportation, the Florida Department of Transportation, and the Virginia Department of Transportation. These three highlighted examples illustrate a range of contracting options, and Chapter 6 –discusses them as case studies.

Please note that the examples in this chapter are not identical to the original solicitations issued. Some changes in format from the original document have been made in order to facilitate inclusion in this report, and some items (such as forms) needed to be referenced instead of included fully. However, content and overall approach provides well thought-out examples. Some errors may have resulted from conversion of file formats.

To enable printing and reviewing of this document, the complete RFPs for this chapter are submitted as a separate document. These will be inserted in the main document in the final report.

## **Appendix A- Introduction to Performance Measurement**

As introduced in Chapter 4, performance measurement allows decisions to be made based on data gathered via a scientific approach. It employs a methodology where data are gathered to determine progress towards specific objectives that the organization has set. Using a consistent methodology allows an agency to collect and evaluate information for the purpose of achieving multiple goals, such as increasing efficiency and meeting customer expectations. Tracking these measurements, both over time and compared to the overall goals, shows agency progress as well as setting accountability criteria for judging and paying on performance-related contracts.

Performance measurement is not new. In fact, the formalized evaluation concept first originated in the 1940s and 1950s, with the push for Total Quality Management (TQM). TQM is a management philosophy which aims to integrate all organizational functions to focus on meeting customer needs and organization objectives. The roots of TQM were advanced in the United States by Dr. W. Edwards Deming, an American statistician. Initially, Deming applied his techniques to improve the quality of military products during World War II. After the war, Deming taught TQM techniques to Japanese industries, most notably the automobile industry.

Although American industries were somewhat slower to establish TQM programs, over time the concepts have caught on and have been implemented as part of standard business practice. Perhaps the step that best highlighted the use of performance measurement as a scientific and systematic assessment tool was a benchmark study released by the federal government in 1997 (2). This study advocated the use of performance management across all federal agencies and provided an overview, best practices summary, and framework to assist in that process.

### **Application of Performance Measurement to TMCs**

The concept of a centralized traffic management system has existed for decades. Cities such as Houston (1922), Chicago (1926), and Philadelphia (1930) pioneered the use of remote control of the signal equipment at critical intersections across the city. Later, cities such as Los Angeles, Chicago, and Houston pioneered the development of a vast network of monitoring capabilities across the urban freeway system which in part allowed for a more rapid response to incidents. These types of facilities, known collectively as Traffic Management Centers (TMCs), also provided agencies some degree of flexibility in how facilities were operated, as well as the ability to deal with problems such as increasing congestion, levels of traffic, and significant reconstruction efforts.

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Over time, beyond the initial role of controlling traffic signals, TMCs have taken on a significant role in the goal of managing traffic and mitigating congestion. Some of the typical tasks that a TMC might perform today include:

- monitoring roadways,
- implementing responses to incidents,
- providing motorist assistance,
- performing equipment maintenance,
- establishing and maintaining communication systems,
- disseminating information to the public and other outlets, such as media,
- reporting system status information, and
- taking part in the planning and response situations for special events, such as inclement weather or large-scale sporting events or concerts.

Regardless of whether these operations are performed in-house or outsourced, the use of a performance measurement process can track progress over time, evaluate if goals are being met, meet customer expectations, set accountability criteria, and identify areas for improvement.

## **Benefits of Performance Measurement**

The use of a performance measurement process can offer a number of significant benefits to TMCs. In particular, many TMC functions are highly visible to the ultimate customer, the traveling public. While a particular motorist might notice pavement conditions, a reduction in a bridge weight limit or some other roadway condition, items such as congestion, increased travel times, incidents, blocked routes, and more, are attention grabbing and something that public has shown they care about. Performance measurement can be used to support both the traveling public and the TMC management. While the traveling public would want to see information on travel time changes, TMC management would typically want to also see the costs associated with the program and the efficiency of how it is being run. In general, the traveling public will care the most about measures that affect their travel, while TMC management will care the most about the measures that detail their ability to provide effective programs.

