



# Transportation Management Center Business Planning and Plans Handbook

Developed for

*TMC Pooled Fund Study*  
*Federal Highway Administration*

By

**Booz Allen Hamilton Inc.**  
and  
**Kimley-Horn and Associates, Inc.**

December, 2005

**Form DOT F 1700.7 (8-72)**

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle  Transportation Management Center Business Planning		5. Report Date December 2005	
		6. Performing Organization Code:	
7. Author(s) Booz Allen Hamilton Kimley-Horn Associates		8. Performing Organization Report No.	
9. Performing Organization Name and Address  Office of Transportation Management Federal Highway Administration Washington DC		10. Work Unit No.	
		11. Contract or Grant No.	
12. Sponsoring Agency Name and Address  Pooled Fund Study		13. Type of Report and Period Covered  Business Planning Handbook	
		14. Sponsoring Agency Code	
15. Supplementary Notes			
16. Abstract  This document presents guidelines for research and development publications. It augments the <i>FHWA Publications and Printing Handbook</i> . COTRS and contractors are the main audiences.			
17. Key Words  publication, guidelines, HRTS, report, brochure, communication, marketing		18. Distribution Statement  No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161.	
19. Security Classif. (of this report)  Unclassified	20. Security Classif. (of this page)  Unclassified	21. No. of Pages  114	22. Price
<b>Form DOT F 1700.7 (8-72) Reproduction of completed page authorized</b>			



## Table of Contents

Chapter 1: Introduction and Overview .....	1-1
Chapter 2: Overview of Business Planning for Transportation Management Centers .....	2-1
Chapter 3: TMC Business Planning Process.....	3-1
Chapter 4: TMC Business Models.....	4-1
Chapter 5: Developing the TMC Business Concept .....	5-1
Chapter 6: TMC Defining the Value Proposition.....	6-1
Chapter 7: Strategy Sets.....	7-1
Chapter 8: Organization and Management.....	8-1
Chapter 9: Financial Plan.....	9-1
Chapter 10: Using and Managing the TMC Business Plan.....	10-1
Chapter 11: INFORM, Long Island, New York – A Regional TMC Operated through a Contracted Operations Model.....	11-1
Chapter 12: Mn/DOT’s Regional Transportation Management Center, Roseville, Minnesota – A Statewide TMC Operated by the Public Sector.....	12-1
Chapter 13: City of Tucson, Arizona, Regional Transportation Control Center – A Multiple Jurisdiction TMC Operated through a Public-Private Partnership.....	13-1
Chapter 14: Freeway and Arterial System of Transportation (FAST), Clark County, Las Vegas, Nevada – A Regional TMC Operated Through a Separate Public Sector Operating Entity .....	14-1
Chapter 15: California Department of Transportation, District 12, Orange County, Traffic Management Center – a Regional TMC operated by the Public Sector .....	15-1

Intentionally left blank.



## Chapter 1: Introduction and Overview

### Chapter Purpose and Objectives:

This is the first of ten chapters that comprise the *TMC Business Planning and Plans Handbook*. Chapters 11 to 15 present five case studies of existing TMCs. The Handbook has been prepared by the TMC Pooled Fund Study, and sponsored by the Federal Highway Administration for TMC and transportation agency managers to assist them with long-range business planning for TMCs. The Handbook is intended to serve as a “how to” tool by applying business planning techniques from the private sector to establish a long-range business plan for TMCs. This initial chapter provides a brief overview and introduction to the Handbook and TMC Business Planning in general.

### Key Messages/Themes:

Business Planning is an effective management tool commonly used in the private sector, and some of these principles can also be translated for use in the public sector to aid in the planning and management of TMCs.

The core components of a TMC Business Plan include a business concept, a set of strategies, a value proposition, organization and management structure, and a financial plan.

Developing a Business Plan for a TMC offers many advantages, but can also present many challenges for transportation agencies since it is not necessarily a common practice for public sector entities.

### Key Topics and Issues to be Covered:

Chapter 1 provides a background and context for TMC business planning, including a discussion of why a TMC Business Plan is needed, the associated challenges and the key components of a business plan. This chapter also discusses the benefits of the plan development process as well as how the TMC business plan can help support TMC establishment, operations, and growth. An overview of the contents of the Handbook, its intended audience, and expected impact and use are also discussed.

### How This Chapter Relates to Other Chapters:

As the initial chapter of the *TMC Business Planning and Plans Handbook*, Chapter 1 sets the stage for the remaining chapters of the Handbook. Its primary intent is to touch on each of the topics that make up the Handbook and provide the reader with a general introduction to the subject matter. The subsequent chapters will expand on this introduction with more detail for the various components of the TMC Business Plan and the TMC Business Planning Process.

### Remaining Sections:

- 1.1 Why do a Business Plan for a TMC?
- 1.2 Background and Context for TMC Business Planning
- 1.3 Relationship of the Business Plan to Other Plans and Processes
- 1.4 Problem Statement
- 1.5 Purpose Statement
- 1.6 Key Themes and Topics That Will Be Presented
- 1.7 Intended Audience
- 1.8 How to Use this Document
- 1.9 Remaining Chapters in this Handbook

## 1.1 Why Do a Business Plan for a TMC?

A TMC Business Plan is a plan for executing the long-range vision and goals of a TMC. Every agency or individual that manages a TMC has a vision of what they want their TMC to be and goals that they would like their TMC to accomplish. The Business Plan acts as the roadmap that agencies follow to first establish these goals and objectives and then ultimately achieve them. Related planning documents such as ITS Strategic Plans, ITS Architectures, Concepts of Operation, and Operations Plans provide important input into the TMC Business Plan and thus will need to be coordinated with the TMC Business Planning process.

**The Business Plan provides a tool for agencies to help link ITS programs to regional objectives and funding sources.**

The concept of business planning for some public agencies might seem a bit abstract. Through the course of developing this handbook, it was apparent that agencies are familiar with plans such as ITS Architectures, Concepts of Operations, and Strategic Plans. Very few develop formal ITS or TMC Business Plans, although many agencies go through some of the key processes and components of business planning as part of their agency or departmental strategic planning or annual budgeting processes.

For an agency that has never developed a TMC Business Plan before, the task of developing a Business Plan may seem daunting. Furthermore, some transportation agencies may not fully understand the benefits of such an effort. It is important for agencies to realize, however, that the effort they spend developing a business plan for their TMC may be one of the best investments they could possibly make.

One of the greatest values of the TMC Business Plan is its role in helping agencies link ITS programs to regional objectives and funding sources. This is what separates the TMC Business Plan from other agency planning processes. If properly implemented, the Plan can establish legitimacy for sustainable funding, near-term needs of the TMC as well as longer-term programs and partnerships through ongoing performance measurement and reporting of outcomes. In this way, it is a valuable tool for communicating with policy makers, partners, and executives.

The Business Plan also plays a key role in outlining TMC requirements such as facility, staffing, operational, partnership, and interface requirements. By establishing a Business Concept, which serves as a description or a 'snapshot' of what the TMC does, what it is envisioned to do, the role that it plays within an agency, and the desired roles and functions that the TMC needs to serve, identifying specific operational and interface requirements is a necessary step in developing the desired 'end state' of how the TMC needs to function. In turn, this 'end state' helps to outline where the TMC currently stands relative to functionality, operations, staffing and agency interfaces, and what key gaps need to be addressed to reach the desired level of operations for the TMC. The Plan also defines the roles and responsibilities of the various TMC partners, specific to the Business Concept and TMC goals and objectives, which is an important part of the planning process.

The TMC Business Plan is relevant to all stages of the TMC life cycle including establishing a new TMC, evolution or expansion of a TMC, sustaining operations in changing environments and re-evaluating priorities. Typically, TMC and agency managers responsible for TMC planning and operations will be the people most involved in the business planning process.



## 1.2 Background and Context for TMC Business Planning

This section discusses the contents of the TMC Business Plan in greater detail with a discussion of private sector business planning and a description of the core components of a TMC Business Plan.

### 1.2.1 Applying Business Planning Principles

While there is no one, universally accepted definition of what a business plan is, there is general consensus on what a business plan is intended to achieve. Business planning is a common practice in the private sector, primarily for a new business venture or branching out into new business focus areas for established businesses. Essentially, a business plan is aimed at:

- Defining a business objective, venture, idea, product or service, why there is a need, and what will be gained by fulfilling this need;
- Analyzing the marketplace, including need or ‘niche’ the product or service will fill, assessing the competition in the marketplace, identifying key challenges or risk factors that will support (or impact) success, and articulating why this product or service is better than the competition’s;
- Describing what operational resources (such as technology, personnel, capital or partners) are needed to develop and manage the product or venture, and achieve the business objective or market placement;
- Outlining financial objectives and needs, financing proposals, budgets and projected incomes, and developing a sound financial plan for how the business venture, product or service should perform and profit;
- Providing a plan for how the product or service will be marketed; and
- Outlining the operations and management environment, including what kind of facilities will be needed, the organization and management structure, and roles and responsibilities of the key players and partners involved.

Common for new business start-ups, the private sector business plan is intended to lay the foundation for a product or service development strategy, but more importantly, it is used primarily to attract investors to the proposed business or product or gain support for expanding an existing product or service.

So why should these principles be considered as part of TMC planning, and how can they be applied in the public sector?

It is important to note that there is not a linear translation from a private sector business plan to one that would be appropriate for the public sector. That is, not all elements of a business plan that would be developed for a product, service, or business venture are necessarily applicable or even appropriate in the context of developing a business plan for a TMC. There are principles and methods used in business planning that TMC managers and agency executives can draw upon to develop a sound, pragmatic, and comprehensive business-based approach to planning for TMCs.

Applying these business planning principles and the business planning process will help TMC managers to:

- Define the specific operational roles and functions that the TMC fulfills, or vision for what operational role it should fulfill with the right resources and systems available and in place;
- Analyze strengths, weaknesses, opportunities, and threats (SWOT Analysis);

**TMC Managers can apply private-sector business planning techniques and practices to build a case for agencies and partners to “invest” needed resources in the TMC.**

- Identify the benefits and ‘payoff’ expected to be achieved, including near-term and longer term scenarios, agency-specific benefits and value, as well as the benefits to the broader regional context;
- Outline the funding requirements and financial strategy; and
- Develop requirements for the needed partnerships, organization and management structure, and personnel needs.

These business planning principles and the process to develop them force agencies to take a hard look at why they need to invest resources in the TMC, what the expected benefits of the investment will be, and how the objectives and investment will be achieved.

### 1.2.2 Core Components of a TMC Business Plan

The contents of a TMC Business Plan may vary from agency to agency but in general, there are five recommended core components to the Plan. These include:

- TMC Business Concept;
- Strategies;
- Value Proposition/Benefit;
- Organization and Management; and
- Financial Plan.

The TMC Business Concept outlines, at a high level, key functions and services, as well as desired functions and services of the TMC. It describes the current TMC, including technical and institutional relationships, its ‘place’ and role in the regional context, and objectives and goals for how the TMC needs to operate. These operational objectives and goals are based on stakeholder input as to how the TMC needs to function. Additionally, the Business Concept will reflect the key goals and functions identified for the TMC in other planning processes such as the regional ITS architecture, concepts of operations, and higher-level goals from agency strategic planning. Finally, the TMC Business Concept provides an overall vision of the TMC.

The Strategies component of the TMC Business Plan documents an overall process for achieving the vision specified in the Business Concept. More specifically, the Strategies define the actions, implementations, upgrades, enhancements, and integration activities that need to occur in order to achieve the vision and what these actions will accomplish. By mapping the current state of the TMC to desired state, strategic directions can be established. The Strategies component of the TMC Business Plan also identifies timeframes, dependencies, and implementation responsibilities.

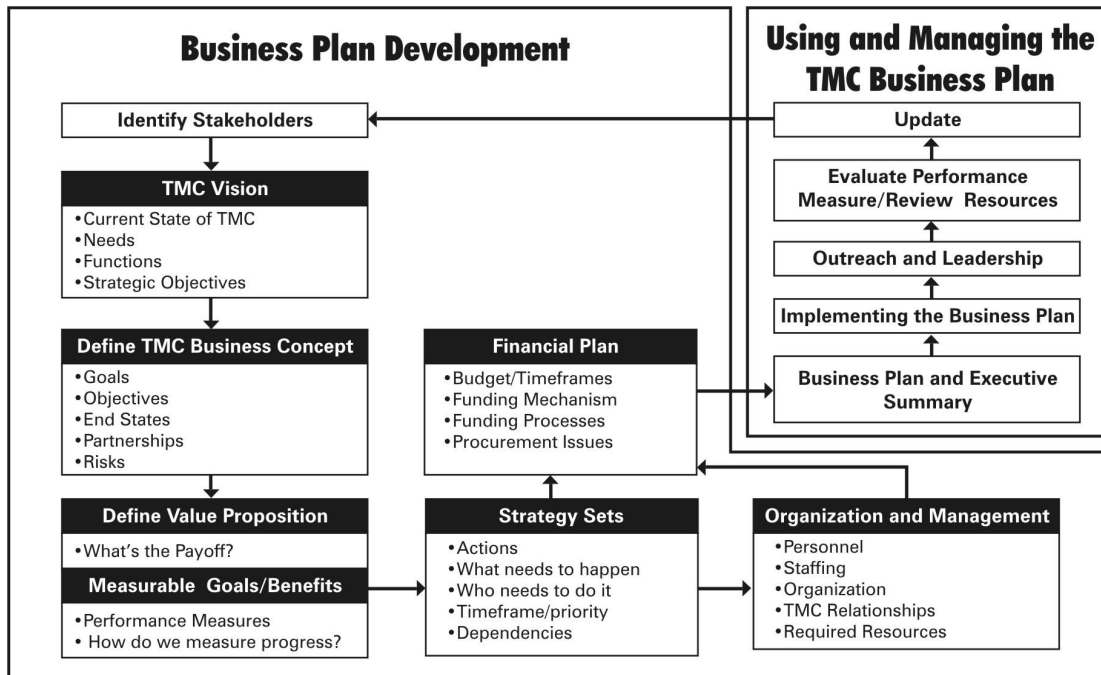
The purpose of the Value Proposition is to explain the anticipated benefits or payoff resulting from achieving the objectives proposed in the TMC Business Plan. These benefits could impact the public (such as reducing traffic congestion) or the agency (such as more efficient use of resources). It will be important that the Business Plan define these benefits well in order to ‘sell’ the Business Concept to key decision makers, leaders, and partner agencies.

The Organization and Management component of the Business Plan defines the roles and responsibilities of primary and partner agencies. It answers questions such as who owns, who manages, and who participates in various TMC activities. The overall organization of the TMC, including personnel and staffing, is clearly documented. The TMC’s relationship to other agencies and the relationships within its ‘owning’ agency are also defined.

The Financial Plan covers all the financial aspects of the TMC. It includes a discussion of the budget for capital expenditures, as well as operations and management costs. It discusses the timeframes for expenditures, potential funding mechanisms, and provides

strategies for working within agency and regional funding/programming processes. Finally, the Financial Plan outlines procurement issues, requirements, and challenges.

**Figure 1-1** shows these components within the context of a step-by-step process for developing the key pieces of the TMC Business Plan.



**Figure 1-1: Business Plan Steps and Process**

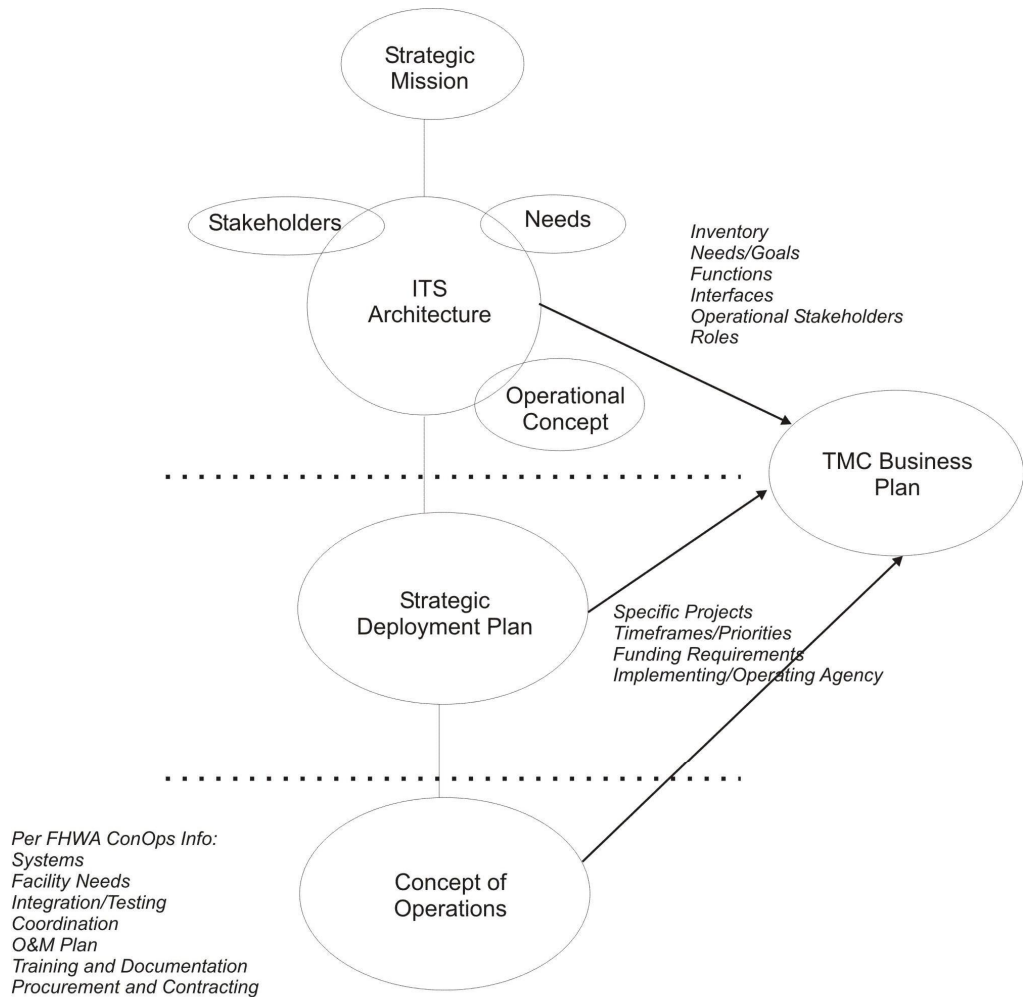
### 1.3 Relationship of the Business Plan to Other Plans and Processes

For many agencies, it is likely that the scope of their TMC Business Plan will overlap with the scope of other planning efforts. This is because a TMC provides a wide range of functions and involves many different stakeholders. By its nature, a TMC is a very complex entity and very broad in scope. Some of the potential planning documents or processes that are likely to contribute to or complement the TMC Business Plan include:

- Regional ITS Architecture;
- Strategic Deployment Plan;
- Concept of Operations; and
- Operations and Management Plans.

**Figure 1-2** shows the relationships and inputs from some of these other plans and planning efforts to the Business Plan. In some cases, the TMC Business Plan may even be a subset of these documents. For instance, the Strategic Deployment Plan may have a separate chapter for TMCs that defines its requirements, stakeholders, expansion plan, and operational and management issues. Alternatively, the Concept of Operations may have a section describing operations specific to the TMC such as incident management plans or procedures for coordinating with emergency personnel from the TMC. It will be important for agencies to have an understanding of the efforts already completed that could support or ‘feed’ a business planning process.

The Business Plan builds on outputs from existing or concurrent plans and planning efforts, and provides a business-based context and need to support goals, objectives, responsibilities, and requirements identified as part of those other processes.



**Figure 1-2: Relationship of the TMC Business Plan to other Plans and Processes**

Because these planning efforts are often interrelated, it will be important for agencies to coordinate them with each other to the greatest extent possible, as well as incorporate relevant information or established goals and objectives that have previously been developed. One of the best ways to do this is to establish a coordinated plan for updating each of the documents. For example, if the Regional ITS Architecture and Strategic Plan are scheduled to be updated every three years, then it may make sense to update the TMC Business Plan at the same time.

### 1.4 Problem Statement

Developing a business plan for a TMC is a relatively new, and potentially abstract, concept for most agencies in the public sector. There are a few examples presented in this Handbook but in general, TMC Business Planning as a formal and concerted effort, is relatively uncharted territory. This presents many challenges for agencies since business planning can be a complex process and there are few specific TMC Business Plans for them to refer to or learn from.

Typically, TMC needs, goals, and functions are documented as a component or part of another planning process (such as the Strategic Deployment Plan or Concept of Operations). An ITS architecture takes a more detailed look at agency interfaces,

functional requirements and the relationships of public and private entities in a region or state to deliver specific functions or services. These documents may be used as starting points or provide input into the TMC Business Plan but for the most part, the Plan will need to integrate existing work and develop from that point on. It is important to note that most agencies, as part of their program management tasks, often work through many of the components of a TMC Business Plan, such as assessing and developing organizational structures, identifying key strategies, and budgeting.

There are also other challenges that agencies may face with the business planning process. In this time of tight budgets, it may be difficult to plan for financial sustainability of the TMC. TMC managers will have to compete with other programs and projects for scarce resources and funding. It may also be a challenge for agencies to understand and demonstrate how the TMC fits in with broader agency business plans and business objectives. It will be important for agencies to have the right staff in place to accomplish the business planning task, and be able to ‘champion’ the Business Concept to key decision makers within their agency or region.

The business planning process, concepts, strategies, and examples presented in this handbook are intended to support TMC managers and others as they develop an approach to business planning and their business plan, and help overcome most of these challenges.

## 1.5 Purpose Statement

The *TMC Business Planning and Plans Handbook* will provide TMC managers and transportation agency executives with a step-by-step guide to multi-year business planning using sound business planning techniques. It will also help managers to understand the realm of possible alternatives for structuring a TMC and the management and operational implications of these alternatives. In essence, the TMC Handbook offers a “how-to” that focuses on evolving TMC functions, concepts, processes, and strategies and presents them within a business planning context.

## 1.6 Key Themes and Topics That Will Be Presented

Among the key themes and topics to be presented in the *TMC Business Planning and Plans Handbook* are recommended ‘best practices’ for TMC business planning illustrated through case study examples of current TMC business plan elements, organizational structures, and management strategies. These case studies include various approaches to TMC business planning garnered from public agencies, as well as how private sector business models and planning processes could be applied to TMCs.

The Handbook presents organizational issues, including TMC functionality and the role of the TMC in agency or regional operations, and recommended organizational structures and resource requirements. A range of potential TMC business models and organizational approaches are presented to provide readers with a context for how business planning can benefit single-agency TMCs, regional or statewide TMCs, as well as unique partnership arrangements that help offset (and complement) the public sector’s roles and responsibilities.

Also covered are methods, strategies, procedures, and key steps that TMC managers can use to develop a business plan for their TMC, including recommended guidelines and techniques. The Handbook also discusses the importance of a multi-year TMC business plan to sustaining operations of TMCs, or expanding operations or functions of TMCs and supporting management systems. Finally, the Handbook introduces performance monitoring strategies that can be used to assess the effectiveness of the business plan.

**The Business Plan is a valuable management tool to gain support from decision makers and guide investments in the TMC.**

## 1.7 Intended Audience

This Handbook was developed specifically for TMC and agency transportation managers who are responsible for any and all aspects of TMC operations, strategic planning, implementation, and coordination with other entities. It is intended to serve as a resource guide that defines what a Business Plan can do for a TMC, the importance of developing a long-range business plan, TMC Business Concept, and being able to justify funding, resources, and other necessary commitments to agency and regional decision makers.

## 1.8 How to Use this Document

This Handbook provides TMC managers and Transportation Agency managers with key tools and strategies that they can apply to business planning development and the plan preparation process. It can be used by managers as a reference or as a guide for all aspects of the TMC business planning process including understanding the Plan, developing the Plan, and using and managing the Plan. The document also shows managers how to use the TMC Business Plan as a management tool and for obtaining buy-in and support from key decision makers for investment decisions about their TMC.

## 1.9 Remaining Chapters in this Handbook

This chapter is the first of ten in the *TMC Business Planning and Plans Handbook*. It is intended to provide an introduction to the business planning process and an overview of the TMC Business Plan topics that are covered in greater detail in the subsequent chapters. Chapters 11 through 15 present five case studies of existing TMCs. The content of the remaining chapters is summarized below.

- **Chapter 2, Overview of Business Planning for TMCs**, provides an overview of what TMC business planning involves and what benefits will result from developing a business plan. It includes Business Planning concepts, strategies, and how private sector business planning approaches can be applied to a TMC business plan. This chapter also introduces the components of a typical TMC Business Plan.
- **Chapter 3, TMC Business Planning Process**, introduces the reader to the processes and sequence of key steps for effective business planning for TMCs. These key steps are illustrated in a flow diagram, and are discussed in more detail in later chapters.
- **Chapter 4, TMC Business Models**, presents the different options for TMC business models, and describes the different options and factors, including geographic coverage, numbers of types of agencies involved, and operational roles. Specific real-world examples of the various models at work are presented.
- **Chapter 5, Developing the TMC Business Concept**, takes a more in-depth look at the Business Concept—what it is, why it is important to the overall TMC business plan, and how to go about developing a vision, TMC strategic objectives, identify desired end states, and articulate these in a TMC Business Concept.
- **Chapter 6, Defining the Value Proposition**, provides the reader with background and context for what a value proposition is and why it is important. This chapter also outlines approaches for agencies or stakeholder groups to use to develop effective value propositions to support the Business Concept.
- **Chapter 7, Strategy Sets**, documents how goals and strategic objectives established as part of the visioning and Business Concept, as well as expected benefits defined within the Value Proposition, are mapped to specific strategies, actions, and timeframes.



- **Chapter 8, Organization and Management**, provides the reader with information about the different variations of TMC organization and management structure, and addresses how the considerations, such as functions, partnerships, geographic area, and other features affect organizational approach and how these considerations have been handled by other TMCs.
- **Chapter 9, Financial Plan**, discusses challenges associated with financial planning for TMCs, including how to justify TMC needs versus other competing priorities within a region. Includes examples of how to document funding needs, timelines, potential sources, etc., and how to tie the financial plan with the strategies, actions, timeframes, and responsibilities that have been previously developed.
- **Chapter 10, Using and Managing the TMC Business Plan**, provides 'next steps' and guidance for agencies in how to make the TMC Business Plan an important tool for continued TMC operations and expansion, as well as use the TMC Business Plan to help sell the Business Concept and Value Proposition to key decision makers, and garner their support. This chapter also discusses the importance of treating the TMC Business Plan as a living document that needs to be periodically reviewed and updated based on changing priorities or new functional capabilities.
- **Chapter 11 – 15, TMC Case Studies**

Intentionally left blank.



## Chapter 2: Overview of Business Planning for Transportation Management Centers

### Chapter Purpose and Objectives

This chapter provides an overview of what TMC business planning involves and what benefits will result from developing a business plan. Essentially – why do one? Business Planning concepts, strategies, and examples from the private sector are introduced, which provides a basis for describing how the process could be applied to a TMC business plan. This chapter introduces the key components of a TMC Business Plan, with greater detail provided in the subsequent chapters.

### Key Messages/Themes:

Long-term system operations is fast becoming a priority focus area for many transportation agencies, and leveraging and protecting the investment agencies have made in Intelligent Transportation Systems (ITS) so that they will remain a vital traffic management tool requires careful and proactive planning. A TMC is the hub of a regional system, and often the TMC functions in many capacities, ranging from overall system operations to traffic and incident management, and even as the nerve center for state as well as local operations, travel information, regional emergency management, and system maintenance. With TMCs evolving into such vital elements of a region's transportation system, how can resources be targeted to achieve the desired results? How can future resource needs be projected and planned for? What are the options for organizing management functions and personnel?

### Key Topics and Issues to be Covered:

Provides an example of private-sector oriented business plan outline and how this can be applied to a TMC Business Plan

Discusses how business planning can be applicable at key stages in a TMC life cycle, including new TMC initiatives, sustaining operations, and evolving and expanding TMCs, including the benefits of business planning at these milestones

### How This Chapter Relates to Other Chapters:

This chapter provides background and context for Business Planning principles and guidelines, including the core components of a TMC Business Plan. By introducing business planning principles and core elements of a business plan, this chapter sets the stage for subsequent chapters that provide more detail on how to develop specific sections of the TMC Business Plan.

### Remaining Sections

- 2.1 What is a TMC Business Plan and Why Do One?
- 2.2 Core Components of a TMC Business Plan
- 2.3 When to Develop a TMC Business Plan
- 2.4 Who Should Be Involved in the Business Plan
- 2.5 Relationship to Other ITS Planning, Plans and Processes
- 2.6 How the TMC Business Plan Relates to Other Agency Plans/Programs (non-ITS)

## 2.1 What is a TMC Business Plan and Why Do One?

Public agencies that are planning, implementing, or managing ITS programs are very familiar with ITS Strategic Plans, ITS Architectures, Concepts of Operation, and Operations Plans. These plans help to guide ITS deployment and implementation, and provide a sound basis and vision for long-range project-level or broader region (or statewide) implementations.

Within the last decade, many agencies and regions have shifted from an ITS infrastructure deployment focus, to an approach that now also factors in integration and sustaining operations. Key to this approach is the functionality, viability, and sustainability of the TMC, which often serves as the 'hub' of a local, regional, or statewide ITS program.

To maintain or enhance this valuable resource, and ensure that it remains a vital part of the overall ITS infrastructure program, a business-based planning approach is needed.

A TMC Business Plan is a plan for executing the long-range vision and goals of a TMC with particular emphasis on **financial sustainability**.

Every agency or individual that manages a TMC has a vision of what they want their TMC to be and goals that they would like their TMC to accomplish. Investments are typically made, and in many cases negotiated, among multiple competing priorities, based on functional needs and with a focus on immediate and near-term management, integration, coordination, information sharing, response, and other day-to-day functions. The benefits of a business plan and a business-based planning approach for the TMC is to:

- Establish TMC-specific goals and objectives;
- Identify actions, resources, timeframes, and responsibilities to achieve the goals and objectives;
- Map out a funding strategy and approach that helps link ITS programs to regional objectives and funding sources, which establishes legitimacy for sustainable funding for programs, partnerships, ongoing performance monitoring, and reporting; and
- Communicate and justify the TMC's role, benefits, functions, and resource requirements to policy makers, partners, and executives.

Business planning in the private sector is quite commonplace, although concept of business planning for some public agencies might seem a bit abstract. Very few agencies develop formal ITS or TMC Business Plans, although many agencies go through some of the key processes and components of business planning as part of their agency or departmental strategic planning or annual budgeting processes.

For an agency that has never developed a TMC Business Plan before, the task of developing a Business Plan may seem daunting. Furthermore, some transportation agencies may not fully understand the benefits of such an effort. It is important for agencies to realize, however, that the effort they spend developing a business plan for their TMC may be one of the best investments they could possibly make.

### 2.1.1 Business Planning Examples from the Private Sector

While there is no one, universally accepted definition of what a business plan is or an established formula for developing a business plan, there is general consensus on what a business plan is intended to achieve:

- A description and plan for a business's future, what the business is intended to do and how it is going to be achieved;
- A tool for attracting investors, obtaining strategic business partners or alliances; and

A management tool to focus on or emphasize a key business sector or specific area of operations.

The business plan is usually focused on defining an objective or idea for a product or service, assessing the market conditions to support the product or service, and describing financial projections in terms of capital costs, operating costs, and expected revenues. While there is a strong emphasis on financial performance and revenue goals, the focus of a business plan in the private sector is also about the people, institutional and market conditions, opportunities, risks, and decision contingencies.

Although there are no specific parameters for how long, detailed, or descriptive a business plan should be, there are general guidelines for overall form and content. Business plans could range from five pages to forty-five pages; how comprehensive the plan is depends largely on the nature of the subject, industry standards for what constitutes a robust business plan or could even be dictated by who the target audience is. It would be reasonable to expect that the length, level of detail and other key parameters will vary from business plan to business plan, and a business plan for a multi-million dollar product national launch will vary greatly from a business plan for a start-up real estate company.

A business plan is typically comprised of:

- An Executive Summary;
- Business Description and Concept;
- Marketplace Analysis;
- Operational Requirements and Resources;
- Financial Plan and Strategy; and
- Organization and Management Plan.

**Figure 2-1** shows the typical components of a private sector business plan.

Executive Summary

A succinct, concise summary of the key points in the business plan  
Clearly state the business concept, financial expectations and requirements, and operations and management strategies

Business Description and Concept

Business objective, venture, idea, product or service  
Why there is a need, what will be gained by fulfilling the need  
The market that will be served  
What will be gained by fulfilling this need and how or why it will be profitable  
Current state of the business, major achievements, size of the operation or corporation, parent companies or affiliated companies, and other features of the corporate or organizational structure

Marketplace Analysis

Status of the applicable industry/field, industry trends  
The need or 'niche' the product or service will fill  
Potential customers, target audience or stakeholders  
Competition in the marketplace, including a competitive analysis and identify how will the business, product or service needs to be positioned to compete  
Key challenges or risk factors that will support (or impact) success of the business

Operational Requirements and Resources

Resources (such as technology, facilities, personnel, partners, special services) that are needed to develop and manage the product or venture  
Key steps and actions to achieving the business concept  
Key timeframes for development, implementation, roll-out and other milestones  
Marketing plan

Financial Plan and Strategy

Financial objectives and needs  
Budgets and projected revenues and expenditures  
Assessment of how the product or venture should perform and profit (break even analysis), business indicators  
Current financial status and resources  
Proposal to obtain new or additional financing  
Risk assessment

Organization and Management Plan

People and personnel, including management and other key staff  
Partners and other affiliates  
Organization structure, roles and responsibilities of the key players and partners involved

**Figure 2-1: Sample Business Plan Components (Private Sector)**

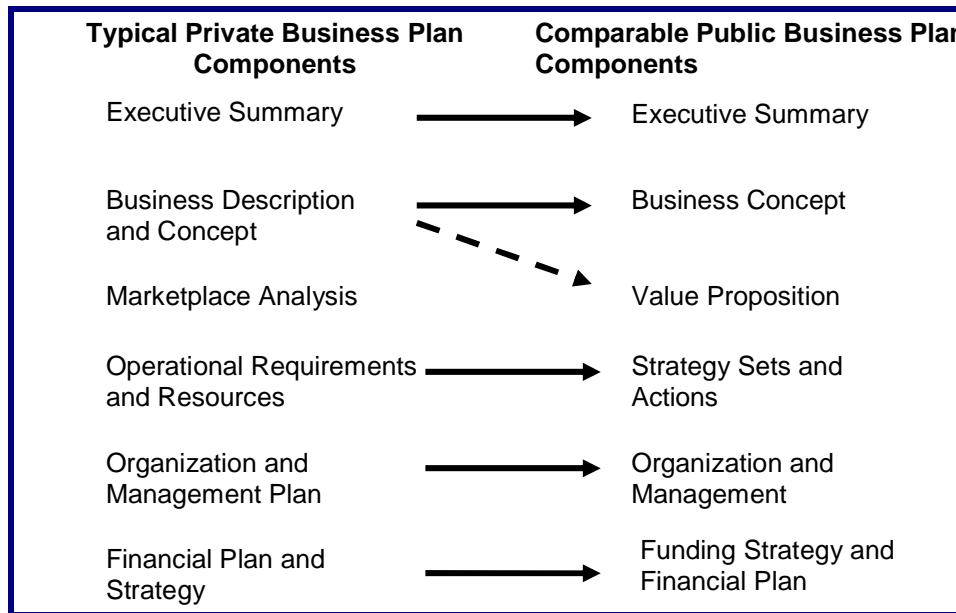
### 2.1.2 Applying Business Planning Concepts to TMCs

So why should these principles be considered as part of TMC planning, and how can they be applied in the public sector?

It is important to note that there is not always a linear translation from a private sector business plan to one that would be appropriate for the public sector. That is, the focus of a business plan that would be developed for a product, service, or business venture may not be applicable or even appropriate in the context of developing a business plan for a TMC. However, there are principles and methods used in business planning that TMC managers and agency executives can draw

upon to develop a sound, pragmatic, and comprehensive business-based approach to planning for TMCs.

**Figure 2-2** maps typical business planning principles and components from the private sector to a model suitable for a public-sector focused TMC Business Plan.



**Figure 2-2: Mapping Business Plan Components**

What public agencies can derive from private business planning practices are:

A business-based approach to planning for the long-term sustainability and justification of the TMC;

A functional assessment of priorities, resource needs, agency and partner roles;

Funding requirements and a funding strategy that looks beyond infrastructure-specific deployments and focuses on implementing, sustaining or expanding operations in line with an established vision and business concept; and

Business planning processes and principles to demonstrate and justify the value of the TMC to the organization, how it supports higher agency goals, and the relationship of the TMC to the overall transportation management strategy – in other words, to justify the continued investment in the TMC among competing priorities.

In this context, the TMC Business Plan provides critical path information to internal leadership, to other agencies, and potential partners about the TMC's goals, plans, and objectives.

Applying these business planning principles and the business planning process will help TMC managers to:

Establish a jointly agreed upon plan to address identified challenges, separate from other ITS and business planning efforts where the TMC is one component of a larger agency or regional program agenda;

Define the specific operational roles and functions that the TMC fulfills, as well as a vision for what operational role it should fulfill with the right resources and systems available and in place;

Analyze strengths, weaknesses, opportunities and threats (SWOT Analysis) to provide a realistic view of what can be achieved and the challenges or barriers that must be overcome;

Implement a mechanism whereby actions and critical path items are regularly monitored to assess progress toward achieving the established goals, as well as progress toward realizing the overall Business Concept;

Identify the benefits and 'payoff' expected to be achieved, including near-term and longer term scenarios, agency-specific benefits and value, as well as the benefits to the broader regional context;

Outline the funding requirements and financial strategy, which provide a basis for future budget planning;

Develop comprehensive and function-based requirements for the needed partnerships, organization and management structure, and personnel needs; and Justify and 'sell' the benefits and functions of a TMC as a critical asset of a broader Transportation Management System (TMS) or regional approach to transportation, safety, connectivity, and integration.

## 2.2 Core Components of a TMC Business Plan

While there is no one specific formula for developing a business plan, TMC managers can borrow business planning concepts and strategies from private enterprise to outline a vision and build a case for continued (or future) support of TMC activities, functions and initiatives.

There are six core components that should be included as part of a TMC Business Plan, as shown in **Table 2-1**. Depending on circumstances, such as a single agency TMC or one that serves multiple functions within a region, the content could be streamlined, enhanced, or expanded. Timing and other regional priorities also could have an impact on the overall approach and content for the business plan. These core elements provide the framework for a succinct and direct business case that can be shared with agency managers, elected officials, partner agencies, and private citizens. Subsequent chapters in this handbook address each component in more detail, including methods to develop these sections, examples from other agency plans, and recommended approaches.

**Table 2-1: TMC Business Plan Core Components**

<b>TMC Business Plan Core Component</b>	<b>Recommended Content and Focus</b>
<b>Executive Summary</b>	<ul style="list-style-type: none"> <li>• Summarizes the key points of the Business Concept, Strategies, Partnerships, Organization and Financial Plan</li> <li>• Used as a tool to sell the Business Concept and Plan to high-level agency managers, local and regional elected officials, and TMC partners</li> </ul>
<b>The Business Concept</b>	<ul style="list-style-type: none"> <li>• Functions and description of key functions or needed functions</li> <li>• Strategic objectives, goals, future trends</li> <li>• Services – within the TMC and how the TMC relates or supports other agency operations and regional TMS, emergency management, safety, regional connectivity, information management, etc.</li> </ul>

<b>TMC Business Plan Core Component</b>	<b>Recommended Content and Focus</b>
	<ul style="list-style-type: none"> <li>• Vision and TMC description (current state, future end state)</li> <li>• Partnerships, including existing and desired or needed partners or alliances</li> <li>• Risks and dependencies</li> </ul>
<b>Value Proposition (what's the payoff?)</b>	<ul style="list-style-type: none"> <li>• Define benefits and how they will be measured, how progress will be monitored and reported</li> <li>• Who benefits – who stands to benefit from achieving strategic objectives</li> <li>• The Value Proposition helps to market and 'sell' the Business Concept to target audience and decision makers</li> </ul>
<b>Strategy Sets</b>	<ul style="list-style-type: none"> <li>• Actions – What needs to happen (projects, implementations, changes or enhancements that need to occur)</li> <li>• Who is responsible (to lead, champion, produce, develop, implement or manage)</li> <li>• Timeframes and priorities</li> <li>• Dependencies</li> </ul>
<b>Organization and Management Structure</b>	<ul style="list-style-type: none"> <li>• Who owns, who manages, who participates</li> <li>• Personnel, staffing (numbers and types of staff, training and experience requirements, etc.)</li> <li>• Organization structure, chain of command, resource requirements</li> <li>• TMC relationships to external agencies, how it functions in the 'bigger picture', and what are the critical agency relationships and partnerships</li> </ul>
<b>Funding Strategy and Financial Plan</b>	<ul style="list-style-type: none"> <li>• Budget and timeframes</li> <li>• Funding mechanisms</li> <li>• Funding processes</li> <li>• Procurement issues/requirements</li> </ul>

Each of these core components is discussed in more detail in Chapters 5 through 9 of this handbook.

## 2.3 When to Develop a TMC Business Plan

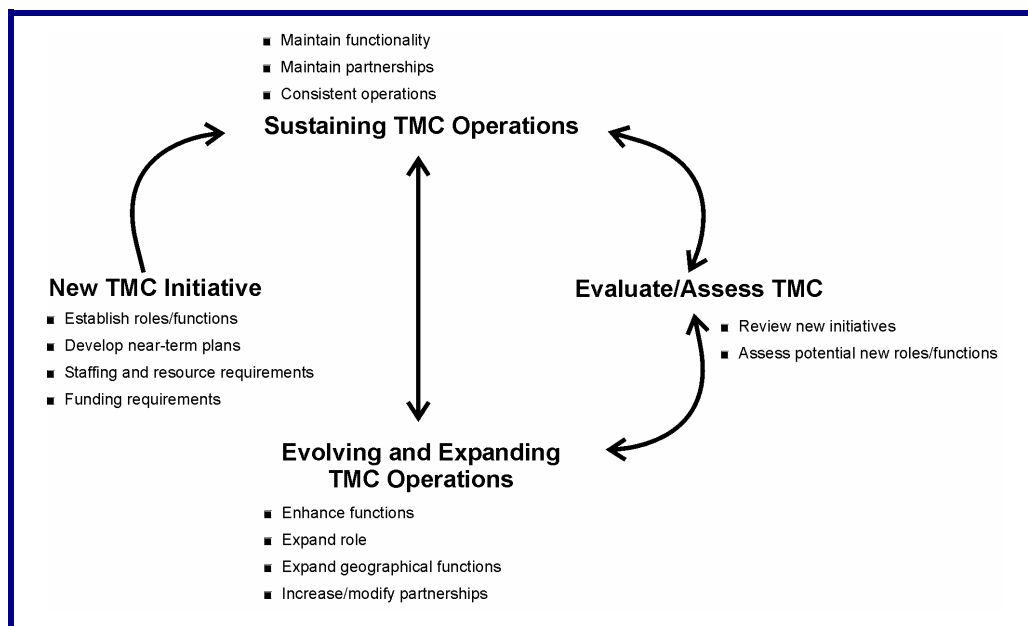
A Business Plan is relevant to all stages of the TMC life cycle including establishing a new TMC, evolution or expansion of a TMC, sustaining operations in changing environments and re-evaluating priorities. Just like business plans are prepared in a variety of scenarios in the private sector – such as for a new start-up company, to expand an existing business into new markets, or even for a major corporate merger – there is relevance in asking key questions and documenting priorities relative to strategic decisions and directions, desired outcomes, financial outlook and needs, and key partnerships that are needed to achieve the envisioned end result.

### 2.3.1 TMC Life Cycle

The status or phase of a TMC usually can be classified into one of three general life cycle categories: new, sustaining or evolving. The dynamics of a TMC, and its inherent role in ever expanding operational responsibilities within any given region, means that once established, TMCs are almost always evolving, expanding their role, adapting to new technologies or processes. Even in a mode that would be considered 'sustaining', there will usually be some degree of ongoing minor enhancements or expansions.

**Figure 2-3** shows a typical life-cycle of a TMC, in terms of high-level development and operating phases. Granted, TMCs will evolve, expand, or sustain relative to their geographic scope of services, functions, partnerships, and interagency dependencies and so forth. These development phases are intended to illustrate key points in the TMC evolution and life cycle process where business planning and business planning approaches can be applied and be beneficial.





**Figure 2-3: TMC Life Cycle**

To illustrate these phases and the corresponding benefits of business planning, **Table 2-2** provides examples of different TMCs and how business planning could benefit their respective life cycle stages.

**Table 2-2: TMC Phase/Business Planning Benefit Comparison**

Phase in the TMC Life Cycle	Examples	Benefits of TMC Business Plan
<b>New TMC Initiative</b>	<ul style="list-style-type: none"> <li>Nebraska DOT Statewide TMC</li> <li>FAST, Las Vegas, Nevada*</li> </ul>	<ul style="list-style-type: none"> <li>Establish functional and strategic objectives</li> <li>Outline and establish role for TMC within a geographic area, agency or consortia of agencies</li> <li>Near-term plan for staffing, operations and maintenance funding needs</li> <li>Establish institutional dependencies and partnerships</li> <li>Identify funding requirements and priorities</li> </ul>

Phase in the TMC Life Cycle	Examples	Benefits of TMC Business Plan
<b>Evolving/Expanding TMC</b>	<ul style="list-style-type: none"> <li>• City of Tucson*</li> <li>• Minnesota DOT*</li> </ul>	<ul style="list-style-type: none"> <li>• Update and expand strategic objectives (technical, institutional, functional)</li> <li>• Establish priorities</li> <li>• Expand role and functions</li> <li>• Expand partnerships</li> <li>• Develop strategic staffing plan</li> <li>• Identify funding needs and appropriate funding mechanisms</li> </ul>
<b>Sustaining Operations</b>	<ul style="list-style-type: none"> <li>• Arizona DOT</li> <li>• INFORM, Long Island, NY*</li> </ul>	<ul style="list-style-type: none"> <li>• Confirm operational responsibilities and objectives</li> <li>• Maintain current institutional relationships and partnerships</li> <li>• Assess sustaining role against other agency objectives, directives, or outside agency initiatives</li> <li>• Align business plan with other operational plans</li> </ul>
<b>Re-Evaluation of Plans</b>	<ul style="list-style-type: none"> <li>• Caltrans TMC Planning Initiatives*</li> </ul>	<ul style="list-style-type: none"> <li>• Assess how TMC is functioning relative to expectations and objectives</li> <li>• Assess how changing agency priorities and objectives need to be addressed as part of TMC operations</li> <li>• Compare new operational roles, systems or functions with current capabilities</li> <li>• Adjust timeframe of staffing and other resource needs based on shifting priorities or expanded TMC responsibilities</li> </ul>

\* These TMCs are highlighted in the Case Studies contained in Chapters 11 through 15 of this handbook

## 2.4 Who Should Be Involved in the Business Plan

Developing a sound TMC Business Plan relies on having input, guidance and championing of the process from the right *institutional* partners, as well as the right *individual* partners. Stakeholders have a key role at many levels of the Business Plan development process, and defining the stakeholders and the target audience early in the process will help to garner the right involvement at the right stages.

When embarking on a business planning effort, it is important to identify three key stakeholder groups:

Those who need to be involved in developing the TMC Business Plan;  
Those who need to provide input to the Plan; and  
Those who ultimately need to approve, support, or champion the plan and its vision.  
The breadth of participants will likely expand beyond transportation, although depending on the maturity level and functionality of the TMC, primary operational stakeholders will typically be transportation oriented. Some stakeholders will have more of a vested interest in the TMC than others; this is largely a result of owning agency, geography, and overall functionality of the TMC. The following outline the types of stakeholders that could be expected to provide input to the business planning process:

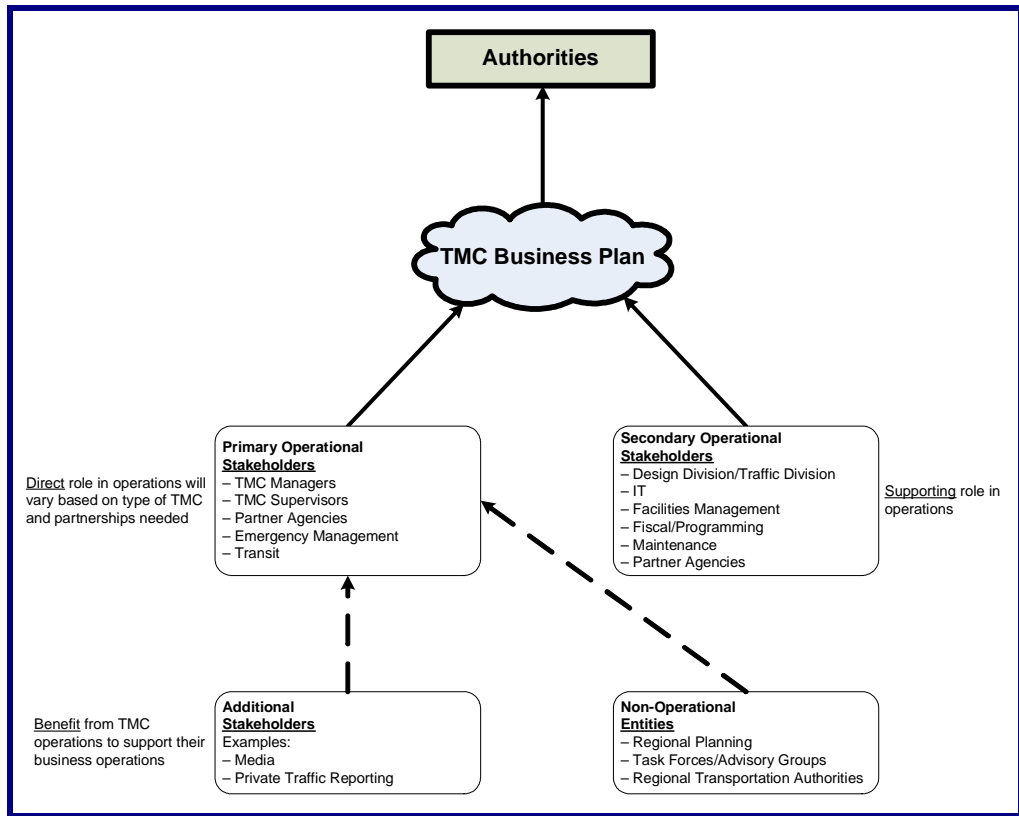
**Primary operational stakeholders** could include state, cities, county, regional transportation, emergency management agencies, law enforcement, public safety, transit, and others depending on level of coordination for operations. These stakeholders have a direct and integral role in operations, either through data exchange, collocation, or other arrangements.

**Secondary operational stakeholders**, although not having a direct role in operations in the TMC, provide supporting services necessary to carry out TMC functions, or utilize outputs and information gathered from the TMC as part of their functions. These could include design or IT departments, maintenance, and others. These secondary operational stakeholders could provide input as to specific considerations, processes, or protocols that would need to be reviewed or incorporated as part of the business planning process.

**Additional stakeholders**, such as media, private traffic reporting firms, and others potentially benefit from information and outputs from the TMC to support their business practices, but in most cases do not make significant operational contributions to the TMC. Depending on the function and role of a TMC, these additional stakeholders also could include transit, law enforcement, and other agencies.

Parties with a vested interest, such as MPO/regional transportation planning authorities citizen's advisory groups, and others that are not directly involved in operations, but could provide input as to how the Business Plan needs to align with other regional planning efforts or initiatives should be included as part of the stakeholder involvement.

**Figure 2-4** shows the inputs and relationships of these stakeholder groups as they pertain to a business planning process.



**Figure 2-4: Stakeholder Involvement in the TMC Business Plan**

When looking at potential stakeholders, including those that need to develop, provide input and ultimately approve or carry the Business Plan forward, these will most likely be dictated by geography, institutional relationship, or organization, and by specific discipline.

### 2.4.1 Geographic Range and Considerations

From a geographic perspective, the coverage area of the TMC needs to be considered on a range of levels, but for business plan development purposes, it is important to consider the geographic area served as well as geographical areas that have (or will have) a vested interest or dependency on the TMC.

For example, a city that establishes a TMC will likely need to involve key city departments such as traffic/streets/public works, asset management, maintenance, information technology, public safety and risk management from within their city departments. The area served by that city TMC is typically limited to established geographic boundaries and a well-defined jurisdiction. That city TMC might need to factor in outside interests if there are relationships with neighboring cities or regional entities that would warrant input as to the TMC functions or services (e.g., coordinated traffic signals along corridors that traverse multiple jurisdictions, freeway/arterial interchange coordination, maintenance agreements among neighboring jurisdictions, etc.). A recent example is the Maricopa County Department of Transportation (MCDOT) TMC Implementation Plan, where

**Geography, institutional relationships, specific organizational structures and disciplines will factor in to which stakeholders should be participating in the business planning process.**

stakeholders from MCDOT, Arizona DOT, Flood Control District, select cities in the County area, as well as various departments within the County were invited to provide input to the long-range vision for the County's TMC.

A statewide or multi-agency TMC, however, would need to involve additional jurisdictions that broaden the geographic scope, as those interests would also need to be represented and accounted for in the TMC's overall function and operations. While there may be a 'lead' agency in terms of management, funding or operations, or facility management, additional stakeholders could have key roles in providing input to the strategic objectives. Chapter 4 of this *TMC Business Planning and Plans Handbook* provides more information about the various TMC business models and institutional relationships.

### 2.4.2 Organizational Considerations

With the geographic area, or areas, identified, the right participants from within that area must be identified and engaged in the process.

Some of the key stakeholders can be provided, at least partially, through other planning processes, such as a regional ITS architecture, concept of operations, capital or long-range transportation program, or individual agency strategic plans. A Regional ITS Architecture in particular, provides a useful framework for stakeholder identification because of its regional scope as well as its focus on existing and desired functional relationships among entities within a region.

The lead agency in developing the TMC Business Plan will need to factor in the organizational structure and climate of their own agency, and work within established processes and protocols in terms of what divisions, offices, or branches would need to be involved. It is important to note that the Business Planning process, with its emphasis on fiscal and resource issues and planning, should get participation and input from divisions within their organization that would need to be involved in such decisions or strategic directions. These could include facilities management, asset management, programming or capital improvements and others as appropriate. When multiple agencies are involved, this could extend to additional divisions or offices within the partnering agencies.

### 2.4.3 Involving Discipline-Specific Perspectives

Operational functions and specialties for a TMC can range many disciplines, and to the extent practical and feasible, these disciplines should be considered as part of the business planning process. Subsections 2.4.2 and 2.4.3 emphasized involving key institutions and institutional partners in the process; their participation will help to ensure that the business plan includes input (and hopefully support) from a range of internal and external entities. It will be essential for those developing the TMC Business Plan to identify the specific perspectives that might not be represented among the 'top tier' of operational stakeholders, and engage their input or involvement in the process. By identifying how these other stakeholders are impacted by or interact with the TMC, its components, its operations, etc., additional perspectives can be included in the process.

Some of these additional perspectives could include (as applicable, and as appropriate to a specific TMC scenario):

Information technology;

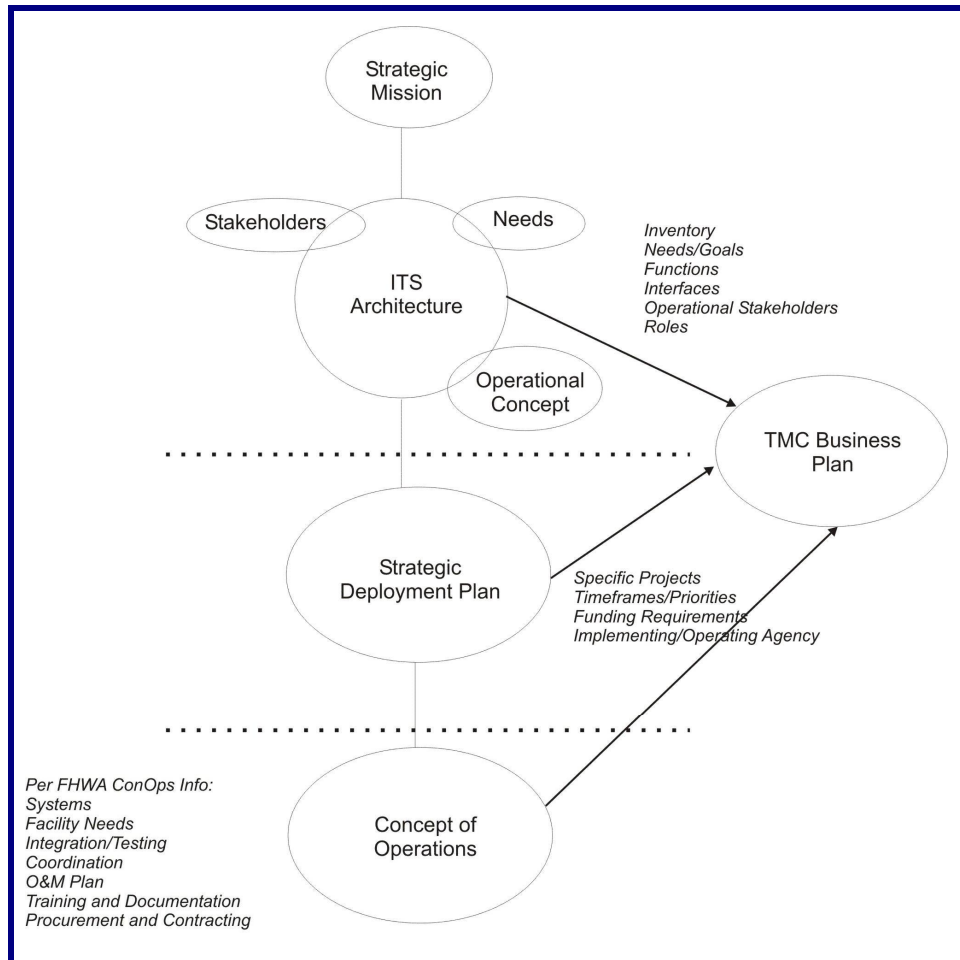
**Each organization will have specific disciplines or other supporting resources that could provide valuable input to the Business Plan.**

Maintenance;  
Facilities management;  
Accounting/programming;  
Law Enforcement/CAD Dispatch not collocated in TMC;  
Other modes (such as transit, ferry);  
Private entities, including media, traffic reporting firms, etc.;  
Regional or metropolitan planning organizations; and  
Citizen advisory or advocacy groups.

## 2.5 Relationship to Other ITS Planning, Plans and Processes

One of the greatest values of the TMC Business Plan is its role in helping agencies link ITS programs to regional objectives and funding sources. This is what separates the TMC Business Plan from other agency planning processes, such as a regional ITS architecture, Concept of Operations or non-ITS plans that have a broader regional impact.

Agencies, and even regions, with established or new ITS programs are responsible for planning, implementing and integrating technologies and systems in a responsible manner, and one that considers the broader impacts and vision beyond individual deployments. Business planning, although not traditionally among the core ITS plans developed, draws upon outputs from the other ITS planning processes, as well as complement those other processes. **Figure 2-5** shows the relationship and inputs of the various ITS planning processes with the TMC Business Plan. The remainder of this section looks at these relationships in more detail.



**Figure 2-5: Relationship of ITS Planning Processes with the TMC Business Plan**

If properly developed and implemented, the TMC Business Plan can establish legitimacy for sustainable funding, near-term needs of the TMC as well as longer-term programs and partnerships through ongoing performance monitoring and reporting of outcomes. In this way, it is a valuable tool for communicating with policy makers, partners, and executives.