The real benefit to using performance measurement for the evaluation of contracted TMC services is to ensure that the public's investment is managed appropriately – i.e. the public is getting its money worth. While an effective performance measurement system will help a TMC meet public needs and expectations, mitigate congestion, reduce travel time delay, and clear incidents more quickly, these are secondary benefits to the program. The primary benefit is



keeping the TMC focused on its core mission of improving or mitigating traffic problems in a cost-effective manner.

In general, performance measurement can provide benefits in multiple areas, including:

- Accountability,
- Efficiency,
- Effectiveness,
- Communications,
- Improvements over time, and
- Future planning.

Accountability identifies if resources are being allocated to the priority needs. The desired effect is to achieve more informed decision making. This goes hand-in-hand with efficiency, which examines the output for any given level of input. A typical example might look at the staff necessary to provide a given level of management and whether improvements in the process can reduce staffing needs, save costs or free up infrastructure for other uses.

Effectiveness typically measures a shift in an agency's approach. By using performance measurement, agencies have been able to shift their thinking. Instead of recording how many incidents took place in a given timeframe, the important concept shifts to questions such as: Has there been a reduction in incidents? Has there been a decrease in the average time of each incident?

Improving communication is perhaps an obvious and self-explanatory benefit of performance measurement. By focusing on primary goals that are important to the customer base, and identifying the appropriate information to convey results, communications cannot help but to be improved.

Identifying improvements over time is another obvious benefit of a systematic evaluation process. By collecting and utilizing data in support of an on-going process, trends can be identified and long-term monitoring put into place. The feedback from these mechanisms can allow for the refinement of programs and services, both internal and external.

As a final benefit, performance measurement can't help but impact on future planning. As detailed above, the information gained from on-going focused evaluations allows for refinements. These refinements can be planned for and accomplished with greater accuracy and efficiency than would be possible without a performance management system. Additionally, the availability of a solid basis for future plans may lead to an increase in the dollars available for operational improvements.

## Challenges of Performance Measurement

Various arguments that have been made against implementing and using performance measurement typically focus on the challenges associated with the process. A casual listing of these challenges might be:

- Too time consuming to start another program from scratch,
- Lacking in-house expertise or previous experience,
- Difficulty in identifying critical activities,
- Difficulty in establishing goals and objectives for those activities,
- Lack of knowledge in selecting appropriate measures,
- Lack of experience as a base for establishing appropriate performance targets,
- Difficulty of identifying and collecting relevant data,
- Producing, interpreting, and explaining results,
- Time consuming to manage the program over the long-haul,
- Too costly in terms of personnel time,
- Lack of evidence that the program is useful, and
- Paying for the costs of the system.

It could be argued, however, that upon closer inspection, these challenges are no different for performance monitoring than they are for any other type of system or process. In fact, these challenges are no different for an outsourcing program than they would be for an in-house system. Performance measurement is in essence, simply a good management practice to identify and track the operation of specific activities.

A new program is often seen as another foreboding task, particularly if the available experience with it is minimal or non-existent. While analyzing all of a TMC's activities to determine the critical ones can be seen as a time-consuming or daunting task, focusing on the core functions should provide a meaningful list fairly quickly. The challenges of establishing goals, objectives, measures, targets, and identifying and collecting data are intrinsic parts of any performance measurement system and should be viewed as more of steps in the system as opposed to challenges that must be overcome.

Data, while potentially easy to collect and analyze, may not always be readily apparent as to meaning. A careful investigation of not only what the data show, but also how best to present the information, is an area that deserves some significant attention. This challenge can be compounded by the need to present results to different groups, such as TMC management, contractors, and the general public. The level of detail and specificity associated with each group may be vastly different, although the topic area is the same.

The last two challenges of management of the program and costs often go hand-in-hand. Performance measurement does require funding to implement, although once in-place, the goal should be that the process becomes a part of normal operations and is not seen as anything other than normal business practices to obtain the best results from contracted services.