### 2.5.1 Regional ITS Architecture

Regional ITS architectures that are developed based on the FHWA Final Rule and FTA Final Policy requirements provide a substantial baseline of information relative to the overall vision, role, and function of a TMC. Specifically, the architecture provides the following key outputs that can be used to support or develop the TMC Business Plan:

- Stakeholders – who are the key players (public and private), what is their operational role, in what capacity do they function in relation to ITS services and functions;
- Needs – the process to develop a regional ITS architecture results in priority needs from a variety of perspectives, including traffic and emergency management, transit, data/information management, and others;
- Functions and interfaces – The ITS architecture also outlines key functions and interfaces for a variety of systems and centers within an region and how they need

to interface. Key functions and the role of the TMC can be derived based on the architecture outputs; and

Operational Concepts – how key systems and stakeholders are envisioned to function to achieve desired goals/vision. The operational concept outlines the operational responsibilities and implementation and maintenance roles of each partner and can be used to gain consensus on the foundation of the TMC Business Plan by clearly defining the expectations and partnerships relative to the TMC.

### **2.5.2 Strategic Deployment Plan**

A strategic deployment plan provides more specific information about projects, timeframes for implementation as well as project priorities and sequencing. Strategic deployment plans also typically include planning-level funding requirements and responsible agency(ies). A strategic deployment plan can provide valuable input to a region's long range plan and transportation improvement plan. Likewise, a strategic deployment plan can assist in budgeting for necessary program management, project development and ITS planning in agencies' overall work programs.

Components of a strategic deployment plan can be applied to the TMC Business Plan to provide more detailed understanding of cost and resource requirements and how they impact the TMC, as well as anticipated timeframes for implementing specific projects or strategies in which the TMC will play a key role.

### **2.5.3 Concept of Operations**

A Concept of Operations defines, in more detail than a high-level Operational Concept found in a Regional ITS Architecture, the specifics of how a particular project or system operates in different scenarios. It would describe not only the roles and responsibilities, but operational scenarios for how a system operates on a day to day basis or in certain circumstances and interactions and data sharing for a project. A Concept of Operations is part of a project-oriented systems engineering approach that enables later validation of the concept of what the system was meant to do (in addition to system testing to ensure that the system meets the specific requirements that were laid out).

The Concept of Operations for a TMC would be developed using input from the Regional ITS Architecture's Operational Concept by utilizing applicable components to further define and refine the specific concept for the TMC's operations.

The Concept of Operations would provide input to the TMC Business Plan in terms of specific partners and roles, and can be expanded to define business processes and operations, management, and maintenance funding structures if applicable. The Concept of Operations would also provide a breakdown of various aspects of the TMC that should be addressed by the Business Plan and later tracked against the plan (and the plan revised as appropriate) related to actual expenditures and performance.



## 2.6 How the TMC Business Plan Relates to Other Agency Plans/Programs (non-ITS)

In addition to ITS planning processes, which will have a direct impact on the TMC, there are other plans that will need to be factored or considered as part of the business plan. These are often 'bigger picture' plans and strategic objectives can help further the business case for a TMC. In this regard, considerations for how TMCs help to support these broader goals and objectives focused on safety, mobility, efficiency, or agency strategic objectives need to be included as part of the business planning process.

Agency strategic goals and strategic plans

- Higher level, strategic missions. Typically these are very succinct goals 'from the top'.
- Often broader than ITS and represent comprehensive interests beyond operations. Need to align or demonstrate how a TMC fits in to these goals and strategic objectives, and more importantly, how a TMC supports strategic agency objectives
- Align with asset management programs

Statewide and Metropolitan Planning Organizations' Transportation Improvement Plans/Programs

Statewide transportation plans and transportation investment plans

- Where are the priority projects/programs, and how current and future TMC operations fit in with those priorities

State, county, and possibly city emergency plans

- How current and future TMC operations fits in the context of established or developing emergency plans
- Interfaces between TMC and emergency services



## Chapter 3: TMC Business Planning Process

### Chapter Purpose and Objectives:

This chapter presents an overview of the steps and processes involved in developing an effective TMC Business Plan, using a few basic scenarios to which planners can relate (or extrapolate) their situation. This chapter discusses participants in the business plan (who are the stakeholders and what are their roles), key decision making processes, where inputs from other planning processes (such as the regional ITS architecture or concept of operations) apply to the TMC Business Plan. It also identifies some of the key decision points and where critical buy-in is needed.

### Key Messages/Themes:

Descriptions of the overall process and key steps in TMC business planning, including stakeholder involvement, developing a consensus-based Business Concept, Value Propositions, strategy sets to achieve the Business Concept and realize the Value Propositions, as well as ongoing use of the Business Plan as a management tool.

Importance of stakeholder involvement and a coordinated stakeholder involvement plan to develop the Business Concept, Value Proposition and ultimately champion the Business Plan to the right decision makers.

Developing target audience objectives – plan should be structured around how to best sell Business Concept and Value Proposition.

### Relationship to Other Chapters:

Chapter 3 introduces the process to developing a TMC Business Plan, with greater detail provided on individual steps in subsequent chapters. The reader will gain a ‘big picture’ view of the flow and sequence of key steps, with additional detail and examples to be included in later chapters.

### Remaining Sections:

- 3.1 Overview of the TMC Business Planning Process
- 3.2 Identifying Stakeholders
- 3.3 The TMC Vision
- 3.4 Defining the TMC Business Concept
- 3.5 Developing the Value Proposition and Measures
- 3.6 Developing Strategy Sets
- 3.7 Developing the Organization and Management Structure
- 3.8 Developing a Financial Plan
- 3.9 Implementing, Updating and Maintaining the Business Plan

### 3.1 Overview of the TMC Business Planning Process

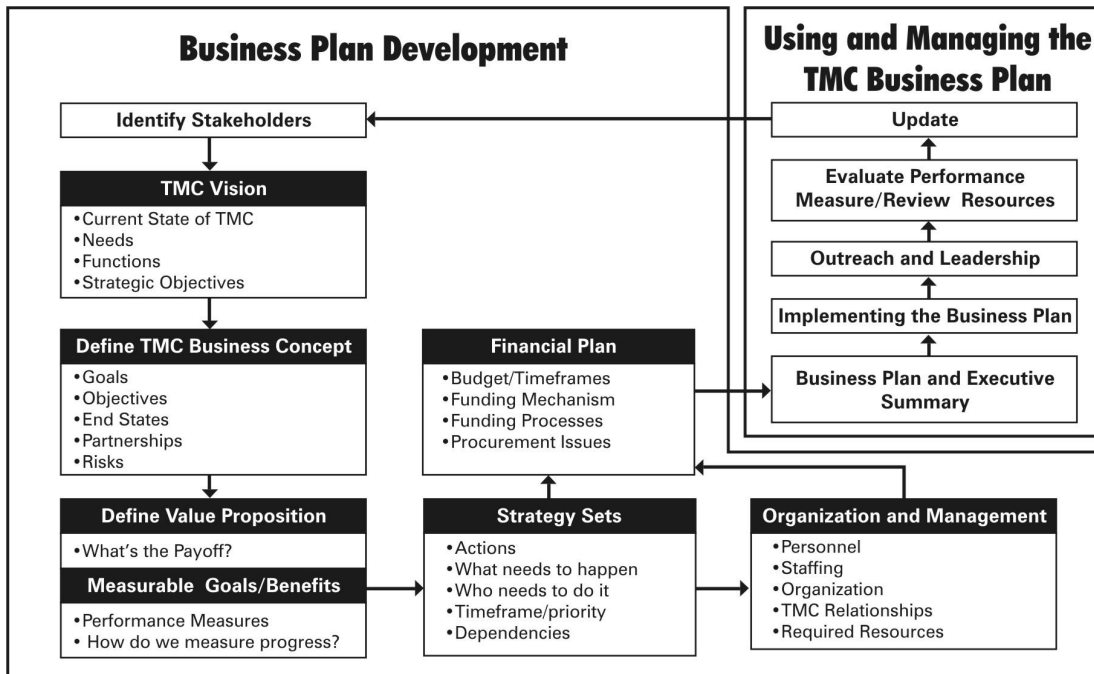
The foundation of the TMC Business Planning process is an effective Business Concept and demonstration of that Concept (in terms of value and benefit) to stakeholders. Legislators, administrators, and ultimately the motorist must be 'sold' the benefits of the TMC, and recognize a return of their investment.

The TMC Business Planning process is comprised of key sequences and steps, as introduced in **Figure 3-1**. As illustrated, the steps are:

- Identifying appropriate stakeholders;
- Developing a TMC Vision;
- Defining the TMC Business Concept;
- Defining a Value Proposition, and consistent with Measurable Goals and Benefits;
- Developing Strategy Sets to achieve the Business Concept, and ultimately, the value proposition;
- Establishing the Organization and Management requirements for the TMC; and
- Developing a Financial Plan with established budgets, schedules, and funding mechanisms.

After Business Plan Development, the Plan must be used and managed, as well as periodically reviewed for timeliness, priorities, or major shifts in operational goals, functions, or parameters. The TMC Business Plan is very much a living document, which requires ongoing review of performance against established goals, measures, and strategies contained in the TMC Business Plan, and periodically updating or revising the Business Plan. Implementation, use, and management of the TMC Business Plan encapsulates the following:

- Implementing the Business Plan;
- Providing Outreach and Leadership;
- Evaluate Performance and Review Resources; and
- Updating the Business Plan.



**Figure 3-1: Business Plan Steps and Processes**

Each of these steps is reviewed in the following sections, presenting a 'big picture' view of the flow and sequence of key steps of the TMC Business Planning process. These concepts are expanded upon subsequent chapters.

### 3.2 Identifying Stakeholders

The first step in the TMC business planning effort begins with a focus on the institutions and people involved. The TMC Business Planning process can be complex because it is so institutionally inclusive. As such, it is extremely important to define the stakeholders as well as the target audiences; in essence, those who need to be involved in developing the TMC Business Plan, those who need to provide input to the Plan, and those who ultimately need to approve, support, or champion the plan and its vision.

Stakeholder identification begins with defining the geographic region served by the TMC. The regions identified in the Regional Architecture development often coincide with a Metropolitan Statistical Area (MSA), or the geographic area of the local Metropolitan Planning Organizations. The region served by the TMC may be synonymous with one of these regions, or it may include just a portion of these regions. Dependent upon the magnitude and scale of the TMC operation, the geographic region may consist of multiple cities, counties, regional districts, a state, or even multiple states. Even if the TMC is that of a local city, the service area of the TMC may include multiple cities as the TMC exchanges information with TMCs from other local cities and towns.

Delineation of the TMC geographic service region facilitates pinpointing the key participants who should be included in the TMC Business Planning Process. Participants will include authorities and key decision makers within the DOT, and policy and decision makers from local, regional, and state leadership, as

**Geography is a key factor in identifying stakeholders to participate in the Plan. Operational functions and other planning processes will also help identify potential stakeholders.**

applicable. Participation from the key decision-makers that have the leadership and authority to make TMC activities and plans a funding and regional or institutional priority is essential. It is also essential to reach out to the stakeholders at the operational levels. While these stakeholders might not have authority to make commitments on behalf of their agency in terms of the TMC Business Plan, they provide a logistics based perspective to the TMC Business Planning process. In turn, these stakeholders also can be valuable champions in helping to sell the TMC Business Concept and overall Business Plan to higher authorities within their respective agency or entity.

Some of the key stakeholders can be provided, at least partially, through other planning processes. A Regional ITS Architecture in particular, provides a useful framework for stakeholder identification because of its regional scope as well as its focus on existing and desired functional relationships among entities within a region. The Regional Architecture reaches beyond the transportation community, extending to external stakeholders such as emergency services, public works, information providers, and the media to participate in the process. The functional relationships defined as part of the architecture development process helps to shape the scope of TMC stakeholders for a particular region or state.

The breadth of participants will likely expand beyond transportation, although depending on the maturity level and functionality of the TMC, primary operational stakeholders will typically be transportation oriented. For example, a new city or state TMC is likely to focus on traffic management, traveler information and maintenance/operational needs such as monitoring weather conditions or managing closures. As the TMC matures and new capabilities are added, a more established TMC could be expanding its functions (and interfaces) to include exchanging information with other TMCs or centers, providing operational support to other transportation or public safety functions, and others. As the TMC exchanges information with multiple disciplines and jurisdictions, participants may include state, city, county, regional, transportation, emergency services, public safety, law enforcement, and transit professionals. The role of media, maintenance, IT departments, citizen groups, regional planning organizations, and others should not be overlooked.

### 3.3 The TMC Vision

The TMC Vision exemplifies the 'ideal' or 'desired' state and functionality of the TMC, expressing long-term goals of how the TMC will function, operate, and serve its owning agency as well as partner agencies. An effective Vision is developed by participants in a consensus-based, bottom-up, collaborative process. The TMC Vision is not limited to those activities that are currently being achieved, or can necessarily be achieved in the immediate future, but sets a standard to be achieved over a period of time.

Visioning is an opportunity to bring the various types of stakeholders to the table early in the process, and establish a forum for a continued dialogue. Stakeholder needs and priorities factor into the

TMC Vision; these needs and priorities will differ from stakeholder to stakeholder. The stakeholder interaction facilitates establishing priorities, and ensuring that the TMC is responsive to stakeholder needs.

It is important to differentiate the TMC Vision from that of the ITS program as a whole. While the TMC Vision is distinctly separate from the visions of other programs and of the Department as a whole, the TMC Vision clearly supports these other visions. Garnering input from other documents and programs including the Regional ITS Architecture, ITS Deployment Plans, and the Concept of Operations will bolster and validate the TMC Vision and will ensure that the TMC Vision effectively supports and meets the needs of overall Department or ITS Program Goals.

Overarching larger agency or regional goals are an important input into the development of the TMC Vision, as these larger agency and regional goals drive the functions of the TMC. As the TMC is an element of the larger traffic management system working in concert with emergency management, the media, and TMCs from other regions, jurisdictions, and agencies, the Visions of these other system members are critical inputs.

An agreed-upon TMC Vision lays a framework to develop specific Strategic and Programmatic Objectives. These objectives present a clear directive and basis

*The Utah Department of Transportation established the Final Four Strategic Goals. These include:*

- *Take Care of What we Have;*
- *Make the System Work Better;*
- *Improve Safety; and*
- *Increase Capacity.*

*These Strategic Goals consists of a subset of focus areas relating to maintenance efforts, traffic management, traveler information, work zone safety, and roadway safety. Supporting the Department's Final Four Strategic Objectives are five focused missions of the UDOT Traffic Management Division, who operates the UDOT Traffic Operations Center. The five missions directly support the higher-level Final Four Strategic Goals of the Department, but are uniquely specific to the Transportation Management Division. These five missions are:*

- *To improve highway safety;*
- *To improve the efficiency of Utah's highways;*
- *To provide timely and accurate real-time traffic information;*
- *Work together with other governmental agencies to serve the public; and*
- *Provide excellent customer service.*

for the TMC Business Concept and Overall Business Plan by identifying the role of the TMC, its core purpose, functions, and future needs.

### 3.4 Defining TMC Business Concept

Building upon the Vision and Strategic Objectives is the TMC Business Concept that articulates the 'end state' of the TMC. The TMC Business Concept is a description or 'snapshot' of what the TMC does, what it is envisioned to do, the role that it plays within an agency, and the desired roles and functions that the TMC needs to play within an agency and as part of a larger regional traffic management system. The Business Concept is not merely a collection of goals or need statements, rather the Business Concept outlines a comprehensive approach and desired end state, encapsulating how the TMC is envisioned to function, the role it plays within its owning agency/entity, and how it supports partner agencies.

Specifically, the TMC Business Concept answers:

How does the TMC currently function, and how should the TMC function?  
What roles should it serve?

With what other agencies does the TMC currently interface and in what capacity?  
With what other agencies does it need to interface with to achieve the desired functionality?

What are the current institutional, technical, and resources barriers that could impede the desired functionality, or end state?

Developing the Business Concept relies on an iterative approach, and an examination of the roles and functions of the TMC at many levels and from several perspectives. Although the Business Concept is largely focused on specific TMC services and functions and how the TMC functions in relationship to other systems and agencies in a given region, it is important for stakeholders to also identify some of the key trends and future end states that could be achieved. Through focused stakeholder outreach and visioning, a consensus on the strategic objectives can be reached. Elements such as functions and services, partnerships, and timeframes factor into the overall TMC Business Concept.

Similar to how private sector entities approach business planning, the TMC Business Concept also needs to balance the vision and desired end state with key risks and dependencies – in other words, what are the 'make or break' aspects that need to be considered in the overall Business Plan? Are there key partnerships that, if not secured, will impact evolution of the TMC? Are there some significant funding needs that are dependent on legislation passing (either federal or local) or on partners contributing to operational funding needs? Are there staff resources that will be needed, but the agency is currently facing restrictions in terms of hiring new or additional resources?

These dependencies must be identified, and articulated within the Business Concept. Dependencies also can be in the form of risks; private sector business plans document risks so that stakeholders, shareholders, and investors can make informed decisions about potential or known impacts. Dependencies must be documented so that critical path items can be identified, and stakeholders will be aware of key elements that influence the Business Concept as well as some of the key strategies to be developed later in the Business Planning process. Dependencies could include:

**Dependencies must be documented so that critical path items can be identified.**



Facilities;  
Technology;  
Partnerships (existing or future);  
Leadership and organization structure;  
Funding (amounts, schedules for fiscal programming);  
Personnel and Staffing Resources (including numbers and types of staff);  
Project implementations/timeframes; and  
Legislation.

Chapter 5 of this Handbook focuses on how to develop and define a Business Concept, including engaging stakeholders, visioning and outlining strategic objectives, as well as provides applicable examples of Business Concepts from the private sector and public agencies. Risks and dependencies, and how to identify and articulate them, also are discussed in that chapter.

### 3.5 Developing the Value Proposition and Measures

The value proposition is a case made (and tailored to each participating agency) to define the expected value of the TMC to the missions of each of the participating agencies and key stakeholders. The value proposition reflects not only a set of overall “good” objectives for regional transportation, but effectively addresses specific value from the stakeholder point of view, especially when particular agencies have core missions that extend outside of transportation management.

Value proposition is a thorough and objective statement of the various benefits (or value) expected to accrue to TMC stakeholders. The value proposition defines value in measurable terms from the point of view of all stakeholders that are expected to invest resources, operational attention, or political support in the TMC, establishing performance expectations and accountability for the TMC. The purpose of the value proposition is not to “sell” the TMC, but to provide a basis for a realistic plan and performance measures, and for stakeholders to rationalize appropriate support for the TMC. The payoff should incorporate stakeholder values, and requires objective, real-world data, credible analysis, and a practical measurement approach in addition to more subjective measures, such as program milestones.

The value proposition is developed through direct stakeholder participation in defining their values in terms of transportation management. The relationship between TMC Vision and Objectives, and stakeholder benefits should be logical, and conservatively derived. Relevant facts and statistics on the “status quo” should be clearly established and agreed upon by the stakeholders. Safety statistics, traffic efficiency, and incident response patterns are key baseline data, but there are several other factors that impact a sound value proposition.

Research of regional transportation economics and productivity issues provide a potential benefits baseline for some stakeholders. A credible projection of measurable transportation outcomes in safety, response, and efficiency are needed to base value. Finally, display and communication of the value proposition needs to be simply delivered and understood.

The value proposition establishes the basis for performance measurement. Performance measures and monitoring is required to chart the progress toward

**The value proposition defines value in measurable terms from the point of view of all stakeholders that are expected to invest resources, operational attention, or political support in the TMC, establishing performance expectations and accountability for the TMC.**

achieving the anticipated benefits quantified by the value proposition. Benchmarks measure progress toward the goals. Performance measures serve to identify problems within the program so that they can be corrected and the value proposition realized.

Chapter 6 of this handbook focuses on how to define and tailor value propositions, as well as how performance measuring and monitoring factors into the value proposition process.

### 3.6 Developing Strategy Sets

Articulating the TMC Vision in terms of needs, objectives, and Value Proposition serves those developing the Business Plan to outline specific strategies directed toward end results. Strategy Sets are actions and directions that lead to the end results, and provide the basis for the overall form and function of the TMC Business Plan. Strategies need to be developed and articulated as specific actions and outcomes so that decision makers have a succinct understanding of overall objectives and how the end states of the Business Concept, and ultimately the Value Proposition, can be realized. Organizing the strategies into a modular, phased approach provides a definitive direction to the TMC Business Plan.

The modular and structured phasing of the strategies begins with their prioritization. High priority items that need to be addressed in the TMC Business Plan are identified through stakeholder input and visioning. The high priority items should show a direct correlation with the Value Proposition previously discussed, yielding the 'payoff' as viewed by the stakeholders. Grouping strategies, either by functional category, institutional relationship or timeframe, will help to provide a more modular framework for articulating the specific actions that need to be taken.

Action items associated with each Strategy Set define the specific elements, tasks, and projects that need to happen in order to support the Value Proposition and Business Concept. The assignment of responsibility and timeframes to actions provide context as to what needs to happen, and by who is essential to their success.

Defining near-term and longer-term actions to achieving the strategic goals defined by stakeholders will allow the Business Plan to identify the required resources, including facilities, staffing, partnering, budget, and technical requirements needed to implement the strategy. Strategy Sets should include a description of the facilities, staffing, partnering, budget, and technical requirements needed to implement the needed strategies.

Chapter 7 provides examples of strategy sets within the context of a TMC Business Plan, and walks through the process of mapping strategic objectives, needs and value proposition requirements into specific strategies, as well as the role of dependencies within the strategy development process.

### 3.7 Developing the Organization and Management Structure

A planned organization and management approach is much more than an organizational chart. TMC scale, functional focus, range of activities, agency

authority, and agency missions influence the organizational approach and design in predictable ways.

First, the number and types of agencies participating in the TMC and the overall jurisdictional or geographic scale, may determine the composition of staffing, budget, functional design, and decision-making and coordination provisions. The jurisdictional scale may range from a single agency to a multi-agency program.

As an example of how the jurisdictional scale impacts the organization and management structure, a multi-state or multi-county agency (e.g. two state DOTs in an urban region) with similar but distinct missions and policies may require special coordination or decision-making provisions, and involve more “dotted lines”. Statewide organizations that provide operational control across the entire state encompassing rural and urban areas may require provisions for separate regional focus in some functions to assure appropriate attention and response across the system. Finally, corridor-focused organizations with many stakeholders might need a functional organization with strict operational “rules” to be viable. Strong legislated accountability for some functions may mean that defined agency-line-of-authority structures will have to be accepted for some functions.

Another significant input into the organization and management structure is the range of primary services provided. Traveler information services, as an example, usually call for a functional approach to TMC organization and management, considering information collection, data management, content management and synthesis, communications or dissemination.

Equally, transportation operations or systems management services may combine functional structures, coordination features, and a decision model for priority decisions. Finally, incident management response functions require special organizational consideration and processes, as they usually trigger an initial organizational response (triage) structure, evolving to incident-specific response teams or coordination activities.

Ultimately, the organizational design is largely driven by the decision-making authority of the TMC. The level of decision-making authority could range from little or no operational authority to the full control of transportation management decisions. This could also extend to entities outside of the TMC (for example, does the TMC provide operational support for other TMCs, either within the agency’s jurisdiction or for partner agencies?). If little or no operational authority is needed at the TMC, a functional management organization with established procedures and processes is suitable. Organization and management structure may be satisfied by means of a simple point of contact structure through which information can be accessed and disseminated, coupled by a content manager for web facilities, data reports, etc.

At the highest level, where partial or full control of transportation management decisions resides at the TMC, a multi-agency organization structure necessitates the incorporation of formal decision models, e.g. steering committees, leadership teams, charters, and voting and consensus rules.

As the decision-making authority of the TMC increases, the organization and management structure becomes more rigid with additional external controls and

**TMC scale, functional focus, range of activities, partnerships, and authority have direct influence on the organizations approach.**

interfaces. For TMCs coordinating resource or application controls, limited responsibility could be vested, typically augmented by external decision-makers. The design of an organization and management structure should consider the ownership and control of the TMC. Typically, this falls to the primary operating (and funding) agency. As a practical matter, in these cases the agency's organization structure and lines of authority have a strong influence on the "ideal" TMC structure.

Incorporating the above considerations, a comprehensive TMC Business Plan specifically addresses the following management elements:

- Staffing Levels and Functions (in house staffing, contracted staffing, which agencies are represented);
- Facilities (primary TMC facility, other facilities with which it must interface);
- Technology Investments (who owns the infrastructure, including field, systems, and facilities);
- Equipment sharing (is another agency/entity responsible for operating/maintaining?);
- Program Management (is there an overall program management plan that can be sourced or referred to?);
- Decision making models, bodies or committee structures (need to address specific operational, technical, policy or staffing issues);
- Charter, management principles (beneficial for all types of TMCs. Having a 'rules of the road' will provide stakeholders and authorities a clear picture of how and by whom decisions will be made); and
- Potential dependencies/constraints.

### 3.8 Developing a Financial Plan

The Financial Plan develops a comprehensive picture of funding needs and a funding strategy, including the documentation of fiscal needs, responsibilities, funding sources, and timelines based on the overall Business Concept, selected Strategy Sets and the Organization and Management Structure. An effective financial plan develops a clear justification of needs versus other competing priorities in the region. The Financial Plan needs to address TMC-specific funding requirements, and to tie these requirements back to the Business Concept, Value Proposition, improvements required to develop the desired capabilities, and services needed to manage, operate, and maintain a TMC.

The Financial Plan identifies the appropriate funding sources within the agency and region, including a documentation of funding cycles, key milestones, issues to consider, and other key factors associated with funding the TMC. While many agencies develop funding requirements for overall Traffic Management System programs, the specific needs, roles and functions of the TMC, as articulated in the TMC Business Concept, need to be specifically oriented towards a sustainable funding stream to not only design and build the facility but also to operate and maintain it for an extended period.

The Financial Plan must answer how much is required to sustain TMC operations. While previous Business Planning efforts developed specific strategy sets, implementation requirements, and priorities, the next task is to assign funding requirements for those specific strategy sets taking into consideration:

- Initial capital costs;
- Operating and Maintenance Costs over the timeframes previously identified;

Staffing requirements (new positions, staff training needs, etc.);  
Integration costs; and  
Contractor/vendor cost requirements.

Costs should be estimated for each of the activities. Where necessary, ranges of costs related to specific performance levels should be established. This will assist the decision makers in their decision on a preferred service level. Ongoing maintenance and operations costs present a particular challenge for TMCs as Federal grants have typically funded capital, development, and integration costs, leaving operations and system maintenance the responsibility of local agencies. Some TMCs have suffered declines in staffing and maintenance following the cessation of federal funding periods. Typical operations and system maintenance costs include:

- Building maintenance;
- Utilities;
- Operating supplies;
- Operations support;
- Hardware;
- Software licenses;
- Communications;
- Training;
- Personnel;
- Communications;
- Preventive and responsive maintenance; and
- Vehicles.

Once the financial needs have been established, the applicable funding sources need to be identified. Funding sources could be federal, state, or local funding. Federal funding typically forms the basis for TMC projects. Currently available and applicable general funding programs include the National Highway System funds (NHS), Surface Transportation Program Funds (STP), Congestion Mitigation and Air Quality Improvement Program (CMAQ) funding, and TEA-LU and ITS Integration funding sources. Some of these funds have restrictions, in terms of capital or operating designations, and federal funding will require a local match.

The *Organization and Management Structure* is a key consideration to determine funding streams, strategies, and budgets. For a single agency ownership model, the TMC budget may be part of an overall agency budget. A joint agency budgeting model results in more intricate budgeting and funding arrangements, which carry with them additional budgeting and funding challenges. When joint funding is required, challenges may include determining the budget sharing arrangements, ensuring that agencies meet and maintain commitments, and working within different budget cycles and processes. Joint agency fund sharing models can be based on utilization of facilities, (e.g. floor space, computer space, communications usage), or the number of field devices implemented within a respective jurisdiction. Alternatively, division of operating costs could be based on pre-determined user fees or dues which are based on a direct benefit and ability to pay model.

The most challenging and perhaps the most critical element of the Financial Plan is to secure funding. A first step is to identify the defined process for decision-making in one's agency, region, or state that includes the linkage to budget-cycles and processes of all partner agencies, application procedures, and

prioritization procedures. To be successful, funding linkages must be established within the Concept of Operations, Strategic Plans, and Performance Measures. These multi-year plans determine the direction of budgeting activities over a multi-year time horizon. This is essential for obtaining political and funding support as well as for establishing internal funding priorities. Finally, of critical importance is the demonstration between funding requirements and sources—and anticipated benefits, e.g. the Value Proposition.

Chapter 9 provides more detailed approaches for developing sound financial plans within the context of a TMC Business Plan, including how other agencies have coordinated the financial component with other regional funding and programming activities. Examples of innovative approaches to funding near and longer-term TMC activities also are shown in that chapter.

### **3.9 Implementing, Updating and Maintaining the Business Plan**

The TMC Business Plan becomes an important tool for continued TMC operations and expansion. The overall usefulness and success of the TMC Business Plan rests on effective implementation and continued monitoring. To maintain currency, strategies and timeframes for regularly reviewing and updating the TMC Business Plan must be established. Updating the business plan is an ongoing process with specific milestones. A key element of the updating process is measuring progress toward goals (i.e., how is the Business Plan performing in relation to the Value Propositions) to demonstrate continued value and benefit of the TMC.

TMC Business Plan implementation milestones are based on the strategy sets, organization and management structure, and the financial plan. A key component of successful implementation is the effective communication of the Plan and its purpose to internal and external stakeholders, including the public.

The Business Plan affords another tool to TMC managers and administrators to use as a reference to supplement operations plans. The TMC Business Plan maps out a clear direction of where the TMC is heading in relation to its key functions and is not intended to replace a Concept of Operations or specific operating or emergency plans. The TMC Business Plan also is a key tool for the annual budget process, as the Financial Plan element should succinctly outline significant near-term and future requirements in terms of technology needs, staffing, and capital and operating costs to provide current and needed functions providing justification for TMC expansion, additional funds, and needed services.

Demonstrating progress toward established objectives and benefits is fundamental to the long-term success and viability of the TMC. Plans should clearly state which entities and individuals are responsible for measuring and reporting on performance, when evaluations will be conducted, and who will conduct them. During these evaluations, reports are made on progress toward the objectives, inhibiting factors and constraints, and the resources and needs to overcome them. While there is a risk of overlap between the TMC performance evaluation and other Operations performance measurement, and careful coordination should take place, the TMC Business Plan evaluation is focused on Business Plan impacts, achievements, and milestones.



Performance measurement may be presented in the form of annual reports or presented to subcommittees, leadership groups and other meetings to which entities belong. Plans should document how and to whom the evaluations will be presented. The frequency, timeframes, and details for reporting evaluation results will vary. While weekly, monthly, or quarterly reports are typically operations focused and intended for internal audiences, annual reports are better suited for management and can document key impacts and performance.

The TMC performance evaluation process may point toward a need to modify and update the TMC Business Plan to reflect contemporary constraints, and to address identified deficiencies and areas for improvement. Guidelines for the updating and modifying process are developed, including:

Timeframe for updating the plan (e.g. every five years, as conditions necessitate);

Laying out warrants or regionally-significant 'triggers' that may drive the need to update the TMC Business Plan. As an example, local programming processes, regional architecture updates, for major system deployments may warrant an update of the TMC Business Plan;

Identifying critical aspects of the TMC Business Plan that are likely to require more frequent updates and reviews;

Agreeing to who will be involved in reviewing and updating the TMC Business Plan; and

Soliciting new partners into the TMC Business Planning process as regional dynamics change.

The approach and method for updating the TMC Business Plan is likely to vary for different types of TMCs based on scale and function. An increase in the scale and/or scope of functional responsibilities of the TMC will require an update of the TMC Business Plan, in context with the new level of responsibilities. As traveler information systems, integration with emergency management, or other operational expansions (e.g. jurisdictional expansion, hours of operation, new partners collocated in TMC, interfaces with other partners required), or focus areas are brought on-line, a shift or update of the TMC Business Plan may be required to assess the additional needs and resources required, with the objective of maintaining the TMC Business Plan as a useful, relevant document that will enhance the ability of the TMC to meet its stated goals and objectives, and in turn the objectives of the larger agency or region.

Chapter 10, Using and Managing the TMC Business Plan, provides strategies for those responsible for implementing or updating the plan as to how to use the plan as a management resource, and general principles and approaches for reviewing and updating the Business Plan.





## Chapter 4: TMC Business Models

### Chapter Purpose and Objectives:

Prior to developing specific elements of a TMC Business Plan, it is important to identify the different types of TMCs (and how they're structured) in order to provide a context for the different elements of the Business Plan. How a TMC is organized, such as a single agency or multiple collocated agencies, what role the TMC serves in a region, and how a TMC operates will directly affect how the Business Plan is developed and what it includes.

This chapter identifies the different TMC business model options an agency (or agencies) can select in developing a TMC business model. There are several different types of organizational and functional options for a TMC that factor in to the business model. The business model is developed around a combination of:

Geographic area covered;  
Number and types of agencies involved;  
Functions or services provided; and  
Operating mechanism.

These business models discuss, at a high level, basic organizational, functional and institutional relationships that comprise various options for structuring a TMC. There are no clear-cut, strictly defined formulas for a TMC business model – within each of the models presented in this chapter, there will be slight variations based on local and regional conditions, needs, institutional arrangements, system capability and maturity and a host of other factors. This chapter presents some typical TMC organizational models, and illustrates those with examples of TMCs from around the country.

### Key Messages/Themes:

The key message for this chapter is that any combination of the identified options (geographic area, number and types of agencies, functions or services, and operating mechanism) could provide a successful TMC business model. How well each combination of options meets the specific needs of the agency(ies) is a function of a needs assessment for the agency(ies) that should be established as part of the system engineering process.

### Relationship to Other Chapters:

Chapter 4 follows the description of how TMC business plans fit into the overall planning process and builds off the information in Chapter 3 to set the stage for the chapters that follow which describe the business planning process. This chapter focuses on describing different types of TMC business models that cover different geographic areas, that involve different types of agencies, that involve different number of agencies, and that are operated by different staffing and organization arrangements. This chapter provides examples that others may learn from as new business plans are prepared.

Remaining Sections:

- 4.1 Geographic area covered
- 4.2 Number and type of agencies involved
- 4.3 Operating mechanism
- 4.4 Examples of where each model has been developed and deployed

Definitions:

In describing the various business models below, the following terminology (with examples) is used:

Jurisdiction – a city, county, or state;

Agency – a transportation department, public safety department, or emergency management department; and

Discipline – within a transportation agency, you might find a traffic engineering discipline, maintenance discipline, etc.

#### **4.1 Geographic Area Covered**

Traffic management centers may serve single jurisdictions, multiple jurisdictions within a metropolitan area, a large region, or even an entire state. The range and scope of the geographic service area of a traffic management center is dependent upon institutional, political, and economic considerations, and the transportation management needs of the area.

Functional responsibilities of early traffic management centers (circa 1960's and 1970's) were typically limited to a centralized traffic signal control system for the traffic signals within one agency's city limits. These traffic systems sometimes involved an entire city, county, or multiple counties resulting in an expanded geographic service area of the traffic management center. As ITS came into its own, traffic management centers began to be developed for regional freeway management systems. Consequently, the geographic service areas of these freeway traffic management centers typically spanned across multiple city and county jurisdictions. As traffic congestion increased in large metropolitan areas, and as agencies developed more sophisticated and integrated systems to manage the congestion, many of the freeway systems evolved to manage both urban traffic signal systems and freeway management systems. Subsequently the geographical service area covered by a TMC expanded even further. To some degree, the geographic area included within one TMC's area of influence could be a function of the maturity and sophistication of the transportation management in an area.

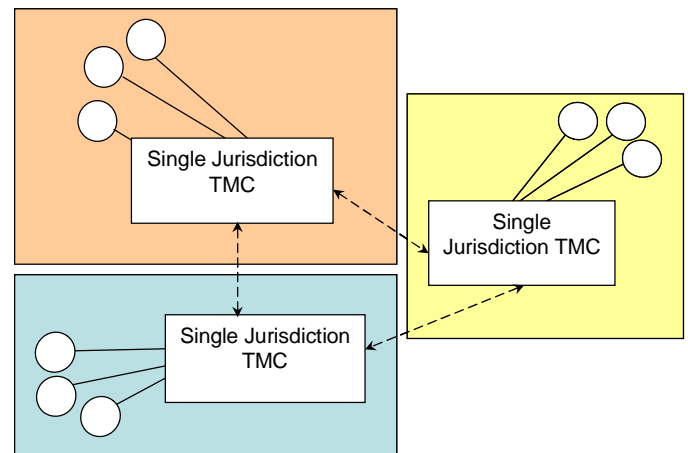
As the benefits of ITS spread beyond urban areas, and systems were developed for rural and statewide applications, the geographic service areas of many urban-area freeway traffic management systems expanded to a regional or statewide level. The advent of traveler information systems and the need for a central depository point for information from multiple statewide data sources has, in many states, further expanded the geographic scope of the urban-area traffic management center.

As intelligent transportation systems have evolved to meet the growing demands of travelers, cities, counties, and states have developed numerous unique business models that serve vastly different geographic areas. This section describes four of these models: single jurisdiction; large metropolitan area with multiple jurisdictions; regional or district area, and statewide.

It is important to note that there is the potential for multiple variations within each of these models. The Federal Highway Administration and Institute of Transportation Engineers' publication, *Organizing for Regional Transportation Operations: An Executive Guide*, provides insights into some of the unique organizational and institutional perspectives that must be considered when weighing the various business and operational models for TMCs.

#### 4.1.1 Single Jurisdiction Traffic Management Center

A single jurisdiction Traffic Management Center represents the least sophisticated business model arrangement. These traffic management centers – serving a single city or single county, typically are located in an office area of an existing facility such as a city hall or at the county department of transportation offices. In most cases these TMC's involve only one city or county department or agency – typically the department of transportation. The geographic service area of a single-jurisdiction TMC is limited to the political boundaries of the owning jurisdiction. However, in metropolitan areas with multiple jurisdictions, TMCs may coordinate their operations with other TMCs through telephone, email, or through dedicated communications lines and networks.

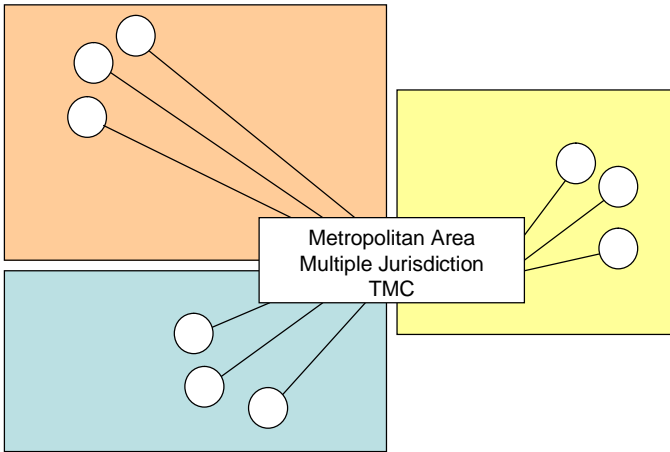


**Advantages:** An advantage of single-jurisdiction TMCs is that they can typically be deployed within existing office facilities. Since the geographic area also is limited, operators usually possess more first-hand knowledge of the limited number of field devices that are managed from the TMC.

Other advantages, in some respects, include the limited number of stakeholders with whom TMC activities must be coordinated. Single-jurisdiction TMCs do not require extensive funding, project management, staffing, or maintenance agreements with other municipalities or agencies, as they work within the existing departmental structures.

**Disadvantages:** More often than not, transportation issues are regional in nature. Traffic congestion, air quality, and other issues that have impacts beyond localized areas often require the efforts of more than an individual jurisdiction. Unfortunately, in a single jurisdiction arrangement, particularly in a large metropolitan area with multiple adjacent jurisdictions, the single-jurisdiction TMC may be focused on the individual jurisdiction's mission, and not on the collective mission of the region. Furthermore, in large metropolitan areas where multiple, single-jurisdiction TMCs each manage a limited geographic area, coordination between jurisdictions may not exist or at least becomes more difficult to accomplish.

### 4.1.2 Multiple Jurisdictions Traffic Management Center



In large metropolitan areas with multiple cities or counties, jurisdictions have coordinated and participated in the construction, operations and maintenance of a common TMC facility. The multi-jurisdictional TMC controls ITS field elements in multiple jurisdictions, irrespective of political boundaries. Consequently, the number of miles of roadway, number of ITS elements, and the number of stakeholders is significantly larger than would be found in a single jurisdiction TMC arrangement.

**Advantages:** Multi-jurisdictional TMCs yield significant benefits to the customer – the tax paying, traveling public. The traveling public expects transportation systems to be seamless across jurisdictional boundaries, irrespective of political and jurisdictional responsibilities. Multi-

jurisdictional TMCs are no longer focused on improving transportation operations within a single jurisdiction, but on improving operations across the entire metropolitan area.

Significant institutional and system benefits are realized when multiple jurisdictions cooperate in the implementation, management, and operations of a TMC. These include:

**Efficiency and Cost Savings** – Multi-jurisdictional TMCs eliminate duplication and overlap in procurement, installation, and integration of technical systems that would be required of individual jurisdictions when operating on their own. Furthermore, compatible systems (such as traffic signal systems, detection or traveler information technologies) allow agencies to share costs for new purchases and upgrades, as well as streamline maintenance requirements and resources.

**Resource Utilization and Availability** – A multi-jurisdictional TMC covering a large geographic area is more cost efficient because only one facility must be staffed and operated. Multi-jurisdictional TMCs are in a position to share and draw upon the technical expertise, strengths, and resources of partner agencies.

**Improved Working Relationships** – The collocation of staff of multiple jurisdictions into a common facility facilitates information exchange, elevates trust and understanding, and strengthens partnerships, thus facilitating enhanced collaboration and coordination of operations.

**Systems Coordination** – The collocation of staff from multiple jurisdictions into a common facility, and management emanating from one physical location facilitates and encourages coordinated traffic management across jurisdictional boundaries.

**Hours of Operation** – The pooled resources of multiple agencies can enable extended hours of service that might be unfeasible for a single-jurisdiction TMC. The extended hours provides an improved level of service to the traveling public. The TMC is prepared to respond to incidents, construction activities (many of which occur at night), and planned special events.

As an example, the Tucson Regional Transportation Control Center (TRTCC) was identified as one of the solutions to address the metropolitan area's increasing traffic congestion. The TRCCC combines the transportation management resources of the City of Tucson, Pima County, the State of Arizona, surrounding jurisdictions, and private industry into a single, integrated operation. The city's TRTCC is serving as the hub for Arizona DOT's traffic management and monitoring until a permanent ADOT facility can be built.

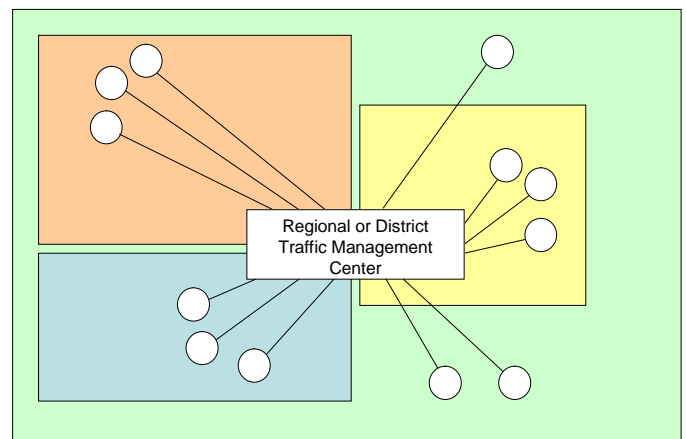
The TRTCC emanated from area Traffic Engineers' desire for a more coordinated approach to traffic management – the first step towards which was the procurement of a common traffic signal system. The common system enables engineers from each jurisdiction to more easily coordinate their signal operations across jurisdictional boundaries.

The TRTCC provides a central depository and processing center for traveler information. Real time traffic-monitoring equipment continuously feeds video and data to the Center. TRTCC operators, who are actually staff of a private-sector traveler information services company, constantly monitor events, update Internet, radio, and television advisories, and are able to visually confirm reported events by video or by air to determine the actual traffic impacts. The report is then broadcast over commercial radio and television, giving commuters reliable information.

**Disadvantages:** Implementation of a multi-jurisdictional TMC carries with it a significant, sometimes cumbersome, process of garnering buy-in on operational parameters and processes and formalizing intergovernmental agreements with each of the participant agencies. Agreements are necessary to define the overall operation of the transportation system, as well as operational, resource sharing, personnel, systems, and institutional integration arrangements of the partner agencies. Documenting and formalizing agreements may require compromise, on the part of each agency, in terms of how facilities are operated. This model is further complicated by the addition of private contractors.

### 4.1.3 Regional or District Traffic Management Center

The regional or district TMC business model expands upon the multi-jurisdictional model in that it encompasses additional non-metropolitan areas such as rural county or state facilities outside the metropolitan area, in addition to the multiple jurisdictions within the metropolitan area. The mission of a Regional or District TMC may include not only urban arterial traffic management, but also the operations and management of suburban, urban freeway, and rural highway and interstate facilities. The geographic area of a Regional or District Area may coincide with Department of Transportation Districts, Metropolitan Planning Areas, or other defined geographic boundaries.



**Advantages:** Many of the advantages of the Multiple Jurisdictions TMC model are seen in the Regional or District TMC model. Again, a primary advantage of this business model is that there is an efficiency of cost when a single TMC can serve a large geographic area, and combine resources for capital, staffing, and operations expenses. Without the resources of the large Region or District TMC, it may be impractical to dedicate human resources to the exclusive monitoring and operating of rural ITS field elements. Other advantages include:

Regional traffic management can occur more easily, thus benefiting the traveling public when the entire network is managed in a comprehensive and integrated manner as opposed to having each agency being responsible for just their facilities. As an example, information regarding route conditions in rural areas can be

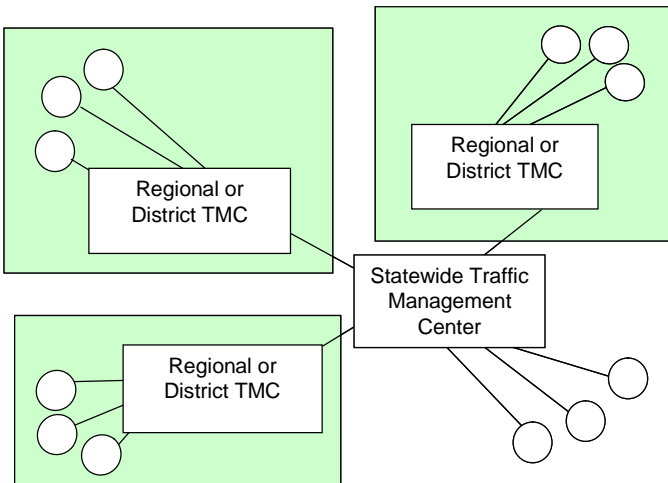
**The State of New York Department of Transportation operates the INFORM Traffic Management Center. The Center controls nearly 320 centerline miles of freeway, major arterials, parkways and expressways in the Long Island region, providing 24 hour, 7 days a week operations, 365 days a year. The primary missions of INFORM are to identify traffic congestion and incidents likely to cause congestion, and to provide information to motorists and incident management.**

disseminated to travelers in the urban area where they can more easily make alternate route choices. Integrated control of multiple ITS systems are more easily achieved when one TMC is managing a regional or district operation. A Regional or District TMC may utilize staff from different jurisdictions that have responsibilities within the region or district geographic area, drawing upon the technical expertise and strengths of partner agencies. Projects supported by a Regional or District TMC, and inherently by multiple jurisdictions throughout the region are more likely to receive federal approval and funding because of the multi-lateral, regional support of the project. A Regional or District TMC is well-suited to serve as a central repository, synthesizer, and clearing house for work zone, maintenance, and construction information for dissemination to traveler information systems.

Disadvantages: Similar to the multi-jurisdictional TMC model, implementing a district or regional TMC carries with it a significant, sometimes cumbersome, process of garnering buy-in and formalizing intergovernmental agreements with each of the participating agencies, if there are in fact multiple agencies participating.

While the integrated control of multiple ITS systems are more easily achieved when one TMC is managing a regional or district operation, such an arrangement does require that intergovernmental agreements, memorandum of understanding, or a concept of operations be worked out ahead of time defining how the different agencies within this larger region are to operate. Legal questions as to liability must also be addressed up front in these written agreements.

#### 4.1.4 Statewide Traffic Management Center



Several states, typically initiated by the State Department of Transportation, have constructed TMCs whose geographic service area encompasses an entire state. Some of these TMCs are operated by a single agency, while others have received participation from other statewide agencies such as the State Highway Patrol. As an example, the Nebraska Emergency Management Agency, the Nebraska State Patrol and the Nebraska Army National Guard have actively participated with the Nebraska Department of Roads in the preliminary planning stages of a Statewide Traffic Management Center.

While the majority of functions and activities of the Arizona Department of Transportation Traffic Operations Center (ADOT TOC) serve Phoenix metropolitan area freeways, the TOC does provide statewide control of centralized

traveler information systems and rural ITS field elements. The ADOT TOC in Phoenix also provides back-up control for field devices in the Tucson metropolitan area, and serves in a back-up role for other ADOT District operations centers.

A Statewide TMC can be implemented in a number of ways. The primary differentiator between the various alternatives is the level and scale of central control of the statewide TMC. Possible configurations include:

An existing regional or district TMC assumes statewide jurisdiction, controlling state-owned devices including those in rural areas and those state devices in other metropolitan areas that do not have a TMC of their own. The Statewide TMC serves



as a centralized hub for the continuous (24 hour, 7 days) control and monitoring of ITS field devices statewide. In this centralized concept, information (such as that from weather sensors, detectors, etc.) is collected at the Statewide TMC, processed, and distributed to the various statewide partners. All 'smarts' of the system reside at the Statewide TMC. This concept requires full-time staffing of the statewide TMC, and allows shorter staffing periods of the other district or regional TMCs.

Statewide TMC assumes operational control for only the rural areas, while control within metropolitan areas is retained at separate facilities.

Statewide TMC is primary operator of statewide systems (e.g. travel information systems, statewide road conditions and maintenance reporting systems), and is a secondary operator of local field elements (e.g. CCTV surveillance cameras, variable message signs), serving as a back-up to regional or district TMCs. The Statewide TMC may assume primary control of local field devices during the evening and weekend hours. In such a scenario, the local district retains primary control of the ITS field elements during business hours, and then turns the operation of these outlying facilities over to the statewide TMC during the evening and weekend hours.

**Advantages:** Advantages of each of the above alternative arrangements include cost efficiencies, particularly in terms of staffing and central system software. A particular advantage to the central hub concept is that coordination along major corridors that pass through different regions can be more easily obtained. Consistency of equipment and other systems is a particular advantage if the agency uses consistent procurement processes and specifications for equipment. This also streamlines maintenance functions.

**Disadvantages:** In either arrangement, a TMC that serves an entire state typically requires a very sophisticated, and perhaps costly, communications network to reach the numerous partner agencies around the state. Provisions for communications and data sharing among partner agencies and district or regional centers are required. The level of integration among partners needs to be defined based on the types of equipment to be monitored or managed, and the desired level of information sharing, control sharing, after hours monitoring, etc.

## 4.2 Number and Type of Agencies Involved

The number and type of agencies (such as a department of transportation, public works, or public safety) involved in the TMC significantly affects the functions and activities of the TMC. A number of different business models are available for TMCs as it relates to the number and types of agencies involved in the TMC planning and operation. Furthermore, multiple disciplines from a single agency may be participants in the TMC. As an example, a public works agency may include traffic engineering, maintenance, community relations/public information, or administrative personnel. This section will describe the different business models as it relates to the number and type of agencies involved.

### 4.2.1 Single Agency Traffic Management Center

The most common implementation of a TMC serves a single city, one county, or one state. The simplest of these single-jurisdiction TMCs, as previously described in section 4.1.1, will likely include only a single agency or discipline within that jurisdiction. Typically, this would be the traffic engineering agency with a given city or county. Many of the same benefits that apply to a single jurisdiction TMC, as described in section 4.1.1, are applicable to the single-agency TMC model.

Advantages: A primary advantage of the single agency arrangement is that all of the control resides within one organization. Decisions can be made about operations, equipment, and other factors without consulting other agencies or jurisdictions.

Disadvantages: In a single agency model, the TMC focuses on the agency's mission – usually to improve traffic management and other related functions within the jurisdictional boundaries of the agency. Agencies may have a limited view of the regional approach to traffic management that is required to genuinely improve the transportation system in an area. A lack of cooperation, collaboration, and consensus building with adjacent jurisdictions or other agencies (such as law enforcement) can result in a less than optimum operation of the transportation network.

Economic, human resource, or technical expertise limitations of single-agency TMCs may limit the breadth and scope of activities that they are able to undertake. As an example, a small, single-agency TMC is not able to dedicate staff to continually monitor CCTV cameras, and to make proactive changes to the traffic signal system as traffic conditions evolve. Furthermore, the implementation costs are typically higher when each agency develops their own TMC, versus having one TMC facility that is shared among multiple agencies.

#### **4.2.2 Multiple Transportation Agencies**

A more sophisticated TMC model arises when transportation agencies from multiple jurisdictions come together to operate a single TMC. An example might be that the Departments of Transportation from two or more cities cooperatively join forces to sustain one TMC to handle both jurisdictions' transportation management needs. Such an arrangement may not include the police or emergency management personnel. Many of the benefits of the multiple-jurisdictions TMC, as explained in section 4.1.2, are also applicable to the Multiple Transportation Agencies model.

Advantages: An advantage of a multiple transportation agencies TMC arrangement is that traffic management can be handled across jurisdictional boundaries more effectively than could be done by separate, single jurisdiction TMCs. Significant efficiencies in software, system development, and procurement can be realized when multiple agencies pool their resources.

Disadvantages: To ensure that a multiple transportation agencies TMC functions satisfactorily, intergovernmental agreements must be worked out and that agreed upon operational procedures should be documented. There is an advantage to this in that it requires cooperation among the staff of the different transportation agencies; however, any given agency may have to compromise some on how they operate their facilities in order to be compatible with partner agencies.

#### **4.2.3 Multiple Agencies and Disciplines**

The Multiple Agencies and Disciplines TMC model is perhaps the most sophisticated, and as a result the most difficult to implement, but provides the highest potential payoff in terms of improved transportation operations throughout a region. Many of the same benefits of a multi-jurisdictional TMC model, as discussed in section 4.1.2, are also applicable to the multiple agencies and disciplines model.

In this TMC business model, the transportation department, public safety department, emergency management department and transit department, or a



combination of these agencies, shares a common facility. The agencies may be from the same jurisdiction, or from multiple jurisdictions. The most typical combination of these agencies includes the collocation of the transportation department and the public safety agency within a single TMC. Transportation and public safety are particularly complementary because of the overlap in their missions – to improve the safety of the transportation system, of which incident management is a core component. Logistically, the partner agencies are responsible for a common jurisdictional area. As an example, a state DOT could collocate with the state highway patrol, while the city traffic engineering department collocates with the local police department.

Multimodal partnerships, while less common than partnerships among transportation with public safety or emergency management, provide travelers with information on travel mode alternatives, such as commuter rail delays or high occupancy vehicle (HOV) lane speeds. Houston's TranStar system received nearly 25% of design and construction funding from transit, and Houston Metro (the region's transit agency) is key in the partnership.

Historically, emergency management personnel (fire department) tend to be separate and only in rare instances are they known to collocate with the transportation and public safety agencies. To help bridge this separation, more and more agencies are providing virtual connections between transportation and emergency management through integrated CAD systems and dedicated communications links so that critical information, including video images, can be shared. Multi-agency TMCs yield significant user, institutional, and system operations benefits.

Advantages: There are obvious advantages to combining multiple agencies within one TMC, such as the transportation agency and the public safety agency. Improved cooperation and coordination can be achieved, particularly for incident management response and processes, when staff of both agencies are within one physical facility. Other advantages include:

Efficiency and Cost Savings – Multi-agency TMCs eliminate duplication and overlap in construction and maintenance of facilities. Furthermore, compatible and integrated systems (e.g. Integrated CAD) allow agencies to share costs for new purchases and upgrades.

Improved Communications and Working Relationships – The collocation of staff of multiple agencies into a common facility facilitates information exchange, elevates trust and understanding, and strengthens partnerships, thus enhancing operations, emergency response, and activities. Agencies begin to consider the impact of their activities on the missions of other agencies.

More complete information on mode options – Houston Metro's involvement in TranStar reinforces transit's role in transportation management. Collocating these functions provides for more comprehensive information sharing among key partnerships in the region, as well as provides opportunities for better coordination.

Disadvantages include the fact that agencies may need to compromise some on their individual desires as to the management of traffic in order to accommodate their partners. Implementation of a multiple agency TMC carries with it a significant, sometimes cumbersome, process of garnering buy-in and formalizing intergovernmental agreements with each of the participant agencies. Agreements are necessary to define the operational, resource sharing, personnel, systems, and institutional integration arrangements of the partner agencies.

### 4.3 Operating Mechanism

One of the most important elements of a TMC Business Plan is a staffing and operations plan. Adequate staffing of the TMC enables effective operations. Without adequate staffing and operations provisions, the full benefits of the TMC will not be realized, which diminishes the capital investment in the TMC and the associated infrastructure.

The first TMCs were operated by staff of the owning jurisdiction; however, many agencies found it challenging to staff and train personnel to effectively operate the TMCs and the associated systems. Intelligent Transportation Systems require several specialized disciplines outside of those normally found at a transportation or traffic engineering department. These include software engineers, communications technicians, system administration personnel, and database specialists.

To address this issue, some agencies outsource the TMC operations to private companies. In other cases the outsourcing of TMC operations has been to a private-sector company that utilizes the TMC data as part of their business of distributing traveler information along with the advertising they sell. Some of these business models have included sharing advertising revenue with the agency owning the TMC.

Organizational models continue to evolve and emerge. What works well in one area or region might not be suited for another. ITE's handbook on *Traffic Control Systems Operations: Installation, Management, and Maintenance* offers some insights on staffing considerations.

This section describes some of the advantages and disadvantages of each of these models.

#### 4.3.1 Public Agency Staffed and Operated Traffic Management Centers

The first option that is usually considered is to staff and operate the TMC with personnel from the jurisdiction and agency that owns the TMC. This requires hiring personnel that have the skills or interest in the "operation" of a traffic management center. These skills might not be present within an organization or even covered in existing agency job descriptions or training programs. Complicating the task, there can be policy or budget restrictions at public agencies that prevent them from hiring new full time employees. This places the agency with responsibility for operating the TMC at a great disadvantage when they are expected to perform the operating function with existing personnel positions and within existing budgets. Any new business plan for a public agency staffed TMC should include new staff positions, adequate training and budget to support the TMC operations.

Advantages: From an operations perspective, a staff comprised entirely of public-agency employees is ideal. A unified personnel management system makes it easier to establish and maintain team cohesiveness. Furthermore, using their own staff develops a greater sense of ownership of day-to-day as well as emergency operations.

A public agency staffed TMC has the advantage of close, hands-on operation by the agency. The owning agency knows best the objectives of the operation and consequently has the opportunity to fulfill the objectives. If the operation is outsourced, then these objectives have to be clearly communicated to the entity selected to conduct the operations.

Some agencies have attempted to share technical staff with other public agencies that have similar needs.