## **Common Classification Schemes for Performance Measures**

Performance measures can be categorized in any of a number of ways. Measures can look at the amount of materials used or the result of using those materials. Measures can be constructed that look at efficiency or customer satisfaction. Each measure is different and serves a different purpose.

The main use of any type of classification system is simply to provide some organization to a list of measures. In and of itself, the classification provides no additional benefit to any particular measure; it simply helps the practitioner organize measures into effective groups to support the evaluation needs and to ensure that the list of measures covers all the areas of the evaluation that are necessary. If agencies use a systems engineering process to develop work flows or tasks for their contracting efforts, performance measures could be tied to the various components of the process to ensure that each aspect of the process is being appropriately analyzed and measured for success.

### *Input /Output/Outcome Classification*

One of the simplest methods for classifying performance measures is using one of three categories; input, output, and outcome.

The first category of measures is related to inputs. Input measures examine the resources available to carry out a program or activity, such as the number of people required to perform routine maintenance on roadside equipment.

An output measure is primarily an objective numerical assessment and is typically the result of a tabulation or calculation. Items such as the average repair time or system up-time are typical output measures.

By comparison, an outcome measure is subjective. It generally provides information or an assessment on the results obtained from carrying out a program or activity. Customer satisfaction assessments are a prime example of outcome measures.

The close wording of these last two categories tends to be a little confusing. A way of differentiating these categories is that an outcome measure typically looks at the effectiveness of something. Has the situation changed? Has a program improved? What has been the progress towards an agency goal?

An output measure typically looks at efficiency. What rate of change was seen? What percent reduction was created? What are the numbers associated with each activity?

### *Goal-Based Classification*

Another typical classification used to organize performance measures is to group them according to their general goal. The categories are typically the goals of the agency or TMC, such as mobility, safety, and system performance. One advantage of this type of classification system is that measures based on their goal area can help provide a continual focus on the TMC goals.

The list of typical goal areas used in this type of classification system might include:

- Accessibility – ensuring convenience and/or right-of-entry to customers,
- Mobility – the relative ease of difficulty of making a trip,
- Economic Development – the cost, economic health, and vitality of the transportation system,
- Quality of Life – the sense of community desires and customer satisfaction,
- Environmental and Resource Conservation – the assets saved or expended, either natural or man-made,
- Safety – the levels and rates of incidents or other occurrences,
- Operational Efficiency – measures of productivity, manpower, financial resources, etc., and
- System Condition and Performance – measures of physical conditions, service ranges, etc.

For contracted TMC services, goal areas might include items such as:

- Quality – meeting specified satisfaction goals for public service oriented tasks, such as courtesy patrols,

- Schedule Adherence – meeting specified hours of operation,
- Staffing Adherence – meeting minimum staffing requirements,
- Timeliness – meeting specified response times, and
- Accuracy – meeting the contract specification for taking the correct or appropriate actions.

### *Performance Variable Classification*

Still another classification scheme for organizing performance measures is to group them according to the type of characteristic they capture. In this scenario, typical measure categories would include:

- Productivity – measures showing the relationship between physical inputs and outputs,
- Quality – measures showing typical ratings of value or excellence, such as number of defects, or problems, or customer satisfaction,
- Timeliness – measures focusing on the time aspects of performance, such as meeting deadlines,
- Cycle Time – measures focusing on how long it takes something to get done, such as the repair time associated with a field device,
- Resource utilization – measure comparing the resources used, vs. available, typically expressed as a percentage or ratio,
- Costs – measures focusing on per unit costs for key tasks.

### *Time –Based Classification*

A final example of a classification scheme focuses on the timing aspects of when tasks are performed in order to categorize different types of measures. Typical types of measures in this system include:

- Baseline – measures that answer the question of “Where is the starting point?”,
- Trending – measures that answer the question of “How is something changing over time?”,
- Control – measures that answer of the question of “Is my system within a pre-determined boundary?”,

- Diagnostic – measures that answer the question of “Where is the problem area?”, and
- Planning – measures that answer the question of “What can I plan for the future?”.