Disadvantage: In today's economic environment, many agencies around the country have a difficult time in finding, training, and retaining the talented staff that is required to operate and maintain their ITS. The recruitment and retention of experienced staff is difficult with private-sector firms offering higher salaries to personnel with similar qualifications.

Furthermore, the public agency is at a disadvantage, in that receiving approval for new full time employees can be a major obstacle. Obtaining budget approval for "operations" is outside the current norm of most transportation agencies. In fact, the budget often has to come from the maintenance-related budget where it must compete with road and bridge and other operations and maintenance needs.

### **4.3.2 Private Sector Contract Staffed and Operated Traffic Management Center**

When agencies find it too difficult to adequately staff their TMCs with their own staff, one option is to outsource portions or all of its TMC operations. An agency may contract out a portion of the TMC staff, just one or two positions, or the agency may contract the entire TMC operations to a private company.

A typical contracted operation involves the private company providing the operators for the TMC and in some cases, providing traffic engineering staff support. In most cases, the private company supervises the operators; however, in at least one case, the private operators are supervised by the public agency staff. This provides more public agency control over the operations of their transportation network. The Utah Department of Transportation TMC in Salt Lake City is a good example, as is INFORM on Long Island.

Advantages: Outsourcing allows the agencies to specify the qualifications of the staff that are needed and to place the responsibility for hiring and training the staff on the private company. It may be easier for a private-sector firm to fill vacancies with appropriately skilled personnel as well as to remove poorly performing employees.

It is often easier for a public agency to "find" the money for contracted operations staff rather than to receive approval and budget to hire their own staff. By packaging outsourced staff as a 'project' with a fixed contractual amount and termination date, agencies may be able to receive funding through the regional transportation improvement program.

The City of Tucson, Arizona is an example of a successful public-private partnership contracting mechanism – a traffic and news reporting organization is partnered with the City of Tucson. City, county and state traffic engineers in the Tucson area recognized the need for a more coordinated approach to transportation operations – the first step towards which was the procurement of a common traffic signal system. Next, stakeholders began working towards a common TMC facility, but lacked funding. Recognizing that video and traffic information have value to private industry, they contracted with a private-sector traffic and news reporting organization to receive exclusive right and use of the video images and traffic information.

In exchange for the use of all the traffic information in the TMC, the City of Tucson receives:

Full remodeling of the computer center and Traffic Engineering Division offices;  
Flight time for City staff to observe traffic conditions and or other transportation issues;  
Prime time commercial slots for peak-hour transportation announcements;  
Percentage of sales of video data;  
Special air support to transportation, law enforcement, fire and emergency storm response crews; and  
Personnel to monitor and operate the control center.

This arrangement provides a significant financial advantage for the city. Key to the success of the private company is their exclusive right to the video and data received at the City of Tucson TMC.

**Disadvantages:** While outsourcing offers some solutions to the types of staffing problems noted above, it does have inherent disadvantages and there are situations where this arrangement has not been successful. Outsourcing introduces contractual issues, and the required administration, oversight, and performance measurement of the contractor. Outsourced staff may tend to have higher turnover rates than would be found with in-house staff.

#### 4.4 Examples of TMC Business Models

**Table 4-1** presents examples of each of the TMC models discussed in this chapter.

**Table 4-1 – Examples of TMC Business Models**

Traffic Management Center	Geographic Area	Number and Type of Agencies	Operating Mechanism	Unique Attributes
City of Anaheim, Anaheim, CA	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 private sector or special event promoters</li> <li>Adaptive signals</li> <li>Arterial DMS and CCTV</li> </ul>
City of Tucson, Tucson, AZ	Multiple jurisdictions in metro area	6 Agencies City of Tucson, City of South Tucson, City of Marana, Town of Oro Valley, Pima County, ADOT	Public-Private Partnership	<ul style="list-style-type: none"> <li>Concessionaire agreement</li> <li>Single traffic signal system and freeway management system operated by city</li> <li>After hours to ADOT TOC</li> <li>Arterial CCTV</li> </ul>
INFORM, Long Island, NY	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>
FAST,	Regional in	6 Agencies	Separate	<ul style="list-style-type: none"> <li>Cost sharing between</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>
Clark County, NV	metro area	NDOT, Cities of Las Vegas, North Las Vegas, Henderson, Clark County, Highway Patrol	public sector operating entity	<ul style="list-style-type: none"> <li>agencies</li> <li>• Freeway and arterial management</li> <li>• Single signal system</li> <li>• Collocated with Nevada Highway Patrol</li> </ul>
Caltrans, District 12, Orange County, CA	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>
Caltrans, District 5, San Luis Obispo, CA	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>
ADOT, Phoenix, AZ	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>
Transtar, Houston, TX	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>
MNDOT, Minneapolis, MN	Statewide	2 Agencies MNDOT, MSP	Public sector – DOT	<ul style="list-style-type: none"> <li>• Freeway management, Minnesota State Police, and arterial management collocated</li> </ul>

Intentionally Left Blank

## Chapter 5: Developing the TMC Business Concept

### Chapter Purpose and Objectives:

A sound Business Concept provides the foundation for the overall TMC Business Plan. This chapter takes a more in-depth look at the Business Concept – what it is, why it is important to the overall TMC business plan, and how to go about developing a vision, TMC strategic objectives, identify desired end states, and articulate these in a TMC Business Concept. The importance of stakeholder coordination and input to the vision, objectives, and overall Business Concept also is discussed, and guidance is provided on which stakeholders are integral parts of the process.

### Key Messages/Themes:

What comprises a Business Concept and why it is important to the overall Business Plan.

How to develop a Business Concept, including what needs to be articulated, how to articulate it, and how the Business Concept guides development of the rest of the Business Plan, including the Value Proposition and Strategy Sets.

Importance of stakeholder involvement and a coordinated stakeholder involvement plan to develop the Business Concept, Value Proposition and ultimately champion the Business Plan to the right decision makers.

Developing target audience objectives, and how the plan should be structured around how to best sell Business Concept and Value Proposition.

### Key Topics and Issues to be Covered:

The importance of the Business Concept in laying the foundation for the overall TMC Business Plan; the importance of stakeholder participation and input in developing the Business Concept, developing strategic objectives that are consistent with goals of other ITS plans and processes as well as align with broader agency objectives and missions.

### How This Chapter Relates to Other Chapters:

The Business Concept provides the foundation and results in the guiding principles that drive the development of the TMC Business Plan. Successfully completing the remaining components of the TMC Business Plan relies on developing a sound, consensus-based Business Concept.

### Remaining Sections:

- 5.1 The TMC Business Concept
- 5.2 Stakeholder Input and Involvement
- 5.3 Vision and Strategic Objectives for the TMC
- 5.4 Defining the Business Concept

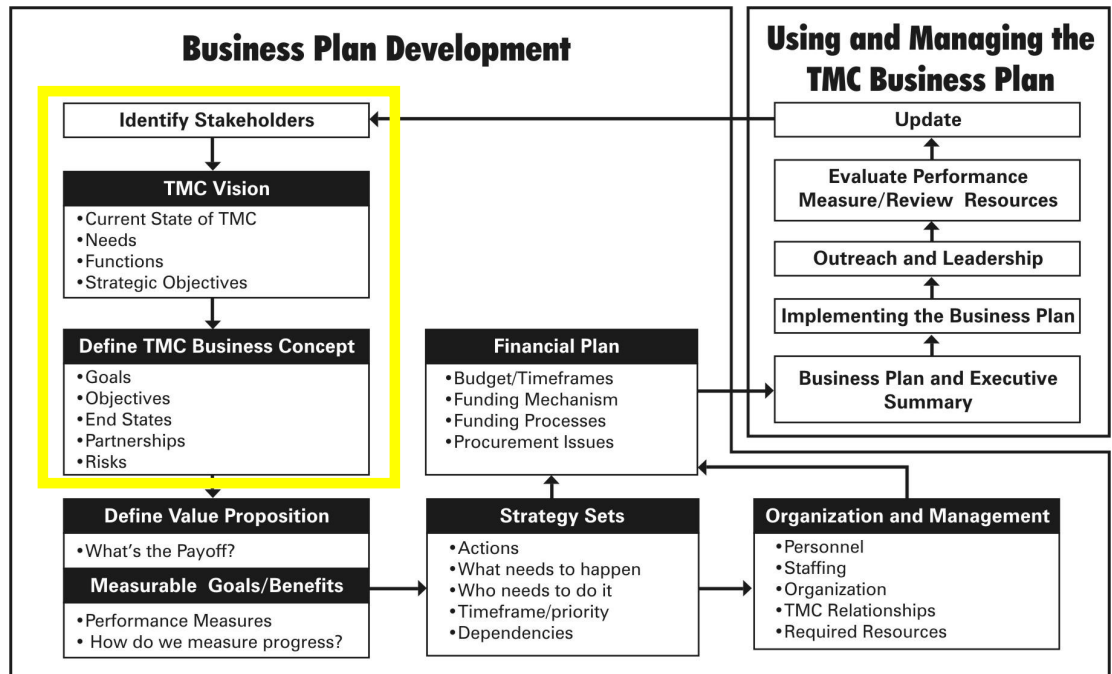


Figure 5-1: Business Plan Steps and Processes

### 5.1 What is a Business Concept?

The foundation for a Business Plan of any type, be it product oriented, service oriented, profit or not for profit, is a sound Business Concept. There are many potential interpretations of a Business Concept – some refer to an entire business plan or strategic plan as a business concept, while others are as succinct as a mission statement.

The Business Concept essentially lays out the core purpose, objectives, products or services, and overall guiding principles for a particular venture. In the private arena, the Business Concept serves as the ‘hook’ for potential investors, lenders, partners and even customers – by telling them what is to be provided (such as product or service), how it is to be provided, to whom it will be provided (market segment and customers), why this approach or product is better than the competition’s (what niche is filled), and what the venture (and its customers) expect to get out of it. It presents a clear, concise picture of what is to be accomplished, and to a degree, the anticipated outcomes or expectations.

The Business Concept for a TMC needs to essentially answer the same questions, but with a slightly different focus:

- What is being provided (TMC’s role, key services, functions)?
- How will it be provided?
- Who is it serving (parent agency, partner agencies, and in a broader context the traveling public)?
- Why is it needed?
- What should we expect?



In the context of a TMC, a Business Concept is not intended to attract investors, lenders or partners in the same way a private sector Business Concept would, but rather the TMC Business Concept needs to answer the following:

*What are we asking managers, policy and decision makers to buy into?*

In Chapter 3, the Business Concept was defined as needing to serve as a description or a 'snapshot' of what the TMC does, what it is envisioned to do, the role that it plays within an agency, and the desired roles and functions that the TMC needs to serve, both within its parent agency and in the context of a regional or statewide system. It needs to succinctly and clearly lay out an overall picture of how the TMC currently functions, and more importantly, the desired end-state of how the TMC needs to function and operate so that it justifies the investment that agencies are making.

The following examples from Caltrans define what the TMC's are and how they are to function for Caltrans.

*Example 5a – Business Concept*

*The California Department of Transportation (Caltrans) has put a focused effort into comprehensive and strategic TMC planning. In its TMC Master Plan (Revised December 1997), Caltrans outlines clear roles, functions, goals and objectives for TMCs in the Caltrans system, as well as development cycles and anticipated changes or shifts that are attributed to the various cycles. This TMC Master Plan provides a statewide framework, plan, and goals from which different TMCs can be implemented and coordinated while being responsive to unique needs and circumstances in the various regions. It distinguishes between urban and rural areas, with the understanding that these areas need to draw upon similar as well as some very distinct functionality and capability.*

***What is a TMC?***

A Transportation Management Center (TMC) represents the joint efforts between the Department of California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). It can be thought of as an information center, which manages the transportation system.

***Why a TMC?***

In past years, there has been an increase in the number of vehicles and miles traveled on California's highways. The need for more sophisticated transportation management of the existing infrastructure is essential. With diminishing space, building new highways is costly, and in many places, no longer feasible. The TMC is the backbone of the Traffic Management Systems (TMS), which is designed to efficiently manage existing infrastructure, mobilized assets, and field personnel (i.e., Freeway Service Patrol (FSP), maintenance crews, and Traffic Management Teams).

***What does a TMC do?***

The combination of TMC strategies increases safety and reduces incidents, delay, environmental degradation, and cost to tax payers. Costs are incurred from: incidents involving property damage or injury, repairs needed from vehicle wear-and-tear, inefficient use of gas, and nonproductive time lost to congestion.

The TMC mitigates these issues through the following methods:

- Expedites the removal of major incidents to prevent secondary incidents and reduce delay.
- Expedites the removal of any minor vehicular problems on the highway.
- Provides weather warning systems (i.e., fog or dust detection) in vital areas.
- Controls traffic demands on the system.
- Informs the public of transportation information.

Example 5b

*In the TMS Transportation Management Centers: Development Considerations and Constraints (December 2002) (Caltrans), outlines the roles and functions of TMCs and how they support statewide emergency operations, and their importance to Caltrans' overall ability to implement transportation system management strategies. With 12 Districts throughout the state, each with a district-level TMC, the overarching principles were stated fairly high level – in other words, common parameters were identified that could be applied and considered for each TMC, while allowing enough flexibility to accommodate TMCs of varying size, function or in areas of geographic complexity.*

Transportation Management Centers (TMCs) are used for the efficient and effective management of traffic, and are an integral part of the Department of Transportation's (the Department) approach to congestion management and reduction. TMCs are, fundamentally, buildings that house staff and systems necessary to accomplish day-to-day functions such as incident management, ramp metering, arterial signalization, and emergency support. They are a focal point for control and support of field elements, and monitoring and support of the transportation infrastructure. They are communications hubs between the Department's Operations and Maintenance Divisions, the California Highway Patrol (CHP), Freeway Service Patrol, public and private partners, and information service providers and other media. The Department is legislatively required to support the Statewide Emergency Management System (SEMS), and that support is provided through the TMC. They are centrally important to the Department's ability to implement system management.

*Following the description of the essential role that the TMCs support, Caltrans further outlined the key principles that the Department would commit to with regard to TMC operations, establishing new TMCs or expanding existing TMCs:*

Every district will have a TMC. The functional complexity, hours of operations, staffing, physical building size, and location will vary, as appropriate, based on demonstrated need.

A system engineering process will be used to justify the need to develop a new TMC or update an existing one.

All TMC development will come after approval of a Feasibility Study Report.

Only real-time operations will be planned into a stand-alone building (see Table 1).

Planning, research, and maintenance functions will not be designed into the TMC and will not be conducted there except as related to real-time operations or as required for emergency support.

All TMCs must accommodate a CHP presence, regardless of whether the building is an essential services act building. The scope of that presence will vary depending on the need. Generally, CHP presence should fall along the following lines:

at TMCs in rural areas, during major emergencies, heavy snow season  
at TMCs in urban areas during peak periods  
stand-alone TMCs must have 24-7 communication center  
Formalizing the feasibility assessment process, and employing definitive standards against which projects can be judged, such as the functions defined in Table 1. This will include defining factors that influence TMC needs (such as VMT, population density, vehicle mixes, accident rates, etc.).  
As appropriate, TMCs will link to local and regional jurisdictions.  
TMC Support Centers are located either in District Offices or satellite locations and will be used for planning and research.  
Specific criteria will be defined and applied to determine the need for a stand-alone TMC. Considerations might include vehicle miles traveled, local funding support, CHP support, and the need for updated communication center.  
Continuance of the regional operations model that was implemented in the *1997 TMC Master Plan*.  
Improve operations and standardize systems and operations statewide around the improvements.

The following subsections provide guidance in how to get to the Business Concept, and strategies that agencies can use to develop a comprehensive and realistic business case for their TMCs.

## 5.2 Stakeholder Input to the Business Concept and Overall Business Plan

Involving and engaging the right stakeholders is critical to developing a comprehensive, sound, and realistic TMC Business Concept. Stakeholders will be internal or external, operations focused as well as policy or management level; and their involvement in the process could vary based on their expertise, involvement, and relationship to TMC activities.

There are several levels of stakeholder involvement to consider when developing a TMC Business Concept, and for the overall TMC Business Plan. Considering that the Business Concept needs to lay out a vision and strategic objectives, it is feasible that several perspectives could be involved in the process. For example, a single agency Traffic Management Center that is responsible for monitoring and controlling its own devices might rely solely on input from groups or divisions with a front-line, vested interest in the traffic operations and management activities. In this case, stakeholder involvement to develop the Business Concept could consist of the city's traffic engineer and his or her support staff that will be operating the city's system, maintenance supervisors and technicians, facilities management representatives that oversee space and equipment requests, etc. Depending on the size or complexity of the city's system, the stakeholder involvement process could extend to emergency management, law enforcement, information technology, public information officer, or others.

In addition to the stakeholders that will need to be involved in the actual business planning process, there are key target audiences that the plan will need to either be approved by, or those that are of an authority level to champion the concepts and needs outlined in the TMC Business Plan. In addition to serving as a valuable tool for future planning, the TMC Business Plan needs to 'speak to' the key target audiences in order to serve one of its core purposes.

The size and scale of the stakeholder involvement effort will vary based on the type of TMC, geographic coverage area, functions and a host of other factors.

### 5.2.1 Key Participants in the Business Planning Process

It is important to recognize that there will be different segments of stakeholders to involve at different stages of the Business Planning process – those who need to provide input to the Plan, those who need to champion and manage the plan, and those who need to buy in to the plan. Because the Business Concept is the summary that needs to articulate the key functions and goals of the TMC, the potential roles and services, as well as expected outcomes, it is important that all three of these stakeholder groups factor in to the Business Concept development process, either as an active participant or as a target audience. Although it might not be feasible or realistic to think that agency managers or elected officials will be actively participating in the TMC Business Plan development process, these could be the key target audience that the plan needs to appeal to, and therefore, the TMC Business Plan must be structured and articulated in a manner that invokes support for the plan.

This section outlines potential participants and roles in the business planning process, as well as examples of stakeholder involvement from two business plans.

**Table 5-1 – Stakeholders and Role in the TMC Plan Development**

Entity	Role in TMC Business Plan Development
TMC Business Plan Facilitator	<ul style="list-style-type: none"> <li>§ Coordinate inputs from various stakeholders</li> <li>§ Lays out timeline, information needed, and from whom</li> <li>§ Coordinate/respond to internal schedule for production of the plan</li> <li>§ Coordinates Business Plan with other internal planning and programming processes</li> </ul>
Authorities	<ul style="list-style-type: none"> <li>§ Has managerial or administrative oversight responsibility for TMC</li> <li>§ Key decision makers within the Agency that lay out departmental missions and goals that individual operating units or divisions support</li> <li>§ Sets strategic direction for overall operations</li> <li>§ Local, regional and state leadership that champions or approves TMC vision, strategies, funding needs</li> </ul>

Entity	Role in TMC Business Plan Development
<p>Stakeholder Agencies</p> <p><i>Primary Operational Stakeholders</i>                      (i.e., state, cities, county transportation; emergency; law enforcement; public safety, others)</p> <p><i>Secondary Operational Stakeholders</i>                      (e.g., IT, maintenance, finance, others)</p> <p><i>Additional Stakeholders</i>                      (e.g., external agencies, private entities such as media, traffic reporting companies, other partner agencies)</p>	<p>§ These entities have integral operational roles within the TMC and/or exchange data as a means of supporting their primary operational goals.</p> <p>§ Provide input as to the functions and needs of the TMC, including technical and resource requirements.</p> <p>§ Not a direct role in operations, but might have input to considerations that would need to be incorporated into the Business Plan.</p> <p>§ These stakeholders benefit from information and outputs from the TMC to support their business practices, but in most cases do not make significant operational contributions to the TMC. Involving these stakeholders in the Business Plan process depends largely on their existing or anticipated level of interaction with the TMC.</p> <p>These stakeholders do not have a specific role in TMC operations, but are partners in regional coordination or planning that could provide input to the TMC functions, vision, or end states (such as a metropolitan planning organization).</p>

The Business Plan is intended to build upon the discussions of functionality, service, missions, long-range goals, and other directives laid out as part of an ITS Strategic Plan, Deployment Plan, or Concept of Operations. A Business Plan is not intended to duplicate those efforts. A regional ITS Architecture, Strategic Plan or Concept of Operations could conceivably involve many different entities; the focus of those efforts is on operations and integration that involve multiple agencies, public and private. For example, in an ITS architecture, input from local, regional, and state transportation, public transit, private information service providers, commercial vehicle operators, and others provides for a more comprehensive, robust 'vision' for how the region's transportation system will operate and integrate over an extended period of time.

It is important for those preparing the TMC Business Plan to select the appropriate stakeholders for input. By answering the following key questions, a 'shortlist' of applicable stakeholders or stakeholder types can be derived:

Who will need to approve or champion the strategies and directives of the Business Plan?

Who is responsible for preparing the annual TMC budget?

Who are the primary users of/partners in the TMC facilities?

Who are the entities that we interface with on a regular basis?

Are there any regional entities or committees that can serve as champions?

What major projects or initiatives could have an impact on TMC operations, and who is leading those efforts?

**In many respects, the Business Plan for a TMC has a distinctly narrower focus than other broader, regional planning efforts; as such, casting a wide net to involve all potential stakeholders could be counterproductive to the entire process.**

The following examples from Colorado and Nebraska outline key stakeholders and their roles in the business planning and development process.

*Example 5c: Colorado DOT ITS Strategic Business Plan (March 2001, page 3)*

CDOT kept involvement to internal staff only for developing the ITS Strategic Business Plan, but acknowledged that there will be other partners and customers that will be involved in implementing various actions identified in the business plan and as a result projects and other planning activities.

Planning Process and Partner Involvement

The ITS Strategic Business Plan is intended primarily for use by CDOT internally to set strategic direction and as a tool for annual business planning. The plan belongs to all of CDOT.

**Statewide ITS Steering Committee.** Policy direction and plan strategies have been developed by a cross-functional statewide steering committee representing headquarters and Region staff. The ITS program office has provided staff support and is responsible for developing and maintaining the plan.

**Region Involvement.** Representatives from the ITS Steering Committee have met with senior management and the key functional disciplines in each of the CDOT regions to identify their; issues, implementation priorities, and perspective on how to make the ITS Strategic Business Plan most valuable. These meetings have been used to set plan priorities. They also indicate considerable statewide consensus on CDOT's ITS strategic direction.

**CDOT's Business Partners.** This plan is intended to be a business plan for CDOT. It is anticipated that CDOT's partners and customers will have broad involvement regarding ITS policies and planning decisions through other mechanisms. This will occur as part of their involvement in action implementation and in CDOT's overall statewide, regional, and other planning and project prioritization activities.

*Example 5d – Nebraska ITS/CVO Business Plan*

Nebraska's ITS/CVO Business Plan for Mainstreaming and improving Motor Carrier Customer Service in Nebraska is a cooperative effort between, Nebraska Department of Motor Vehicles, Nebraska State Patrol Carrier Enforcement Division, Nebraska Department of Roads, Nebraska Public Service Commission, and the Nebraska Motor Carrier Association. This working group will continue to meet and use this publication as a working document modifications, additions, deletions, and improvements to its content can and will occur.

### 5.3 Vision and Strategic Objectives for the TMC

While there are numerous vision and mission statements at transportation agencies across the country, there are few that focus primarily on the TMC's core vision, mission, purpose, and objectives. State, regional, or local departments of transportation, transit agencies, public safety, and others often have strategic



mission/vision statements that serve as guiding principles for the Department's activities or goals. Divisions or operating units within those Departments may also have visions and missions that not only provide focused direction as to the division's or operating unit's core function, but also to support the broader agency vision, mission and goals.

In order to distinguish the unique role the TMC serves in a Department of Transportation, region or other organized entity, it is important to place the TMC Vision and Mission's emphasis on defining specific programmatic objectives, role of the TMC, its core purpose and functions, and relationship to other visions or program goals. Five Vision Statements are shown in the examples below. Input to the vision, current and future functions, and overall role of the TMC can be provided by the regional ITS architecture development process, concept of operations, etc.

This section defines what a TMC Vision should encapsulate, how to develop a consensus-based vision, the importance of developing goals and objectives to support the agreed-upon vision, and how the TMC vision helps to support the overall Business Concept.

*Example 5e:* National Architecture Vision Statement (April 2002). This is a 32 page 'vision statement', and the aim is to look ahead to January 2012 to document the progress that has been made in deploying and integrating ITS nationwide.

*Example 5f:* Nebraska ITS/CVO Business Plan Vision Statement. Articulates a vision and mission, but still is quite broad in that it pertains to desired benefits of ITS to the state's transportation system.

Mission: We provide and maintain, in cooperation with public and private organizations, a safe, efficient, affordable, and coordinated statewide transportation system for the movement of people and goods.

Vision: Nebraska's citizens, businesses and visitors will benefit from the application of ITS to the state's transportation system. ITS will become fully integrated into Nebraska's transportation strategies for the enhancement of safety, mobility, communication and economic vitality for the protection of the natural environment, and for the deployment of sustainable resources.

*Example 5g:* California Transportation Plan 2025. Articulated in a 'future scenario' of the state's transportation system

California has a safe, sustainable transportation system that is environmentally sound, socially equitable, economically viable, and developed through collaboration; it provides for the mobility and accessibility of people, goods, services, and information through an integrated, multimodal network.

*Example 5h: 511 Deployment Coalition Vision Statement.* Concise and specific to phone-based travel information. In the format of 'for whom', 'what', 'where', 'how' and 'benefits'

511 will be a customer driven multi-modal traveler information service, available across the United States, accessed via telephones and other personal communications devices, realized through locally deployed interoperable systems, enabling a safer, more reliable and efficient transportation system.

*Example 5i: ITS Strategic Plan Vision, Colorado DOT*

It is to position CDOT so that ITS investment decisions can be made based upon their contribution to CDOT's overall performance objectives. The vision is for a future in which ITS devices and systems are deployed and integrated to provide cost-effective solutions that help meet CDOT's performance objectives. To accomplish this vision requires deploying what the plan refers to as the ITS enabling infrastructure as a strategic priority and institutionalizing ITS across CDOT's business area.

### 5.3.1 Building on Agency or Regional Goals to Develop a Succinct Vision for the TMC

For the TMC Business Concept and overall Business Plan, a Vision should be established that outlines the primary goals and objectives of the TMC, what is the current state/functionality vs. desired functionality and role (both within the agency as well as within the region). When developing such a focused vision or mission, it is important to differentiate between overall ITS program vision, goals, etc., and keeping the focus on the specific goals, strategic objectives and unique role that the TMC serves.

There are several sources that could factor in to a TMC Vision statement:

Agency Vision, Mission, Goals and Objectives;  
Project or Program Vision, Goals or Objectives;  
Regional or Statewide Plan Vision Goals or Objectives; and  
Additional stakeholder input.

The vision examples shown above in Section 5.3 aimed at illustrating broader agency objectives. Although it is important to consider these broader objectives, a TMC Vision should show how the TMC operations or end states support those objectives, not just reiterate them. The agency or department level visions and missions are often supported with goals, critical program areas, or values. These supporting statements often provide a narrower field to which a TMC can relate – they provide the overarching agency goals that are typically driving the core functions of the TMC.

### 5.3.2 Relationship of the TMC Vision to Agency Vision

In Caltrans' TMC Master Plan (Revised 1997), vision and mission statements for the TMCs as an entity were articulated. Caltrans Regional TMCs combined Caltrans and

A 'vision statement' describes a desired state of reality made possible by accomplishing the mission and goals in a way that is consistent with the core values of key stakeholders.



California Highway Patrol functions; both of these agencies visions and missions were noted in the Master Plan, which served to guide statewide implementation of TMCs.

<i>Example 5j: Caltrans TMC Master Plan</i>	
<p><b>Caltrans Mission</b></p> <p>In partnership with others, Caltrans:</p> <p>Provides the people of California with a safe, efficient, and effective intermodal transportation system:</p> <p>Plans, develops, maintains, and manages the interregional transportation systems.</p> <p>Assists and guides delivery of local and regional transportation services.</p> <p>Provides leadership for California's transportation future by conducting research and development, and by formulating plans, programs, guidelines, and standards.</p> <p>Is a good steward of it resources.</p>	<p><b>CHP Mission</b></p> <p>The mission of the CHP is to ensure safety and provide service to the public as they utilize the highway transportation system and to assist local government during emergencies when requested.</p>
<p><b>TMC Mission</b></p> <p>The Purpose of the TMCs is to aggressively manage the transportation system to reduce congestion and provide the safe and efficient movement of people, goods, services and information in order to promote economic vitality and enhance the quality of life for the people of California.</p>	
<p><b>TMC Vision</b></p> <p>The TMCs will help accommodate California's growing mobility needs, while reducing congestion, improving air quality and conserving energy. They will enhance the movement of goods, giving California businesses a competitive edge by adding value to their products and services. They will utilize the latest in ITS, incorporate multimodal transportation and be a leader for the Transportation Management Systems.</p>	

In the California example, the mission clearly outlines the TMCs role and core purposes. The vision outlines strategic objectives and what the expected outcomes are envisioned to be.

### 5.3.3 Functions

It is the role and key functions that define what a TMC does and its overall 'place' in a transportation management system, region, state or other geographic distinction. As described by the various TMC business models in Chapter 4, a TMC can serve several functions, typically within the parameters of traffic management, incident management and traveler information.

Stakeholder visioning sessions or discussions about a TMC – how it is currently working, what kinds of roles they envision the TMC fulfilling, relationships of the TMC to other systems or agencies – is really about the functions of the TMC. The day-to-day functions, event-specific functions, and desired future capabilities of the TMC are really the backbone of the strategic objectives as well as the desired end states.

Functions define nearly every facet of the TMC, from hardware and software needs, staffing and organization, partnerships, facility requirements, operations, and of course funding needs. As an example, a TMC that primarily serves as the operations center for a municipal traffic signal system, that operates during typical weekday business hours with no interfaces to another agency's system will have far fewer functional considerations than a multi-agency TMC operating 24/7.

A detailed discussion on TMC functions, functional requirements, or functional relationships is not likely warranted as part of the Business Plan development. Functions and needed functions are typically discussed and agreed to as part of other processes, such as an ITS architecture or Concept of Operations. Although these latter two processes focus on elements of a TMS beyond just the TMC, the role of the TMC is typically fairly well defined through the development of the architecture (and illustrated using market packages and interface diagrams), and can be derived from a Concept of Operations. Detailed functions or functional requirements are not needed to support the Business Concept; however, high-level, core functions and roles can be derived from other planning processes to support the Business Concept and subsequent Value Proposition, strategy sets and other elements of the Business Plan.

#### *Example 5k: Wichita Falls TMC Concept of Operations (draft)*

The Wichita Falls TxDOT District is in the process of implementing a TMC and its first phase of ITS infrastructure. The Wichita Falls District is primarily rural, although the initial ITS implementation is being focused on the Wichita Falls metro area. The TMC is being implemented consistent with other TxDOT TMCs.

The Wichita Falls TMC shares the common vision of ITS as it is being deployed throughout Texas and the nation. This vision focuses on improving safety, reducing congestion, improving traveler mobility, enhancing economic productivity, and promoting energy efficiency and environmental quality.

The Wichita Falls TMC will act as the control center for traffic operations within the TxDOT WFS district. The TMC will gather traffic data, weather data, and other data to support decisions in day to day traffic operations. Information will be disseminated to the traveling public through signage, the internet, and other media in order to meet the ITS vision.

The Wichita Falls TMC will implement the ITS vision by providing the following services to WFS area travelers.

Pre-Trip Travel Information.

Traffic Control.

Incident Management.

Emergency Notification.

Environmental/Weather Condition Notification.

The primary stakeholders in the WFS TMC are TxDOT WFS District, the Wichita Falls Police Department, and the City of Wichita Falls.

## 5.4 Defining the Business Concept

A Business Concept lays out a clear picture of what the Business Plan needs to support – in other words, what the TMC does, what the TMC could do, how it will be done, and why it is needed. A private sector venture would use the Business Concept as a means of attracting investors or partners. For a TMC, the Business Concept lays out specific goals and objectives, desired end states, and key roles/functions of the TMC so that managers, policy and decision makers will have a quick, concise understanding of what it is they are buying into.

The Business Concept provides the framework and context for the entire TMC Business Plan. It is from the Business Concept that the Value Proposition is defined, Strategy Sets and specific actions are identified, and the resources to operate, fund and execute the Business Plan are derived.

Articulating the TMC Business Concept can take a number of forms – depending on the size and complexity of the TMC, previous ITS strategic planning or operations planning efforts, current institutional environment, and a host of other factors. Because the Business Concept serves several purposes within the Business Plan – as an impetus for more detailed discussions about institutional or funding needs, or as an ‘executive level’ synopsis of what/where/how the TMC needs to function – a recommended outline for a Business Concept would address the following:

Introduction;  
Goals and Objectives;  
End States;  
Partnerships; and  
Risks.

### 5.4.1 Introduction and Overview

It will be important for the readers of the Business Plan to have some sort of context for how the TMC fits within or has evolved as part of the broader transportation management and operations program. An introduction to the Business Concept, including:

Why the Business Plan is being prepared;  
History and background of the TMC;  
Need for proactive business planning for the TMC;  
Regionally significant issues that are to be addressed in the Business Concept; and  
Key Partners.

## 5.4.2 Goals and Objectives

Building on the visioning and discussion of key high priority functions, goals and objectives for the TMC should be defined as part of the Business Concept. Again, if there are already established goals for the TMC that have been defined as part of other processes or documents, the Business Concept can reiterate and build on those that are relevant. In its *TMC Master Plan*, Caltrans provides an example of three priority goals for its TMCs and supporting objectives. From these goals and objectives, which address standardization, regionalized approach, and partnerships, it is clear that the Master Plan contains strategies, timeframes, and responsibilities aimed at addressing those three priority goals.

### *Example 5l: Caltrans TMC Master Plan*

#### **Goal 1:**

Standardize systems, operations, and facilities to ensure cost-effectiveness, uniform functionality statewide, and to achieve economies of scale.

#### *Objectives:*

- To specify a standard system design for all aspects of the TMS.
- To deploy a standardized computer system for all TMCs.
- To deploy a standardized communications systems for all TMCs.
- To specify standard TMC operational procedures statewide.

#### **Goal 2:**

Establish a regionalized structure that will provide an integrated, statewide framework for transportation management.

#### *Objectives:*

- To establish three regions: Coastal, Valley, and Southern with a Regional TMC at the core of each region.
- To define roles of Regional and Urban TMCs.
- To define roles of Satellite Operations Centers (SOCs) and Mobile Operations Centers (MOCs).
- To establish communication links to all TMCs to ensure remote operations during an emergency.
- To establish authority and resource requirements necessary to manage transportation-related activities.

#### **Goal 3:**

Enhance public and private partnerships that promote multimodal transportation activities and services.

#### *Objectives:*

- To be proactive in developing new partnerships with other transportation stakeholders.
- To develop a variety of databases that are easily accessible, secure, and provide uninterrupted service.
- To create and maintain a reliable real-time traveler information system.

Goals and objectives within the Business Concept provide a foundation for the next major section of the Business Plan, which is the Value Proposition and measurable benefits.

This section also is the ideal location within the Business Concept to demonstrate the relationship between the TMC and recommendations contained in the Business Plan to broader agency goals and objectives. How does the TMC support or strengthen the agency's 'bigger picture' strategic objectives, mission, or core values? Articulating how the TMC's role or functions help to support the agency (or region's) strategic objectives or overall mission will strengthen the Business Plan's purpose.

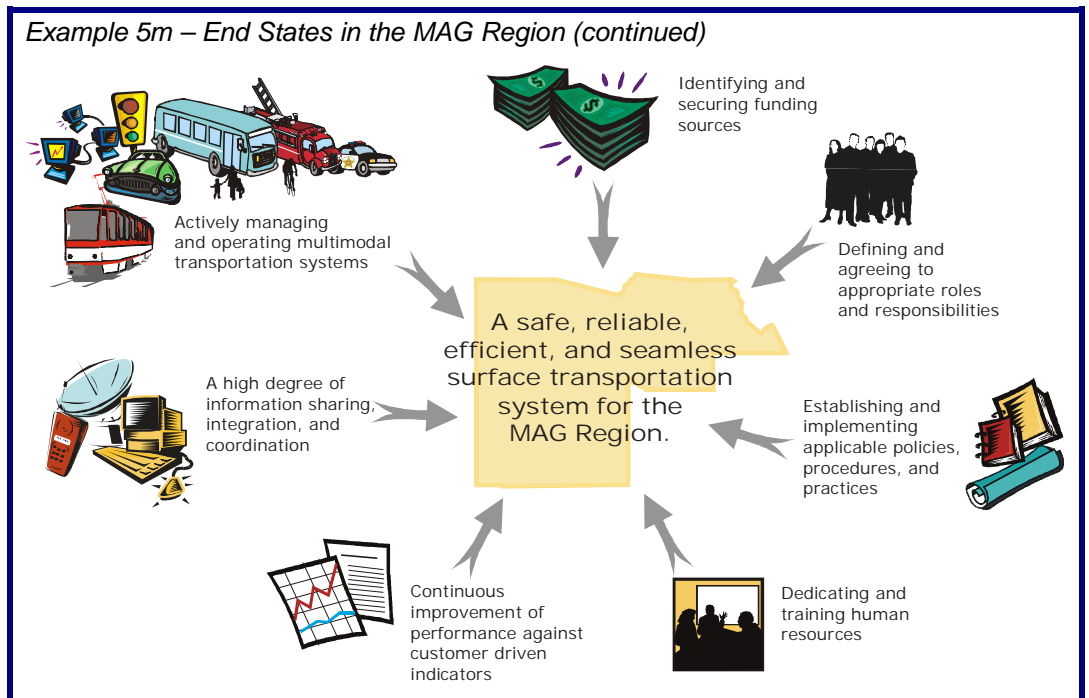
### 5.4.3 End States

Visioning discussions among stakeholders as part of the Business Planning process will likely result in several 'what if it could do...' statements. Future 'what if' discussions are often critical to many consensus-based processes to help define a desired outcome or specific direction. All too often, vision statements remain just lofty, broad philosophical statements that contain all the right 'words', but lack real-world applicability.

For the TMC Business Concepts, it is important to take the visioning a step beyond philosophical and state desired outcomes, functions and functionality in terms of 'end states'. What end states do for the Business Concept is articulate how the TMC will function, how it will support regional or agency needs, how it benefits the public, etc., and they do so in an affirmative tone rather than a needs statement. The end state signifies how the TMC will operate once the goals and objectives are achieved, the needed funding is available, the TMC is adequately staffed, partnerships are in place and other key needs are met.

#### *Example 5m – End States in the MAG Region*

In the MAG Regional Concept of Transportation Operations, several 'end states' went into shaping the overall vision for the Region's transportation system. Rather than articulate these in terms of "need to have funding" or "need to share information among agencies," stakeholders opted for more affirmative 'end states', such as Identifying and securing funding sources, or A high degree of information sharing, integration and coordination.



#### 5.4.4 Partnerships

Regardless of the business model that the TMC is following (or desires to achieve), there will be some level of partnering to achieve desired outcomes or end states. These partnerships may be internal or external, public or private. There will likely be several levels of partnerships – partners that are needed to operate or interface with systems, or partners that will need to champion or approve funding for desired operations. Needed partnerships, their role in current or future TMC operations, and other aspects will likely be defined as facilitators move through the Business Planning process. Some partners will be obvious at the early stages of the business plan development; the need for others might arise through discussions on Value Proposition, Organization and Management, and other components of the plan.

The Business Concept should succinctly and clearly outline anticipated partners that will support the goals and objectives, end states and overall TMC Business Plan.

*Example 5n – Caltrans TMC Master Plan*

The Caltrans TMC Master Plan recommends several public and private partnerships that are critical to efficiently and effectively meeting the needs of the transportation system. Although the primary stakeholders in Caltrans' TMC program are Caltrans and CHP. Other stakeholders are included in the Master Plan along with their potential roles and responsibilities. These partners include:

Metropolitan Planning Organizations;  
Local Agency TMCs;  
Local Emergency Responders;  
Local Mass Transit/Public Transportation;  
Academia (Research and Evaluation);  
Media;  
Federal Highway Administration; and  
Private Entities.

### 5.4.5 Risks

Articulating risks and dependencies as part of the Business Concept helps to provide a balanced view of the TMC Business Plan. A private investor would raise a few questions prior to buying in to a proposed business concept, and public agency TMCs should not be treated differently.

There are a range of factors or challenges that could impact how or if the concepts in the TMC Business Plan get implemented, and stating these up-front will provide potential partners, managers, decision makers and key stakeholders to weigh options and implications of those factors.

For example, if recommendations and strategies in the TMC Business Plan are dependent on voters approving a bond, or on specific partnerships being in place, or on institutional issues being resolved (such as hiring freezes), then those issues should be articulated as part of the Business Concept. If the TMC end states or desired functionality is dependent on certain policies being in place, the Business Concept should stress the importance of these policies to TMC operations.

*Example 5o – Las Vegas Advanced Travel Information System Business Plan*

For the FAST ATIS Business Plan, several legal or institutional issues were examined prior to recommending a specific business model or operational parameters between the public and private sector. Below is an excerpt from the ATIS Business Model Legal Restraints technical memorandum:

Prior to conducting the interviews, other ATIS business plans and agreements were reviewed. The result of these reviews and a review of the FAST Agreement identified a number of areas for potential legal and administrative issues that could affect this ATIS. The following topics and questions were discussed with the agencies' legal staffs:

Can FAST provide a regional ATIS program?  
FAST Organization, Legal Representation  
What are the FAST Administrative and Contracting Authorities?  
What methods of contracting, soliciting for goods services are available to FAST?  
What contract form is preferable with the different public/private information providers?  
How does FAST address content and quality of data, liability for data?  
Can FAST restrict or limit access to data?  
Resale of data  
Placing prohibitions, restrictions, or warnings on the use of data  
Data privacy issues



Intentionally Left Blank



## Chapter 6: TMC Defining the Value Proposition

### Chapter Purpose and Objectives:

The Value Proposition is a thorough and objective statement of the various benefits (or value) expected to accrue to TMC stakeholders. Ultimately it will be the basis on which the TMC can be sustained.

This chapter presents an overview of the principles and considerations involved in developing a value proposition for agencies to deploy and operate a TMC. The chapter outlines how value can be established in measurable terms from the point of view of key stakeholders that are expected to invest resources, operational attention, or political support in the TMC. The chapter also addresses the establishment of performance expectations and accountabilities for the TMC.

### Key Messages/Themes:

To motivate investment and effort by participating agencies and stakeholders, the TMC value proposition must reflect not only a set of overall “good” objectives for regional transportation—but should offer specific value from the point of view of each key stakeholder, especially those particular agencies that have core missions that extend outside of transportation management.

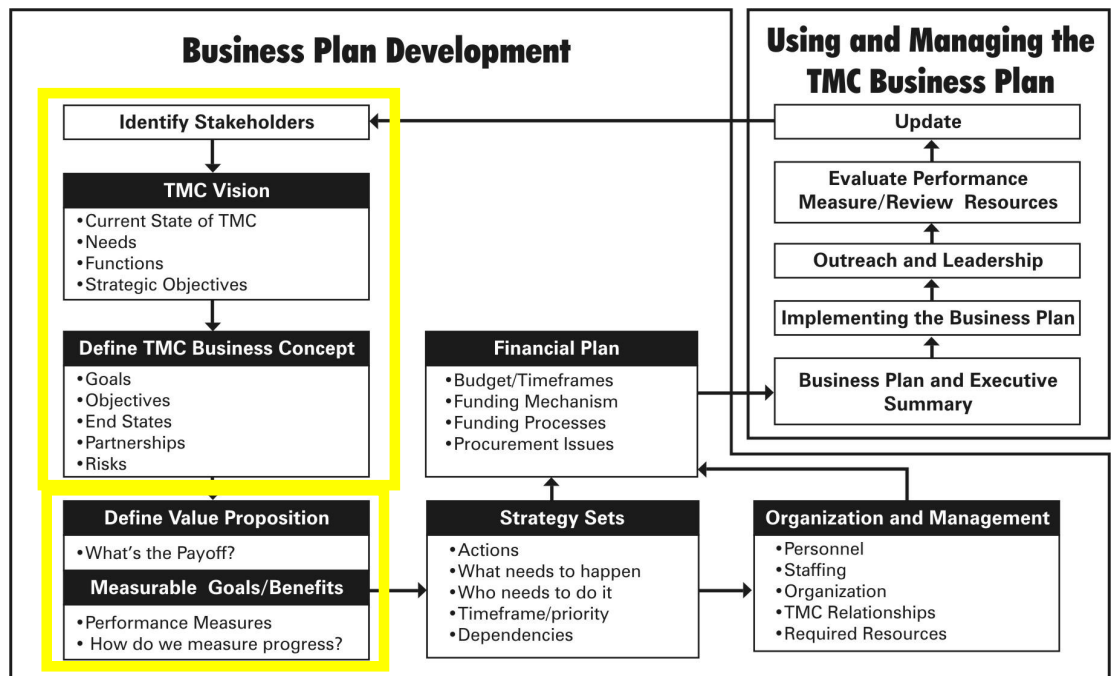
The value proposition provides an important framework for performance measurement, and the assessment of value realized by participants and stakeholders on a continuing basis.

### Key Topics and Issues to be covered:

What a value proposition is;  
Context for agencies’ views of TMC value proposition;  
Examples of important components of the TMC value proposition;  
Suggested steps in value proposition development; and  
Performance measurement – assessing the value realized by the TMC.

### How This Chapter Relates to Other Chapters:

Development of value propositions follows the TMC visioning process and introduces the value proposition as a key component of TMC business planning, by essentially defining the value incentives for stakeholder participation and support. This incentive aids in establishing practical designs for the TMC organization, processes, and priorities – and establishes the high-level performance measures that will be needed.



**Figure 6-1: Business Plan Steps and Processes**

Remaining Sections:

- 6.1 What is the value proposition?
- 6.2 Principles for developing effective value propositions
- 6.3 Performance measurement and value assessment

**6.1 What is a value proposition, and why do we need it?**

In transportation regions or corridors, many agencies have mandates, missions, and functions that touch in some way on transportation, and can affect the mobility and safety of the public. Some of these agencies view the transportation mission as an important part of their core business – while other agencies may attach importance to transportation management, but transportation is not itself a *core* responsibility or concern of the agency.

For most government agencies, primary missions and accountabilities encompass or affect some aspects of transportation, but these missions usually extend outside transportation operations. They often include broader missions in (for example) public safety, health, security, and environmental protection.

Agencies' tendencies to focus inward on their respective mandated authorities and responsibilities have historically had a stove-piping effect on agency operations and communications. Unfortunately, multi-agency information and coordination opportunities that could be very useful in transportation management have often been trapped by this stove-piping.

The table following has examples of transportation-related agencies and core missions that illustrate how these agency types might view the value of a TMC differently.

**Table 6-1 Stakeholder Groups and Example Core Missions**

<b>TMC Stakeholder Type</b>	<b><i>Examples of Core Missions</i></b>
Transportation Providers	Efficient, safe, and convenient transit
Infrastructure Managers	Highway condition and facilitated use (traffic)
Emergency Responders	Fast and effective incident response
Law Enforcement	Safety, security, and law/regulation compliance
Sub-regional Transportation Management Associations	Local development and commuter access
Local 911's	Incident notification
Information Providers	Gathering/disseminating transportation information

Today's growing transportation management challenges and public expectations have focused new light on the need for better transportation management coordination and more information sharing for stakeholder agencies to be effective in their missions. Multiple entities are investing in ITS deployment, and the value of Transportation Management Centers is becoming more evident in many regions of the nation.

For most effective overall transportation system management, many entities have to share messages and information, and make decisions according to their mission responsibilities. They need to take appropriate, coordinated action together or separately, often in short order.

To establish, to sustain, and to extend TMC capabilities requires significant investments by agencies that commit to it. Demands on the transportation network will continue to increase, and transportation management will require ever increasing resources and technology. So, TMC participants/partners will need to continually "invest" various combinations of funding, staffing, management attention, information, field resources, and other support. The benefit to be realized needs to be clearly established, and continually assessed for TMCs to be sustained long-term.

TMC business models can evolve along a number of lines, as has been discussed in Chapter 4, combining a number of variables:

- Single, multiple, regional, or super-regional jurisdictions;
- Single or multiple operating agencies; and
- Publicly or privately operated, or combinations of the two.

The value proposition for a single jurisdiction, single agency is the simplest case, as it addresses the agency's own mission, coordination requirements, and explicit performance measures. While a single-agency TMC can have a broad benefit to the region, it mainly improves the operational performance of the agency, and its ability to coordinate effectively with other agencies. For example, a state DOT district TMC would enhance the DOT's traffic management capability and its communications with emergency responders. In this way, agencies that coordinate more efficiently with the DOT (via the TMC) could realize some secondary benefit or value in their own missions.

TMCs that are supported in some way by multiple agencies – adds new dimensions to the value proposition (and to an extent performance). There are explicit mission-related values to be addressed, and there are also perceived implicit internal agency benefits that can be made part of the TMC value proposition. The explicit benefits of effective TMC operation can be illustrated with examples based on mission examples shown earlier:

**Table 6-2 Stakeholder groups and Example Explicit Benefits**

TMC Stakeholder Type	<u>Examples of possible explicit benefits</u>
Transportation Providers	§ Buses can avoid incidents, meet schedules § Better lane closure information § Better management of short-term mode shifts
Infrastructure Managers	§ Improved traffic monitoring, signal management § Better, safer work zone deployment § Faster incident response
Emergency Responders	§ Improved transmission of notifications § More complete situational information § Better dispatching and routing information
Law Enforcement	§ Improved surveillance and monitoring § Faster response by coordinating agencies
Sub-regional Transportation Management Associations	§ Real-time traffic and agency operations data § Better information on planned lane closures
Local 911's	§ Simplified, fewer notification points § Better network status information
Information Providers	§ "One-stop shopping" for traffic information § Better network status/performance information

These examples can be assigned values for each agency -- in terms of operating costs, and service reliability or quality.

Perceived implicit benefits of effective TMC operation can also accrue to participating agencies. These are often perceived as reductions in management risks and better information for decision-making. The benefits address performance of mandated responsibilities within participating agencies. Some examples of these implicit benefits:

**Table 6-3 Implicit TMC Benefit Examples**

<u>Examples of implicit TMC benefits to agencies</u>
• More reliable receipt of timely incident notifications and situational information
• More reliable sending of notifications and coordination requests as needed
• Better knowledge of the transportation network "big picture" at all times
• Reducing cost of ad-hoc efforts to obtain needed information
• Access to monitoring and functional staff resources not otherwise available
• Redundancy in communications links, possibly needed in emergencies
• Shared accountabilities for shared transportation challenges

The last implicit value statement in table 6.2 is an important element of the value proposition for jointly-supported TMCs. Congestion and safety management are two areas to illustrate this point. In the public eye, network “owners” operators and law enforcement agencies are perceived as responsible in significant ways for traffic conditions and safety. Yet, alone, each agency is actually able to manage only a few of many factors governing congestion and safety. Establishment of joint TMC operations is often recognition of this reality. While joint TMCs do not necessarily mean joint decision-making or joint operations, they can provide a platform on which common performance goals can be set and acted upon by participating agencies.

The value proposition is a case made to state the expected value of the TMC to the missions of each of the participating agencies and key stakeholders.

It defines value in measurable terms from the points of view of all stakeholders that are expected to invest resources, operational attention, or political support in the TMC

It establishes performance expectations and accountability for the TMC

It also provides a basis for realistic and practical business planning assumptions and decisions – The objective of the value proposition is to provide a basis for a realistic planning and performance measures – as well as grounds for stakeholders to rationalize resource investments for the TMC

The expected operational effects of a TMC should be translated into expected payoff for specific stakeholders, in terms of economic benefits, organizational objectives met, commercial development benefits, level of service, productivity, reduced management risks, etc.

**The value proposition is a case made to state the expected value of the TMC to the missions of each of the participating agencies and key stakeholders.**

## 6.2 Value Proposition Development Principles

Developing the case for TMC value requires a thorough initial understanding of the stakeholders in all jurisdictions involved, as well as the operational policies, mandates and constraints each organization must address relative to the transportation network.

The value proposition is developed through direct stakeholder participation in defining their values in terms of each agency’s role in transportation management. The relationship between TMC Vision and Objectives, and stakeholder benefits should be logical, and conservatively derived

Relevant facts and statistics on the “status quo” should be clearly established and agreed upon by the stakeholders. Safety statistics, traffic efficiency, and incident response patterns are key baseline data. Research of regional transportation economics and productivity issues provide potential benefits baseline for some stakeholders

Based on the TMC concept of operations, and realistic operations scenarios, a credible estimate should be made of measurable overall transportation outcomes in safety, response, and efficiency. Explicit and implicit operational benefits to each agency should also be estimated

The estimates require objective, real-world data, and a practical measurement approach, using a few basic scenarios to which planners can relate (or extrapolate) their situation.

Finally, display and communication of the value proposition needs to be simply delivered and understood.

### 6.3 Performance Measurement – Principles and Approaches

The value proposition establishes the basis for performance measurement. Performance measures and monitoring is required to chart the progress toward achieving the anticipated benefits quantified by the value proposition.

Benchmarks measure progress toward the goals. Performance measures should directly address each element of the agency-by-agency value proposition, serve as indicators of whether or not participating agencies are realizing expected benefits.

To illustrate the kinds of measures that could be agreed on and adopted, we can use the explicit and implicit example benefits outlined in **Tables 6-1** and **6-2** as a framework:

**Table 6-4 Examples of explicit TMC-related performance indicators**

TMC Stakeholder Type	<i>Examples of possible explicit measures</i>
Transportation Providers	§ Schedule adherence on arterials § Number of planned re-routings § Ridership on “special service” pull-outs
Infrastructure Managers	§ Peak hour speeds § Number of work zone incidents § Incident response time improvements
Emergency Responders	§ Response times § After-action grading of situational information § Transit times
Law Enforcement	§ Grading value of surveillance and monitoring § Grading response by coordinating agencies
Sub-regional Transportation Management Associations	§ Satisfaction with traffic operations data § Satisfaction with planned closure/event data
Local 911’s	§ Incidence of notification problems § Satisfaction with network status information
Information Providers	§ Satisfaction with quality of traffic information § Satisfaction with status/performance data



**Table 6-5 Examples of implicit TMC-related performance indicators**

<b><i>Examples of implicit TMC benefit measures for agencies</i></b>	
	• Satisfaction with reliable, timely incident notifications and situational information
	• More reliable sending of notifications and coordination requests as needed
	• Management satisfaction in knowledge of network “big picture” at all times
	• Reduced investment in network information-gathering
	• Utilization of TMC monitoring and functional staff resources
	• After-action review of communications issues
	• Accountability for shared transportation challenges – <u>see below</u>

The last item refers to the shared responsibilities of the transportation management community in typical regions. Where a regional TMC is established that involves most of the transportation network stakeholders in significant roles, it may be realistic to assign some overall regional accountability to the TMC “owners” for network performance. Examples of these measures are shown below, and are based on ***Performance Monitoring, Evaluation, and Reporting Handbook, NCHRP Performance Measurement Documents:***

**Table 6-6 Shared Performance Measures**

<b>Category</b>	<b>Example “Shared” TMC Performance Measures</b>
Mobility	Improvement in average speed by time of day
	Improvement in average speed by route
Safety	Improvement in accident rate
	Improvement in response and clearance times for incidents
Maintenance and Reliability	Percentage of system Uptime; including field devices
	Average time to resume service if system failed

Some agencies will make investments in deploying and sustaining TMCs because it is obvious that they can enhance agency operations and efficiency – e.g., in most DOT districts it makes sense in light of the substantial resources that must be deployed in the field for maintenance and emergency events, and because of the extensive signal and sign assets that need management. But to attract similar commitments from other agencies that share transportation management roles -- yet have mandates outside of transportation – a clear and persuasive TMC value proposition is needed.



Intentionally Left Blank



## Chapter 7: Strategy Sets

### Chapter Purpose and Objectives:

Strategy sets provide the basis for the overall form and function of the TMC Business Plan. This chapter takes a more in-depth look at strategy sets – what they are, how they relate to the Business Concept and Value Proposition, and how to go about developing strategy sets to achieve the TMC vision, objectives, and desired end states. Up until this point, the handbook has focused on how to engage players in determining the overall role and function of the TMC in relationship to broader transportation goals, and how to articulate the ‘where does the TMC need to be’ perspective. This chapter takes the needs and objectives a step further and helps readers understand the importance of articulating specific actions and strategies to achieve the desired objectives and end states.

### Key Messages/Themes:

Strategy sets provide the basis for the overall ‘form and function’ of the TMC Business Plan;

Articulating the vision for the TMC in terms of needs, objectives, and strategies allows those developing the business plan to outline specific directions, actions, and end results; and

Strategies translate into specific actions and outcomes so that decision-makers and authorities have a succinct understanding of overall objectives and how the end states of the Business Concept and Value Proposition can be realized.

### Key Topics and Issues to be Covered:

Identifying strategies and action items that meet the objectives for the specific TMC, developing a deployment schedule, and developing an action plan.

### How This Chapter Relates to Other Chapters:

This chapter builds on the business concept and value proposition chapters and provides the basis for the organization and management and financial plan chapters that will quantify the impact of the strategies that are selected.

### Remaining Sections:

- 7.1 Defining Strategy Sets
- 7.2 Converting Objectives and End States into Action Items
- 7.3 Assigning Roles and Responsibilities to Stakeholders
- 7.4 Establishing Timeframes
- 7.5 Identifying and Documenting Dependencies
- 7.6 Developing Strategy Sets

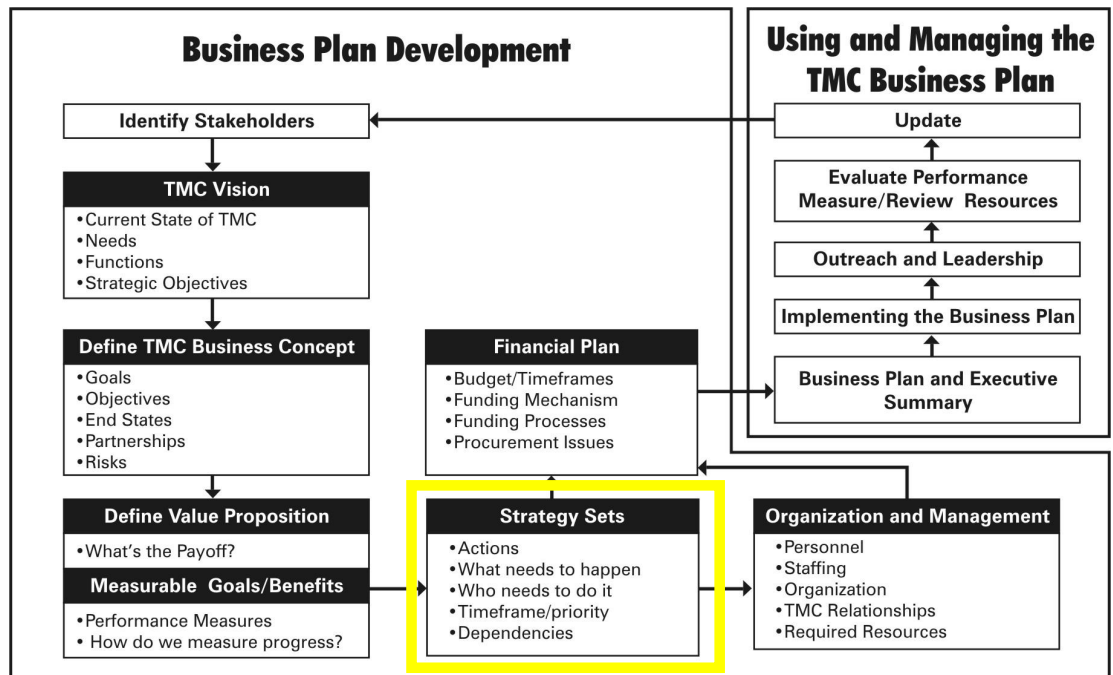
**Strategy sets provide specific strategies or actions that are needed to meet the objectives and end states articulated in the Business Concept and Value Proposition.**

### 7.1 Defining Strategy Sets

Strategy sets provide specific strategies or actions that are needed to meet the objectives and end states articulated in the TMC Business Concept and Value Proposition. Defining specific strategies as part of a Business Plan is a critical element to the overall process. Although the visioning and value proposition processes allow stakeholders and key participants to identify longer term end states of how the TMC should function or need to function, the strategies help to define how to achieve the desired objectives. A typical strategy set is comprised of the following:

- Overarching objectives and desired end states;
- Action items that will allow/enable the objectives and end states previously identified, to be met;
- Stakeholder roles and responsibilities associated with the action items;
- Timeframes for the completion of the action items; and
- Dependencies that could impede or prevent completion of the action items.