The key to a successful program is not to rely on any single type of measure. In any family of measures (classification scheme), there will be multiple measures of each type utilized in any on-going program. The goal of performance measurement is to identify measures that help the TMC to better manage, control, and improve their outsourcing operations.

## **What Makes a Good Measure?**

For most any activity, there are probably dozens of measures that can be defined. As stated previously, however, the goal of performance measurement is to facilitate the management, control, and improvement of their systems and contracting. This involves selecting not just measures, but good measures. The obvious question then is what makes a good measure?

First and foremost, a performance measure must measure or gauge the right item. It does so by focusing on the desired end results and determining if they are being met. A performance measure should focus on the end result—not the measurement itself.

The second trait of a good performance measure is that it is accepted. Generally, this means that the measure must be simple, understandable, unambiguous, and meaningful to the customer, regardless of whom the customer is. To best accomplish this, agencies may well use different measures for different customers. In terms of outsourcing, while a TMC has contractual authority over the agencies providing the outsourcing, the choice of measures should be mutually accepted by both the TMC and the contractor. This helps to ensure that both agencies will support the measure, the data needs, and the interpretation of the results.

The third trait is that performance measures must be responsive and/or sensitive to data they are measuring. They do this by clearly showing any trends, changes, minimums or maximums. Notice that this closely relates to one of the previously discussed classification schemes. A performance measure that is insensitive to events within the data will not be meaningful to either the agency or the contractor it cannot accurately depict progress or change.

The fourth trait of a good measure is that it is appropriate. Judging the appropriateness of a selection is typically done in two ways. First, the timeframe must be suitable to the desire. If the desire is to determine a percent reduction in incidents, the measure should look at a lengthy analysis period, such as a week, month, or even a year. Reporting on a timeframe of minutes, hours, or even a day, would make little sense and would be an inappropriate timeframe for this measure. Second, the measure must be geographically appropriate. Measures can be directed towards a point, a segment, and entire facility or travel corridor, and even a region. A reduction in travel time would not make sense at a point location, but might be a good measure from a corridor or regional perspective.

A fifth trait is that a good performance measure should be supported by economical data collection. Measures that require large and expensive data collection are not likely to be sampled very often due to time and/or budgetary constraints. This makes the measure untimely and insensitive to smaller changes, and ultimately will not convey meaningful results. At the same time, TMCs should recognize that it is okay to stretch beyond the current practice and find and collect additional data sources if the performance measures can provide meaningful results. This trait is arguable as many agencies have fallen into the trap of only looking at measures that can be supported by data they or their contractors already collect. This can hinder effective evaluations and often results in choosing measures that do not support the stated goals.

### **Guidelines for Selecting Appropriate Measures**

Over time, a number of keys have been identified to have a successful performance management program. These keys, listed below, are not set in stone, but provide some guiding principles to help organizations navigate through the chore of picking appropriate measures. These keys are not an exhaustive list from the literature, but rather a compilation of those items and advice which are commonly accepted.

- *Keep the number of measures manageable* – Don't be afraid to include measures when significant, but exclude measures that are merely interesting and not directly relevant. Making contractors collect and/or provide data for measures that won't be used will increase the costs of the contract.
- *Use a balance of measures* – Provide measures across all areas of the classification scheme. Determine the critical areas of focus in the TMC and select measures for each area. Remember that some measures are more suited to a particular audience and ensure that the selection of measures can adequately convey understanding to each group of stakeholders.
- *Be flexible* – TMCs, especially ones new to the outsourcing environment, should be prepared to refine the performance measures used to evaluate contracted services.
- *Go beyond the basics* – While it is recognized that simplicity and ease of measurement are attractive characteristics, a TMC should not shy away from measures that may require more data collection or manipulation, if the measure will be an appropriate evaluation metric for contracted TMC services.
- *Establish regular reviews* – The performance measurement process should recognize the need for regular review. Regular reviews of the contracts and procedures at procurement cycles can refine the performance measures used for outsourcing.

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