Organizing these components into modular, phased sets provides the stakeholders of the TMC Business Plan with definitive, strategic direction for future activities related to organization, management, and financial planning of the TMC. **Figure 7-1** shows how strategy sets relate to the other components of the TMC Business Plan process.



**Figure 7-1: Strategy Sets Steps and Processes**

As has been previously discussed, there are few documents currently available from Transportation Departments that are exclusively focused on TMC business planning. As such, there are few examples of strategy sets that contain all of the components described herein.

There are, however, numerous documents that contain some form of strategy sets as they relate to TMC planning and business planning. These de facto strategy sets are typically found in documents like Strategic Plans, Deployment Plans, and Concept of Transportation Operations. More often than not, strategies included as part of most planning documents are typically in the form of projects. Strategic Plans and Deployment Plans often consist of lists of projects and timeframes to implement necessary ITS services or components or integrate systems. In the context of Business Planning for a TMC, strategies should be aimed more at specific actions, institutional or technical requirements, partnerships, training, and other activities that are needed to achieve the desired end states. For the TMC Business Plan, some strategies might very well depend on specific projects being implemented or systems integrated; perhaps a strategy might be to 'implement near-term projects identified in the regional ITS Strategic Plan'. The challenge in business planning for a TMC is that it requires agencies and managers to shift their planning focus from project-specific to strategy development.

Discussions with several TMC managers around the country revealed that most agencies undergo some form of strategy development, either as a stand-alone effort or as part of annual program activities; as such, there are some examples of how other agencies and TMCs have developed and articulated strategies or actions to achieve desired operational goals or objectives. The terminology used to describe strategy sets varies between documents and includes the terms strategies, objectives, tasks, projects, functions, actions, and next steps.

Regardless of terminology, document title, or context, strategy sets are an integral component of the business planning process because:

They define what specific actions need to occur to meet the overarching objectives and desired end states;

They assign responsibility to groups or individuals who need to perform those actions;

They establish timeframes for when those actions need to be completed; and

They identify what dependencies could potentially impede or prevent those actions (and ultimately the end states) from being completed or achieved.

## 7.2 Converting Objectives and Desired End States into Action Items

Strategy sets include specific action items (defined tasks, projects, etc.) that state what needs to happen to accomplish the objectives and end states defined in the Business Concept and Value Proposition. These action items are based on the Business Concept and Value Proposition but contrast with the high-level nature of those earlier components of the Business Plan by being specific, measurable actions or tasks. Action items are the bridge between high-level objectives and detailed work assignments. Detailed work assignments are outside of the scope of the TMC Business Plan.

For example, if one of the high-level objectives defined in the Business Concept were to decrease traffic congestion on freeways, then one of the action items under that objective could be to develop criteria, parameters, and algorithms for the TMC to include the functionality to implement adaptive ramp metering in areas currently experiencing excessive congestion. This kind of action item outlines what would need to be done prior to implementing an adaptive ramp metering project. Following the activity associated with the action documented in the Business Plan, one of the

**The challenge in business planning for a TMC is that it requires agencies and managers to shift their planning focus from project-specific to strategy development.**

detailed work assignments resulting from the findings of the action item could be to implement adaptive ramp metering at a specific location.

Following are some real-world examples showing how agencies have gone from high-level objectives and desired end states to specific action items. While some of the documents in these examples refer to other transportation-related topics rather than a TMC business plan, the process of developing action items from objectives and desired end states is similar.

*Example 7a – Wichita Falls TxDOT District Concept of Operations (Draft May 2004)*

*One of the goals of the Wichita Falls TMC was to improve the safety of the traveling public by providing advance traveler information and real time incident response. To meet this goal, the following action items were developed:*

Provide accurate weather conditions from the deployed Environmental Sensor Subsystem sites to warn TxDOT and the traveling public of possible icing conditions; Improve the dissemination of valuable information, including Amber Alerts, to the traveling public through the use of Dynamic Message Signs and the informational web site;  
Provide the City of Wichita Falls Police Department and other emergency response vehicles including EMS and Fire with critical information for responding to incidents more accurately and quickly; and  
Integrate the following field devices: Dynamic Message Signs, Closed Circuit Television (CCTV) Cameras, and Environmental Sensor Stations.

*Example 7b – Caltrans TMS Transportation Management Centers: Development Considerations and Constraints (December 2002)*

*In order to satisfy the goal that a system engineering process be used to justify the need to develop a new TMC or update an existing one, Caltrans created action items recommending studies be performed by Caltrans to:*

Develop space standards for each TMC function;  
Evaluate the impact co-location has on the long-term operating environment; and  
Evaluate the current TMC organizational and staffing design.

Performing these action items was anticipated to facilitate the decision-making process for determining need, and to support the planning and development effort if need was demonstrated.



*Example 7c – Caltrans District 4 Operations Procedures and Strategies Report  
(January 1994)*

*District 4 of the California Department of Transportation (Caltrans) in the San Francisco Bay Area developed goals that were high level statements of desired results and were not necessarily intended to be measured. For each of the recommended goals, a group of supporting objectives was developed that could be expressed in more measurable and achievable terms. These goals and objectives supported the missions of the various operating and policy-making agencies sponsoring the San Francisco Bay Area Traffic Operations System (TOS). Specific techniques and action items were then identified to achieve the aforementioned goals and objectives.*

**Goals of the Bay Area TOS**

- 3.10 Improve Safety
- 3.11 Improve Efficiency
- 3.12 Improve Quality of Life
- 3.13 Improve Systems Administration

*Objectives were developed for each of the goals. For example, “Goal 3 – Improve Quality of Life” had two corresponding objectives: Enhance traveler comfort; and Improve Environmental Quality. Under each of these objectives were bullet lists giving more information as to what each objective entailed.*

**Objective 1: Enhance Traveler Comfort**

- 3.14 Assist stranded travelers
- 3.15 Reduce traffic turbulence
- 3.16 Maintain consistent travel times
- 3.17 Inform travelers of traffic conditions
- 3.18 Reduce travel times

**Objective 2: Improve Environmental Quality**

- 3.19 Reduce vehicle-generated pollutants
- 3.20 Reduce energy consumption
- 3.21 Reduce freeway noise levels
- 3.22 Support economic vitality

*These objectives guided the development of specific congestion management techniques. For example, ramp metering and HOV lanes were techniques identified as potentially being able to accomplish many of the bullet items under Objective 1 and Objective 2.*

*Example 7c – Caltrans District 4 Operations Procedures and Strategies Report (January 1994) (continued)*

*In order to implement the congestion management techniques identified, a set of action items was developed. For example, the action items for the technique of ramp metering included the following:*

Create consensus with local governments regarding how freeway ramp metering and traffic management strategies will be implemented and operated and how impacts upon local street systems will be monitored and controlled.  
Incorporate ramp metering and related traffic surveillance and management in reconstruction projects to reduce implementation costs and protect investments in upgraded facilities.  
As appropriate, perform ramp metering pilot projects to demonstrate the effectiveness of metering in improving traffic operations and flow. Document the results of such projects and previous Bay Area ramp metering evaluation studies. Share this information with local governments and public media organizations.

*Example 7d – MCDOT TMC Implementation Plan: Action Plan (October 2001)*

*As part of its TMC Implementation Plan, Maricopa County DOT in Phoenix, AZ developed an Action Plan of recommended action items. These action items were based on the needs and functional requirements identified by stakeholders and included estimated costs, equipment, and space required to complete the action items. A timeframe for the action items was determined from the corresponding functional requirements, which were prioritized and given proposed phasing timeframes relative to planned future TMC expansion.*

For example, under the functional requirement (objective) of detector data monitoring and archiving, three action items were recommended:

Procure and integrate Traffic Management System (TMS) software and hardware;  
Complete implementation of “SMART” Corridors; and  
Complete implementation of Regional Archived Data Server (RADS).

### 7.3 Assigning Roles and Responsibilities to Stakeholders

After taking part in developing the high-level Vision, Business Concept, and Value Proposition, it is through strategy sets that stakeholders first see their roles and responsibilities clearly defined. The assignment of action items to specific stakeholders gives these stakeholders a sense of ownership regarding the Business Plan, Business Concept, and overall Vision. The process of developing strategy sets should involve all stakeholders who will have roles and responsibilities defined by the action items in the strategy sets. Including stakeholders in the strategy process allows the stakeholders’ decision-makers and authorities to better understand how and when the end states of the Business Concept will be realized and what decisions and actions are needed from each respective stakeholder to reach the desired end states.

Following are some examples showing how specific action items from strategy sets were assigned to participating stakeholders.

**It is through strategy sets that stakeholders can see their roles and responsibilities clearly defined.**

*Example 7e – Caltrans TMC Master Plan (Revised December 1997)*

Caltrans, in conjunction with CHP, developed strategy sets to achieve their overall goals and objectives that included specific actions to be performed by stakeholders within a defined timeframe.

For example, for the objective of “create and maintain a reliable traveler information system”, CHP was designated as the primary stakeholder responsible for accomplishing the action item of providing incident and transportation information to the TMC Caltrans employee and the media via the CHP Computer-Aided Dispatch (CAD), telephone, and fax.

Caltrans’ corresponding action items under the same objective included disseminating real-time traffic information to interested parties by operating and maintaining an Advanced Traveler Information System (ATIS).

*Example 7f – MCDOT ITS Strategic Plan (October 2001)*

MCDOT developed a number of action items to achieve strategic goals and objectives previously identified. A table was created that showed, among other things, the overarching objectives, the action items, and the partners or stakeholders to be involved in the implementation and funding of an action item. The Metropolitan Planning Organization (MPO) for the region, known as the Maricopa Association of Governments (MAG), was identified as a partner agency for those action items that had already been identified in the MAG Transportation Improvement Program (TIP) or the MAG ITS Strategic Plan Update because of MAG’s potential to fund the action item.

For the strategic goal or objective of expanding the Advanced Traffic Management System (ATMS) on roads of regional significance, the following action items and responsible partners were identified:

<b>Action Items</b>	<b>Partners</b>
Deploy, expand, and improve “SMART” Corridors	MCDOT ITS (Lead), Local agencies MAG
Deploy ITS infrastructure elements (detection, CCTV cameras, Variable Message Signs [VMS], etc.) at site specific locations as needed	MCDOT ITS (Lead), MAG
Deploy communications infrastructure (center-to-center, regional backbone, center-to-device)	MCDOT ITS (Lead), Local agencies, Arizona DOT

*Example 7f – MCDOT ITS Strategic Plan (October 2001) (continued)*

<b>Action Items</b>	<b>Partners</b>
Deploy central signal system control in TMC	MCDOT Traffic Engineering (Lead), MCDOT ITS
Deploy signal preemption for emergency vehicles	MCDOT ITS (Lead), MCDOT Traffic Engineering
Integrate ITS technologies into work zone activities	MCDOT ITS (Lead), MCDOT Operations
Establish a railroad/highway grade crossing monitoring system	MCDOT ITS

### 7.4 Establishing Timeframes

Assigning timeframes to action items in a strategy set permits stakeholders to evaluate how important a particular action item is in terms of meeting the goals and objectives developed previously in the Business Planning process. In particular, those action items with the best payoff, or return on investment, as defined in the Value Proposition, should be given the highest priority. Funding and other dependencies should be considered in establishing timeframes for the completion of action items.

It is important to note that high priority items might not always translate into near-term achievable actions. There are several factors that could impact the likelihood of being able to carry out specific actions, such as funding, institutional barriers or challenges, maturity of technology, required partnerships. Some of these are internal to the TMC managing agency and/or key partners; others could be external, such as regional planning processes or legislative decisions that could impact available funding. The next subsection of this chapter discusses these and other dependencies and the importance of documenting specific (or potential) dependencies in the Business Plan.

By focusing on the action items with immediate and near-term (three to five years) priorities, stakeholders can better identify facility, resource, staffing, partnering, budget and technical requirements in the subsequent Business Planning steps of Organization and Management (Chapter 8) and Financial Plan (Chapter 9). Longer-term strategy sets should feed into future updates of the Business Plan, a process that will be described in Chapter 10.

*Example 7g – Caltrans TMS Master Plan (December 1997)*

Caltrans divided its strategy sets into short-term and long-term horizons. For the short-term horizon (two to three years), specific action items were identified to help Caltrans meet the goal of preparing for and supporting future aggressive TMS implementation. For the long-term horizon (four to ten years), specific action items addressed how Caltrans will meet the goals of restoring lost capacity, reducing projected freeway congestion, and improving travel time reliability.

**Assigning timeframes to strategy sets permits stakeholders to evaluate how important a particular strategy set is.**

*Example 7h – Wichita Falls TxDOT District Concept of Operations (Draft May 2004)*

As was previously mentioned in Section 7.2, the Wichita Falls TxDOT District developed the following action items to meet the goal of improving the safety of the traveling public by providing advance traveler information and real time incident response:

Provide accurate weather conditions from the deployed Environmental Sensor Subsystem sites to warn TxDOT and the traveling public of possible icing conditions; Improve the dissemination of valuable information, including Amber Alerts, to the traveling public through the use of Dynamic Message Signs and the informational web site;

Provide the City of Wichita Falls Police Department and other emergency response vehicles including EMS and Fire with critical information for responding to incidents more accurately and quickly; and

Integrate the following field devices: Dynamic Message Signs, Closed Circuit Television (CCTV) Cameras, and Environmental Sensor Stations.

The aforementioned action items were then prioritized to assist decision-makers in understanding which action items should be implemented first. The order of priority, from highest to lowest, was:

- Environmental Sensor Stations;
- Dynamic Message Signs;
- Public information web site;
- CCTV cameras;
- External access to the system to the City of Wichita Falls Police Department;
- External access to the system to TxDOT Area Offices; and
- Vehicle detection.

## 7.5 Identifying and Documenting Dependencies

While there may be several objectives and corresponding action items that stakeholders desire to implement with respect to the TMC, it must be recognized that there are factors that could impede, prevent, or otherwise adversely impact their implementation. These factors are typically termed dependencies or constraints.

Identifying and documenting potential dependencies up front provides stakeholder decision-makers with the information they need to identify critical path items, weigh their options and the implications of those options on the overall Business Concept, and ultimately determine which action items should be pursued. Timeframes and priorities associated with action items may need to be adjusted to account for these dependencies.

Dependencies also include risks. Most private sector business plans document risks so that stakeholders/shareholders/investors can make informed decisions about potential or known impacts.

**Table 7-1** shows potential dependencies and key questions planner should ask when evaluating risks and contingencies.

**Documenting potential dependencies upfront provides stakeholder decision-makers with the information they need to determine which action items should be pursued.**

**Table 7-1 – Potential Dependencies**

Dependencies	Key Questions
Facilities	<ul style="list-style-type: none"> <li>• Are the current facilities adequate for what the TMC needs to accomplish?</li> <li>• Are there any restrictions on space, usage, functions, or partnerships relative to the facilities?</li> <li>• Does it have to fit into an existing building/space?</li> </ul>
Technologies	<ul style="list-style-type: none"> <li>• Is there a technology plan in place to address new or maintenance of existing systems?</li> <li>• What other groups, divisions or partners need to provide input (or approval) for technology issues?</li> </ul>
Partnerships (existing and future)	<ul style="list-style-type: none"> <li>• Are there functions or roles that the TMC needs to address that will require active participation of partners?</li> <li>• Who are those partners and are they willing to participate?</li> <li>• Are there needs that have been undefined by the partnership?</li> <li>• Will partners be required to make financial commitments?</li> </ul>
Leadership and organizational structure	<ul style="list-style-type: none"> <li>• What are the current institutional issues or challenges that could impact the overall TMC Business Concept?</li> <li>• Are there internal or external management practices or processes that the Business Plan needs to work through?</li> </ul>
Funding (amounts as well as schedules for fiscal programming)	<ul style="list-style-type: none"> <li>• Is adequate funding available in time to carry out the actions, address technical or facility needs, and other operations/maintenance requirements?</li> </ul>
Personnel and staffing resources (including numbers and types of staff)	<ul style="list-style-type: none"> <li>• Is there adequate staffing to fulfill the functional and operational end states identified in the Business Concept?</li> <li>• Are there staffing needs or gaps, either in numbers of staff or technical capabilities?</li> </ul>

Dependencies	Key Questions
Project implementations/timeframes	<ul style="list-style-type: none"> <li>• Are there significant projects that will need to be in place to support the functional or operational end states identified in the Business Concept?</li> <li>• Who is/are responsible for those projects?</li> <li>• Are they funded and programmed?</li> <li>• Do the timeframes for those projects or programs fit within the timeframes and objectives outlined in the Business Plan?</li> </ul>
Legislation	<ul style="list-style-type: none"> <li>• Are there pending legislative issues that could impact the organization, funding or project implementations or that may be required?</li> <li>• What is the role of the legislature in determining agency priorities, and what kinds of factors need to be considered?</li> </ul>

Following are examples of how agencies identified and documented dependencies as they relate to the action items of strategy sets.

*Example 7i – Caltrans TMC Master Plan (Revised December 1997)*

Caltrans identified a number of dependencies that needed to be satisfied before the proposed action items related to developing TMCs could be implemented. These dependencies included:

- Justification for development (needs analysis);
- Identified source of funding;
- Approval of a Project Report; and
- The State TMC Architecture must be compliant with the National ITS Architecture.

*Example 7j – Arizona DOT Fiscal Years 2005-2009 Strategic Plan (Draft 2003)*

To increase the probability that funding could be secured annually for the operations and maintenance of transportation infrastructure and equipment, ADOT recommended the action item that Life Cycle Costing be applied to the operations and maintenance costs for any new features that might be added to ADOT's system. Implementation of this action item hinged on the dependency that legislative approval was required.



*Example 7k – FHWA TMC Concept of Operations Implementation Guide (December 1999)*

This document identified several dependencies, or constraints, on agencies with regards to TMCs. These dependencies included:

Ensuring adequate staffing levels and budget for TMC operations and maintenance;  
Losing qualified TMC maintenance personnel to the private sector;  
Addressing technological evolution and obsolescence;  
Estimating the time it takes for a TMC to become operationally stable;  
Mitigating false alarm rates; and  
Workloads.

## 7.6 Developing Strategy Sets

In summary, then, a strategy set is comprised of the following:

Overarching objectives and desired end states;  
Action items that will allow/enable the objectives and end states previously identified, to be met;  
Stakeholder roles and responsibilities associated with the action items;  
Timeframes for the completion of the action items; and  
Dependencies that could impede or prevent completion of the action items.

Stakeholders should be involved in developing each component of a strategy set. The strategy sets should then be compiled in a format that allows the reader to easily identify how the strategy sets define what specific actions need to occur to meet the overarching objectives and desired end states, who needs to perform those actions, when those actions need to be completed, and what dependencies could potentially impede or prevent those actions from being completed.

Determining implementation costs and staffing resource requirements associated with each action item are not part of a strategy set, as defined herein, but are the next natural steps in the Business Planning process and will be discussed in further detail in subsequent chapters (Organization and Management – Chapter 8 and Financial Plan – Chapter 9).

Following are examples of strategy sets that contain the components described above. These examples also include many of the other components of the Business Planning process, including financial and staffing needs within the strategy sets, illustrating that agencies may choose to discuss these issues in conjunction with the development of strategy sets.

**Stakeholders should be involved in developing each component of a strategy set.**



*Example 7I – Nebraska ITS/CVO Business Plan (August 1998)*

*After defining the overall mission, vision, goals, and objectives, the Nebraska ITS/CVO Business Plan identified needs and then corresponding strategy sets (called tasks in this document) to meet those needs. Each strategy set contained the following headings:*

Task description;  
Objective;  
Outcome;  
Lead agency;  
Other participating agencies;  
Market;  
Approach;  
Key issues;  
Products;  
Schedule;  
Cost; and  
Estimated task management requirement (staffing needs).

In this example, the action item (task description) is stated first and is followed by the overarching objective and outcome (desired end state). The roles and responsibilities of the stakeholders are next identified. Then, the schedule provides a timeframe for the completion of the action item and the key issues highlight the major dependencies.

To further assist stakeholders in understanding the proposed strategy sets, all of the action items were prioritized in order of importance. The action items were also grouped by:

Stakeholder responsibilities;  
Deployment scheduling; and  
Costs and funding sources.

Presenting these tasks, or strategy sets, in various formats allowed the stakeholders to quickly find the information they were looking for and in the format that best suited their purposes.

*Example 7m – MAG Regional Concept of Transportation Operations (January 2004)*

Maricopa Association of Governments (MAG) in Phoenix, AZ developed a series of technical memorandums that covered much of the Business Planning process. First, vision and mission statements were established, followed by 3-year and 5-year goals, performance measures, and policies and practices needed to achieve the goals. A set of functions, or objectives, were then developed that mapped to the 3-year and 5-year goals.

For each function, a table was created that included:

- Specific action items;
- Roles and responsibilities of stakeholders (broken down into planning, implementation, operations, and maintenance);
- Resources required and estimated costs; and
- Additional pertinent information (such as dependencies).

While not explicitly stated, the timeframe for the action items was either three or five years, depending on which goal the overarching objective was mapped to.

Applied specifically to the TMC Business Planning process, a sample strategy set might be developed as shown below. The Business Plan would then contain several such tables of strategy sets.

**Strategy Set #1**

**Objective #1: Improve Incident Management Response on Freeways**

**Action #1: Develop incident response protocol guidelines**

Responsible Stakeholder(s): DOT and Highway Patrol (Co-Leads), other local emergency response agencies

Timeframe/Priority: Complete 6 months prior to construction of TMC

- Dependency:
- 1) Assumes coordination between DOT TMC operators, Highway Patrol dispatchers, and local emergency response units
  - 2) DOT and Highway Patrol expected to equally fund action item

**Action #2: Prepare CCTV Camera and DMS Deployment Plan**

Responsible Stakeholder(s): DOT (Lead), Highway Patrol, local transportation, and law enforcement agencies

Timeframe/Priority: Complete 12 months prior to construction of TMC

- Dependency:
- 1) Assumes funding is available for deployment of field equipment
  - 2) Assumes completion of ongoing FMS conduit/fiber infrastructure

**Action #3: Procure central system software to control, display cameras and DMS**

Responsible Stakeholder(s): DOT (Lead), Highway Patrol, State Information Technology Department

Timeframe/Priority: Complete 6 months prior to construction of TMC

Dependency: 1) Assumes MPO funding will be available  
2) Software must be compatible with existing field equipment and ITS standards compliant

**Strategy Set #2**

**Objective #1: Facilitate inter-agency agreements to extract CAD data to travel information services and TMC**

**Action #1: Implement Highway Patrol CAD System**

Responsible Stakeholders: TMC (Lead), Highway Patrol dispatch, other local agencies

Timeframe/Priority: Not specified

Dependency: 1) Assumes the Highway Patrol is willing to establish and support a CAD system  
2) System should have export functionality to travel information services and the DOT system as a procurement specification

**Action #2: Make capital improvements to the Highway Patrol CAD System**

Responsible Stakeholders: TMC (Lead), Highway Patrol dispatch, other local agencies

Timeframe/Priority: Not specified

Dependency: 1) Assumes funding is available for necessary capital improvements

**Action #3: Develop institutional arrangements**

Responsible Stakeholders: TMC (Lead), Highway Patrol dispatch, other local agencies

Timeframe/Priority: Not specified

Dependency: 1) Establishment of a Transportation Incident Management Policy Group  
2) Establishment of a Transportation Incident Management Working Group



Intentionally Left Blank



## Chapter 8: Organization and Management

### Chapter Purpose and Objectives:

Present key considerations and strategies for outlining an effective TMC Organization and Management structure. Many possible variations are possible, depending on jurisdictional, functional, and agency mission realities. The chapter addresses how the considerations affect organizational approach and how these considerations have been handled by other TMCs.

### Key Messages/Themes:

Importance of scale, functional focus, and stakeholder missions in defining organizational realities; and  
 A planned organization and management approach is much more than an organization chart.

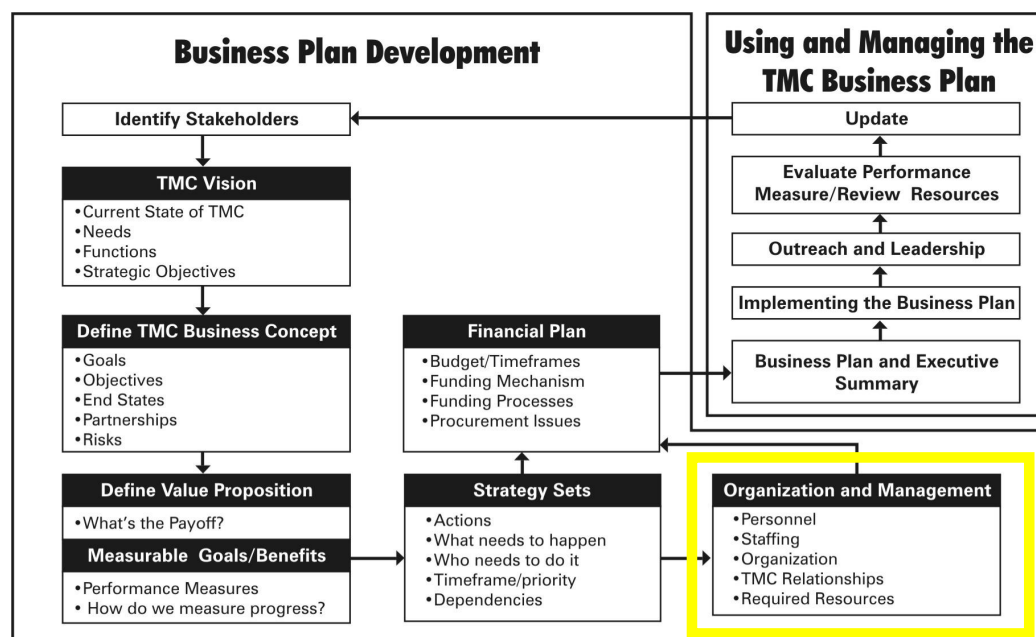
### Key Topics and Issues to be Covered:

Principles of TMC organization and management structure to respond effectively respond to:

- Agencies participating in developing and sustaining a TMC;
- What roles each agency wants to (or must) play as a condition of TMC partnership;
- The overall jurisdictional authority and scale of the TMC;
- The transportation management functions required of the TMC;
- The assets at the disposal of the TMC; and
- Operational management and administration needs.

### How This Chapter Relates to Other Chapters:

Chapter 8 guides the planner's thinking on realistic organization options, which narrows the range of possible plan variations in a number of areas, including staffing, budgeting, decision-making, functional versus service or operational focus, and other considerations.



Remaining Sections:

- 8.1 General Organizational Feature Definitions
- 8.2 Agency Participation, Resources, and Mission Issues
- 8.3 Agency Leadership and Decision-Making
- 8.4 Organizational Likes to Participating Agencies
- 8.5 Variations in Organizational Strategies
- 8.6 Summary

## 8.1 General Organizational Feature Definitions

Organizational development commonly displays basic features that will be referred to from time to time in this chapter:

- *Line-of-authority (or Line) organization elements* – These are common in widely dispersed operations, where each organizational unit needs to incorporate enough authority, resources, and functions to be self-sufficient and responsive to operational needs. A District office is typically a line organization with respect to the overall DOT structures.
- *Functional organization elements* – These are elements of organizations that incorporate authority and resources to perform specific functions in the overall enterprise, such as project development, traffic management, construction management, or maintenance of assets. They sometimes exist within line organizations
- *Matrix, or cross-cutting elements* – These elements or units exist where it is not always economical or feasible to build certain specialties or common service capabilities into line or functional units; instead they act as cross-cutting support services or resources to the line and functional units. Common examples include technical specialties like IT and geology, or services like financial management, legal services, benefits administration, etc.

Most organizations incorporate combinations of these elements at some levels.

## 8.2 Agency Participation, Resources, and Mission Issues

TMCs can involve one, two, or many agencies that may contribute to and/or benefit from its operational functions. What agencies participate in the TMC, and how they participate – are the most important considerations in determining how the TMC might be organized and how decisions and priorities are determined. For each participating agency, the key issues are:

- What is each agency's transportation management scope and jurisdiction? (e.g.):
  - Geography
  - Mode
  - Facility infrastructure
  - Regional service
- How does each agency expect to participate operationally? (e.g.):
  - Staffing and management of the TMC
  - Communications and monitoring linkage
  - Integrated systems (such as CAD or operational status)
  - Resource sharing (ITS, equipment, infrastructure, information)

**What agencies participate in the TMC, and how they participate – are the most important considerations in determining how the TMC might be organized and how decisions and priorities are determined.**



- What responsibilities and decisions can be delegated to the TMC? (e.g.):
  - Traffic monitoring
  - Signal and sign management
  - Dispatching
  - Operations coordination
  - Public information
- What resources are being invested by each agency?
  - Funding
  - Staff and management
  - Deployed ITS
  - Information

The answers to these questions are keys to determining the high-level requirements for the organization structure, how leadership decisions are made, and how TMC performance will be assessed by the participating agencies. Of course there are myriad possible organization situations that can reasonably exist. Chapter 4 of this handbook described and discussed the various TMC business models that are known to exist, with variations in agencies involved, and jurisdictions covered. The sections below include discussions of how agency participation, resources and mission considerations affect organizational design in the various business models. Focus in these sections is on:

Leadership and decision-making structures;  
Function and matrix links to participating agencies; and  
Variations in organizational strategies.

### 8.3 Agency Leadership and Decision-Making

#### 8.3.1 Participation and Delegation

A TMC operated by a single agency, to support the transportation management mission of that agency, with a clear definition of jurisdictional boundaries, is the least complicated case to address organizationally. It can be organized, funded, and managed as a functional organization within the parent agency, placed at a level fitting to the priority and management focus that senior agency management deems appropriate.

If little or no operational authority is needed at the TMC, a functional management organization with established procedures and processes is suitable. Organization and management structure may be satisfied by means of a simple point of contact structure through which information can be accessed, managed, and disseminated.

Leadership and decision-making becomes far more complex when the TMC vision is for it to involve multiple agencies; to execute multiple program responsibilities beyond transportation network monitoring; and to utilize funds and operational assets of more than one agency.

At the highest level, where agency-delegated of transportation management decisions are expected to reside at the TMC, a multi-agency organization structure necessitates the incorporation of a formal, chartered decision model, e.g., steering committees, leadership teams, and processes and rules for voting and consensus.

With decision-making authority, the TMCs organization and management requires more structured rules, with additional external controls and interfaces. TMCs that coordinate or share multiple-agency resources need formal agreements and conditions of use from the delegating agencies, underscoring the need for formal

**TMCs that coordinate or share multiple-agency resources need formal agreements.**

oversight. The organization and management structure should also clearly reflect the interests of the primary “owners” of the TMC, usually the primary funding agency. As a practical matter, in these cases the agency’s organization structure and lines of authority have a strong influence on the “ideal” TMC structure.

### 8.3.2 Jurisdiction

Multi-state or county agencies (e.g., two state DOTs in an urban region) with similar but distinct missions and policies may require special coordination or decision-making provisions, and involve more “dotted lines”. They may also require joint “representative” staffing of the center or – depending on the limitations of the agency agreements – there may have to be specific functional organization units in the center (e.g., a city police dispatcher). The operational jurisdiction of multi-agency regional TMCs could be a complex patchwork, with variations in the operating authority that the TMC can assert in various parts of the region.

Super-regional or statewide TMCs organizations may have to provide for separate regional focus in some functions for effective coordination and decision-making on more local regional issues.

Corridor-focused organizations with many stakeholders might need a functional organization with strict operational intervention “rules” to be viable for the constituent sub-regions<sup>1</sup>. While integration of corridor transportation management is a sound strategy for corridor-wide transportation issues and events, many transportation management issues continually arise in corridor sub-regions – that can and are managed effectively by agencies in that region.

### 8.3.3 Resource Issues

Agencies may participate in a TMC via contribution of funding, staff, sharing of assets on the transportation network, and by providing access to relevant information. These all require input (if not direct control by some agencies) on the use of those assets, which needs to be considered in the organizational design of the TMC. For example, the TMC needs to be accountable to participating agencies for operations expenses and capital investments, and/or the use of the other resources mentioned above.

Differences in duty hour policies and/or treatment of shiftwork and overtime among participating agencies can be a barrier to a fully integrated joint operation. Staff may have to separate organizationally in the TMC to manage shift assignments, supervision, assessment, and other HR-related issues.

Agencies that have acquired and own capital assets that are used by or shared with the TMC may – by policy – remain accountable for the efficient use of those investments. Liability issues usually remain with asset owners. These issues imply that a joint-agency TMC needs to be organized to focus clear accountability for asset ownership and use.

Where the TMC taps information resources of participating agencies, or accesses agency systems directly, security and systems use policies come into play. Related policies are often managed centrally in participating agencies with broad missions beyond transportation management – as a result, these policies are hard to change, and may need some form of coordination or gate-keeping function to be included in the TMC structure.

---

<sup>1</sup> Urban-suburban regions such as the Delaware Valley

### 8.4 Organizational Links to Participating Agencies

In principle, a TMC is a functional organization unit from the perspective of the parent structures of participating agencies. Parent-agency operations management, technical support, personnel administration, and cost accounting are examples of “home-team” functions that are organized in a matrix relationship to the TMC.

IT support is a good example of the kind of matrix support that usually is needed by a TMC structure. The participating agency with the greatest IT investment in the enterprise is the logical source for IT support, but integration of the multiple technologies of other agencies may call for attention of specialists from other agencies to manage “translation” software, or specialized ITS technology.

**Table 8-1** below shows the connection between TMC functional objectives and linkages to participating agencies. The links typically require delegated authorities and operating rules.

**Table 8-1: TMC Functions and Sample Organizational Implementation**

TMC Functions		Operational Management	Organization Implications (Examples)
Basic traffic monitoring and surveillance		Supervising technicians and analysts, transmit information	Line organization, producing information. Most support matrixed from agencies
Added Functions (Examples)	Signal and sign management	Authorized decision-making on traffic management actions	<ul style="list-style-type: none"> <li>Unit with delegated authority and “rules-of-engagement” or</li> <li>Direct communication link to a primary agency point of contact with authority to represent participants’ interests</li> <li>24/7 implications</li> </ul>
	Shared ITS and systems resources	Coordination of ITS resource use and integration of data	<ul style="list-style-type: none"> <li>Unit to manage use and condition of the resources</li> <li>Increased surveillance resources mean increased monitoring</li> <li>Unit to manage acquisition, translation, use, and dissemination of data</li> </ul>
	Dispatching	Deployment of field units usually a key action in performing agency missions	<ul style="list-style-type: none"> <li>Unit with delegated authority and “rules-of-engagement” or</li> <li>Unit linked to incident and event notification resources and 911s</li> <li>Centralized work crew assignment information</li> <li>Function to handle service request call-ins from the public</li> <li>Unit to maintain resource status and network situation data</li> <li>24/7 requirements</li> </ul>
	Coordination	Centralize decision-making for speed	Jointly staffed, authorized units
	Public Information	Smooth access to network and event status	Multi-agency-authorized spokespersons or POC

## 8.5 Variations in Organizational Strategies

Establishing and operating a TMC has been shown to significantly improve transportation agencies' ability to manage over-stress networks and increased public demand for safety and mobility. In today's climate of government streamlining and reduction, the most difficult TMC investment for agencies to make is providing staff effort and attention to the operation.

Yet, as indicated above, TMCs need to incorporate authorized decision-making units in order to perform proactive roles in transportation management<sup>2</sup>. Accountable decision-making requires staff with vested authorities, rules, and processes to act timely and effectively.

Chapter 4 describes various business models that have been established to meet practical staffing and organizational constraints. The case studies in the Appendix to this handbook show a mix of these scenarios, and illustrate some of the strengths and weaknesses of the different organization strategies:

- *Single agency with agency mission focus and jurisdiction* – The simplest situation, with clear functions, and lines of authority to act. This approach can be staffed with agencies personnel, augmented by contract staff or services, or performed under turnkey contract arrangements with operating rules and performance objectives. Does not leverage the capability of other agencies to help improve regional transportation operations.
- *Multi-agency joint program* – Usually initiated as a joint program combining interests of infrastructure management (DOT) with law enforcement and emergency response agencies. Collocation of coordinators and decision-makers with complementary but distinctly delineated roles. This is the most common case, where three or fewer agencies reach agreement on structure, funding, staffing, and transportation management roles.
- *Multi-agency specialized programs* – TMC initiatives involving many regional agencies take on greater organizational challenges due to jurisdictional issues, a variety of agency missions, and differentiated perception of value to be gained from the TMC operation. Agreement on funding, staffing, and authorized management roles is difficult. In these situations the organization strategy calls for specialized TMC roles that resonate with participants' values, such as communications and information sharing, timely operational status reporting. Public-private partnership and new chartered entities (see below) are common alternatives.
- *New chartered public sector entity* – An ambitious but probably effective solution to multi-agency TMC programs. The FAST TMC in Nevada involves cost sharing and transfer of specific transportation management roles to a new separate entity, with authority to perform those roles, and an oversight committee that includes decision-makers from six participating agencies.
- *Chartered public/private partnership* – A second variation on the chartered TMC operations entity, this approach involves private sector management under a concession arrangement. Authority for traffic management and control actions, and to dispatch agency resources is difficult to transfer to this type of organization arrangement. Cases of this type have gravitated toward roles that focus on transportation and incident monitoring, and sharing of information

---

<sup>2</sup> To go beyond monitoring and information dissemination, to actively influence traffic movement, to deploy services, and to directly assist incident management

useful to participating agencies and motorists. Organization funding for this kind of operation is easier for agencies to contribute and share than TMC staffing.

- *Contracted operations* – This approach is used essentially for specific TMC functions or services, such as breakdown assistance dispatching, maintenance of ITS assets, IT support, and information dissemination. There are precedents for regional information services providers to staff monitoring functions at TMCs, in return for rights to provide traffic information services to private and commercial customers.

## 8.6 Summary

A Business Plan for a TMC that involves multiple agencies, multiple missions, and proactive traffic control and incident management decisions --should clearly delineate key organizational factors, including models and processes to make those decisions and commit resources, and should define the overarching joint leadership structure to which the TMC is accountable. Authorization to make functional decisions needs to be spelled out for agreement by the participating agencies, as do plans to manage specific technical, policy or staffing issues.

Single agency, single mission TMCs are usually treated as line organizations in the overall agency structure, with functional components – some of which lend themselves to contracting out.

TMCs combining two or three agencies' missions and jurisdiction tend to be organized in functional groupings, with clearly delineated roles. Staff tends to be co-located, but not extensively shared. This simplifies the linkages with "home organization" operations, personnel management, and administrative functions.

TMCs combining many agencies, many missions, multiple jurisdictions, and multiple proactive transportation management roles – need a more ambitious organization design. Two ways these challenges are being met include (1) a public-private partnership in which some TMC roles are performed under concession arrangements, or (2) a separate public sector operating entity has been formed under an over multi-agency leadership committee, defining overall jurisdiction and operating authorities.



Intentionally Left Blank





## Chapter 9: Financial Plan

### Chapter Purpose and Objectives:

This chapter describes how to develop a Financial Plan to support the Business Concept. By developing a comprehensive picture of funding needs and a funding strategy, a financial plan will help document fiscal needs and responsibilities based on the Strategy Sets. This chapter also discusses challenges associated with financial planning for TMCs, including how to justify TMC needs versus other competing priorities within a department, agency, or region. Examples of how to document funding needs, timelines, potential sources, etc. are included in this chapter.

### Key Messages/Themes:

The Financial Plan needs to address the TMC-specific funding requirements, and tie these requirements back to the Business Concept, Value Proposition, improvements required to develop the capabilities required, and the strategies and services needed to manage, operate, and maintain a TMC.

### Key Topics and Issues to be Covered:

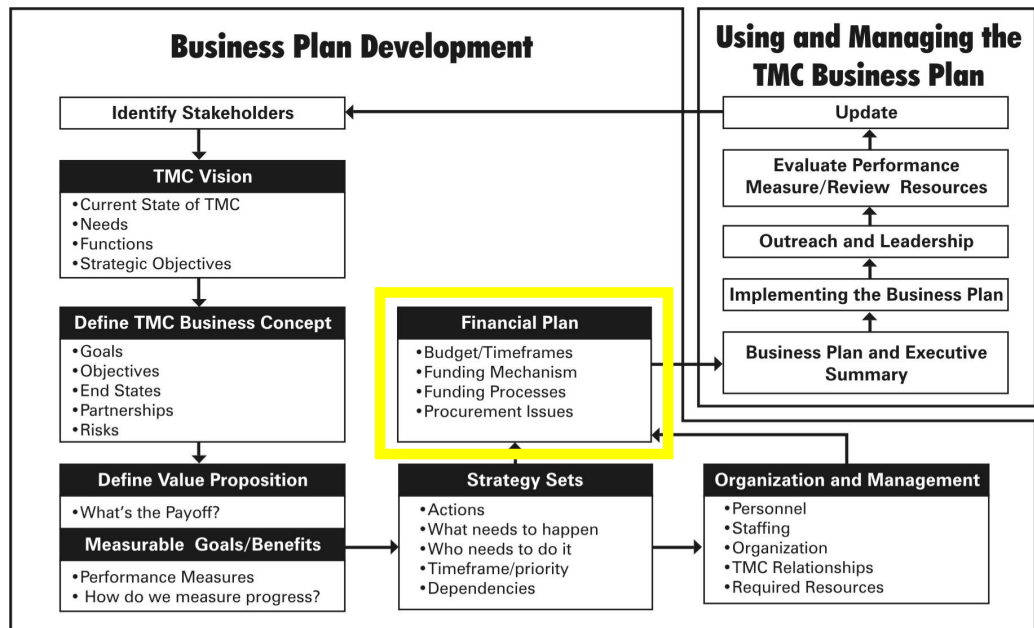
The previous chapters have already justified the proposed strategies, support services and operations of the TMC; identified the multi-year plan component that lays out what is required to support these items; indicated what influence that they would have on performance measures and benefits provided based on investment; and discussed how, collectively, these various initiatives would be rolled up and identified as capital cost and an annual cost per year. This chapter addresses a series of questions including:

What are the appropriate sources of funding within the agency and/or region?  
What are the funding cycles and key milestones that need to be factored in to the business planning process?;  
What are other issues to consider and other key factors with funding?

### How This Chapter Relates to Other Chapters:

The Financial Plan builds on all the previous chapters in that it estimates the financial impact of the proposed TMC considering the Business Concept, Strategies, and Organization and Management. It is the last part of the Business Plan content, yet in many cases it is often the most critical piece of the plan as it maps dollars to end-states and strategies; it is the 'bottom line' that usually speaks to the key decision makers and authorities.

As illustrated in **Figure 9-1**, the Financial Plan utilizes specific input from Chapter 7, Strategy Sets and Chapter 8, Organization and Management, and describes how the financial needs are derived and various means of funding both the one-time capital expenditures and the annual operating expenditures.



**Figure 9-1: Business Plan Steps and Process**

There are several issues that need to be considered when developing a Financial Plan as part of a TMC Business Plan. While many agencies develop funding requirements for overall TMS programs, the specific needs, roles and functions of the TMC, as articulated in the TMC Business Concept, need to be specifically oriented towards a sustainable funding stream to not only design and build the facility but also to operate and maintain it for an extended period.

Remaining Sections:

- 9.1 Assigning Funding Requirements to Strategy Sets
- 9.2 Budgeting and Funding Definitions, Issues, and Challenges
- 9.3 Budget Planning Process
- 9.4 Fund Sharing Models

**9.1 Assigning Funding Requirements to Strategy Sets**

The first step in developing the Financial Plan is to determine the estimated costs to carry out the strategies and action plans resulting from the previous activities in the development of the Business Plan. These funding requirements should take into consideration items such as:

- Initial capital costs;
  - Planning and design costs;
  - Contractor and vendor costs;
  - Integration costs;
- Operating and Maintenance costs over the timeframes previously identified;
- Replacement costs; and
- Staffing requirements (new positions, staff training needs, etc.).

One of the shortcomings of agencies and consultants working on TMC implementation plans is failing to account for some of the ancillary and incidental costs associated with implementing a TMC. Often the annual operating responsibilities and associated costs

are not addressed early enough in the program development, and operating units find themselves struggling to fund the TMC operational expenses from existing program annual maintenance budgets or other operating unit annual budgets. This obviously results in less than adequate resources for the TMC and also reduces the effectiveness of the other activities' budgets that get reduced. This is a "lose-lose" situation which can, and should, be avoided with some advance planning that leads to a strong Financial Plan that management supports and endorses.

To help account for the array of costs associated with a Traffic Management Center program, templates are presented in **Figures 9-2** and **9-3** itemizing the various elements of a capital and operating budget for a new TMC. Any specific TMC program will have various combinations of the illustrated cost items requiring the template to be customized for each specific situation. The objective of the illustrated template is to trigger the thought process that needs to go into a TMC Financial Plan.

<b>TEMPLATE FOR DETERMINING TMC FINANCIAL NEEDS</b>		
<b>Capital Expenditures</b>		
<b>TMC Strategies</b>	<b>Outside Services</b>	<b>Contractor</b>
Planning and Conceptual Design	\$ -	-
Plans, Specifications, and Estimate	\$ -	-
Land	\$	-
Construction	\$	-
Permits	\$	-
Civil Infrastructure	\$	-
Landscaping	\$	-
Building	\$	-
Utilities (electrical, water, sewer, telephone, gas, cable TV)	\$	-
Uninterruptable Power Supply	\$	-
Generator	\$	-
Fire Protection System	\$	-
Consoles	\$	-
Furnishings (furniture, office equipment)	\$	-
Replacement costs	\$	-
Central Communications	\$	-
Central System Hardware	\$	-
Video Display System	\$	-
Central System Software	\$	-
Integration	\$	-
Security Systems	\$	-

**Figure 9-2: TMC Capital Expenditure Template**

<b>TEMPLATE FOR DETERMINING TMC FINANCIAL NEEDS</b>	
<b>Annual Operating Expenditures</b>	
<b>TMC Strategies</b>	<b>O&amp;M</b>
Central System Hardware	\$ -
Central System Software	\$ -
Software Licenses	\$ -
Replacement Costs	\$ -
Security	\$ -
Building Maintenance	\$ -
Utilities	\$ -
Operating Supplies	\$ -
Operations Support	\$ -
ITS Support	\$ -
Janitorial	\$ -
Communications	\$ -
Staff Training	\$ -
Overtime for Staffing	\$ -
<b>SUBTOTAL</b>	<b>\$ -</b>
Operations Staff - Normal Hours Only	
Engineering	\$ -
Operators	\$ -
Operations Staff - Peak Hours Only	
Engineering	\$ -
Operators	\$ -
Operations Staff - Extended Hours Only	
Engineering	\$ -
Operators	\$ -
Operating Staff - 24 Hours	
Engineering	\$ -
Operators	\$ -
<b>TOTAL</b>	<b>\$ -</b>

**Figure 9-3: TMC Annual Operating Expenditure Template**

Costs should be estimated for each of the activities and strategies associated with the TMC program. There are a number of resources available to help determine an opinion of probable cost for the various components. Resources include:

Traffic Control System Operations – Installation, Management, and Maintenance ITE, 2000

BiState St. Louis Area Intelligent Vehicle Highway System Planning Study, 1994

*Intelligent Transportation Systems Benefits and Costs 2003 Update*, May 2003

[http://www.mitretek.org/its/benecost/BC\\_Update\\_2003/index.html#app\\_a](http://www.mitretek.org/its/benecost/BC_Update_2003/index.html#app_a)

The template includes several operational scenarios from 8 hour per day operation up to 24 hour per day operation. These differing estimates of cost are associated with differing performance levels. This type of information in the Financial Plan will assist the decision makers in their decision on a preferred service level.

Examples of a summary of the TMC facilities and requirements are presented for the reader.

**Example 9a: TMC Building Requirements Estimate**

<b>Estimate of Probable Cost for a 18,000 ft TMC building</b>	
Architectural (building)	\$1,611,480.00
Civil Construction	\$227,425.00
Landscaping	\$71,680.00
Furnishings	\$110,000.00
Plumbing	\$60,000.00
HVAC	\$176,000.00
UPS	\$184,000.00
Generator and Accessories	\$157,900.00
Electrical	\$130,200.00
Fire Protection	\$59,000.00
Contingencies	<u>\$172,938.00</u>
<b>TOTAL</b>	<b>\$2,960,623.00</b>

Source: ADOT Central Control Facility Technical Memorandum

Examples of operational and maintenance costs for four different sizes of TMCs (regional, large, medium, and small) are presented to give the reader an idea of how the operations and maintenance funding needs can be presented in the Financial Plan.

**Example 9b: Traffic Operations Center – Regional (Continuous 24/7 operations)**

Personnel  Title	Regular Shift Operations			Yearly Overtime Operations	
	Annual Salary (1)	Number of Personnel	Hourly Rate	Total Hours at 96 Hours/ Person	Overtime, Hourly Rate
Director	\$ 56,000	1.0	\$ 26.92	0	\$ 40.38
Shift Supervisor/Manager	\$ 47,400	4.0	\$ 22.79	384	\$ 34.18
System Operator	\$ 30,400	9.0	\$ 14.62	864	\$ 21.92
Software Programmer	\$ 46,200	2.0	\$ 22.21	192	\$ 33.32
Communications Specialist	\$ 46,200	2.0	\$ 22.21	192	\$ 33.32
Traffic Analysts	\$ 40,000	2.0	\$ 19.23	192	\$ 28.85
Technician, Control Center	\$ 36,500	4.0	\$ 17.55	384	\$ 26.32
Administrative Assistant	\$ 32,000	2.0	\$ 15.38	192	\$ 23.08
IT Manager	\$ 50,000	1.0	\$ 24.04	96	\$ 36.06
Subtotal		27.0	\$ 369.23	2400	NA
Annual Total, Unloaded			\$ 768,000		\$ 49,300
Benefits Package	60%		\$ 460,800	0%	\$ -
Annual Total			\$ 1,228,800		\$ 49,300
<b>Total Personnel Operations Cost for a Year</b>					<b>\$ 1,278,100</b>
Notes:					
a. Overtime operations are 12 holidays during the normal work year at 8 hours per person per holiday.					
b. This table does not include the effects of vacations and sick time.					
c. This table is for a 24-hour-operation control center.					
Physical Plant Costs	Unit Costs (1)	Size or Quantity	Yearly Cost		
<b>Monthly Building Operating Costs (See Note 4)</b>					
Building Maintenance				\$	112,904
Utilities				\$	70,449
Operating Supplies				\$	298,729
Operations Support				\$	280,750
EDP Support				\$	666,939
Software Licenses				\$	236,300
Training (out-of-state)				\$	14,329
Training (in-state)				\$	33,423
<b>Other</b>					
AZTech Support				\$	125,000
<b>Total Physical Plant Operations Cost for a Year</b>					<b>\$ 1,838,823</b>
Notes:					
1. All costs were in 1994 dollars, unless otherwise noted. All costs have been converted to 2002 dollars based on the Consumer Price Index (CPI).					
2. CPI conversion factor = 1.217					
3. Based on ITS Unit Cost Database (as of September 30, 2002)					
4. Source: PECOS- ITI Data Models, Final Report. Annual Operation and Maintenance Forecast, Phoenix TOC. Arizona Department of Transportation. Report No. FHWA-AZ98-464					

Source: ITE - Traffic Control System Operations

**Example 9c: Traffic Operations Center – Large (Weekday, 12 hours per day/ 5 days per week)**

Personnel  Title	Regular Shift Operations			Yearly Overtime Operations	
	Annual Salary (1)	Number of Personnel	Hourly Rate	Total Hours at 96 Hours/ Person	Overtime, Hourly Rate
Director	\$ 56,000	1.0	\$ 26.92	0	\$ 40.38
Shift Supervisor/Manager	\$ 47,400	1.0	\$ 22.79	96	\$ 34.18
System Operator	\$ 30,400	2.0	\$ 14.62	192	\$ 21.92
Software Programmer	\$ 46,200	1.0	\$ 22.21	0	\$ 33.32
Communications Specialist	\$ 46,200	1.0	\$ 22.21	0	\$ 33.32
Technician, Control Center	\$ 36,500	1.0	\$ 17.55	0	\$ 26.32
Subtotal		7.0	\$ 140.91	288	NA
Annual Total, Unloaded			\$ 293,100		\$ 7,500
Benefits Package	60%		\$ 175,900	0%	\$ -
Annual Total			\$ 469,000		\$ 7,500
<b>Total Personnel Operations Cost for a Year</b>					<b>\$ 476,500</b>

Notes:

- a. Overtime operations are 12 holidays during the normal work year at 8 hours per person per holiday.
- b. This table does not include the effects of vacations and sick time.
- c. This table is for a special event/incident response operation control center.
- d. Personnel typically have other responsibilities in addition to these.

Physical Plant Costs	Unit Costs (1)	Size or Quantity	Yearly Cost
<b>Monthly Building Operating Costs</b>			
Rent (Yearly)	\$ 12 /ft <sup>2</sup>	1,100 ft <sup>2</sup>	\$ 13,400
HVAC & Electric (Daily)	\$ 0.103 /kW	266.0 kW/day	\$ 10,000
Maintenance	\$ 946 /month	12 months	\$ 11,400
General Supplies	\$ 189 /month	12 months	\$ 2,300
<b>Communications, Telephone (General)</b>			
Regular Phone Service	\$ 405 /month	2 units	\$ 11,300
Cellular Phones	\$ 608 /month	2 units	\$ 17,000
800 Number Service	\$ 1,217 /month	1 number	\$ 14,600
<b>Communications, Modem Links</b>			
Dial-up	\$ 25 /drop/month (3)	12 locations	\$ 3,500
Leased Lines	\$ 122 /drop/month	23 agencies	\$ 34,100
T-1 Lines (Video)	\$ 700 /line/month (3)	1 agency	\$ 700
<b>Computers ( \$ 189,000.00 Initial Cost)</b>			
Supplies	\$ 572 /month	12 months	\$ 6,900
Maintenance	10% of initial cost/year	1 year	\$ 18,900
Replacements	10% of initial cost/year	1 year	\$ 18,900
<b>Miscellaneous</b>			
Training	\$ 500 /person	1 year	\$ 3,500
Monthly Vehicle Costs	\$ 0.61 /mile	1,944 mi/month	\$ 14,200
<b>Total Physical Plant Operations Cost for a Year</b>			<b>\$ 180,700</b>

Notes:

- 1. All costs were in 1994 dollars, unless otherwise noted. All costs have been converted to 2002 dollars based on the Consumer Price Index (CPI).
- 2. CPI conversion factor = 1.217
- 3. Based on ITS Unit Cost Database (as of September 30, 2002)
- 4. All costs are hypothetical and need to be determined for each location.

Source: MAG Regional Concept of Transportation Operations – Technical Memorandum No. 5/6 (May 7, 2003)

**Example 9d: Traffic Operations Center – Medium (Peak period coverage: 8 hours per day/5 days per week)**

Personnel  Title	Regular Shift Operations			Yearly Overtime Operations	
	Annual Salary (1)	Number of Personnel	Hourly Rate	Total Hours at 96 Hours/Person	Overtime, Hourly Rate
Director	\$ 56,000	0.5	\$ 26.92	0	\$ 40.38
Shift Supervisor/Manager	\$ 47,400	1.0	\$ 22.79	96	\$ 34.18
System Operator	\$ 30,400	1.0	\$ 14.62	96	\$ 21.92
Software Programmer	\$ 46,200	0.5	\$ 22.21	0	\$ 33.32
Communications Specialist	\$ 46,200	0.5	\$ 22.21	0	\$ 33.32
Technician, Control Center	\$ 36,500	0.5	\$ 17.55	0	\$ 26.32
Subtotal		4.0	\$ 81.85	192	NA
Annual Total, Unloaded			\$ 170,300		\$ 5,400
Benefits Package	60%		\$ 102,200	0%	\$ -
Annual Total			\$ 272,500		\$ 5,400
<b>Total Personnel Operations Cost for a Year</b>					<b>\$ 277,900</b>

Notes:

- Overtime operations are 12 holidays during the normal work year at 8 hours per person per holiday.
- This table does not include the effects of vacations and sick time.
- This table is for a special event/incident response operation control center.
- Personnel typically have other responsibilities in addition to these.

Physical Plant Costs	Unit Costs (1)	Size or Quantity	Yearly Cost
<b>Monthly Building Operating Costs</b>			
Rent (Yearly)	\$ 12 /ft <sup>2</sup>	600 ft <sup>2</sup>	\$ 7,300
HVAC & Electric (Daily)	\$ 0.103 /kW	152.0 kW/day	\$ 5,700
Maintenance	\$ 541 /month	12 months	\$ 6,500
General Supplies	\$ 108 /month	12 months	\$ 1,300
<b>Communications, Telephone (General)</b>			
Regular Phone Service	\$ 405 /month	1 units	\$ 6,500
Cellular Phones	\$ 608 /month	1 units	\$ 9,700
800 Number Service	\$ 1,217 /month	1 number	\$ 14,600
<b>Communications, Modem Links</b>			
Dial-up	\$ 25 /drop/month (3)	7 locations	\$ 2,000
Leased Lines	\$ 122 /drop/month	13 agencies	\$ 19,500
T-1 Lines (Video)	\$ 700 /line/month (3)	1 agency	\$ 700
<b>Computers ( \$ 108,000.00 Initial Cost)</b>			
Supplies	\$ 327 /month	12 months	\$ 3,900
Maintenance	10% of initial cost/year	1 year	\$ 10,800
Replacements	10% of initial cost/year	1 year	\$ 10,800
<b>Miscellaneous</b>			
Training	\$ 500 /person	1 year	\$ 2,000
Monthly Vehicle Costs	\$ 0.61 /mile	1,111 mi/month	\$ 8,100
<b>Total Physical Plant Operations Cost for a Year</b>			<b>\$ 109,400</b>

Notes:

- All costs were in 1994 dollars, unless otherwise noted. All costs have been converted to 2002 dollars based on the Consumer Price Index (CPI).
- CPI conversion factor = 1.217
- Based on ITS Unit Cost Database (as of September 30, 2002)
- All costs are hypothetical and need to be determined for each location.

Source: MAG Regional Concept of Transportation Operations – Technical Memorandum No. 5/6 (May 7, 2003)



**Example 9e: Traffic Operations Center – Small (Special event or incident response only)**

Personnel  Title	Regular Shift Operations			Yearly Overtime Operations	
	Annual Salary (1)	Number of Personnel	Hourly Rate	Total Hours at 96 Hours/ Person	Overtime, Hourly Rate
Director	\$ 56,000	0.0	\$ 26.92	0	\$ 40.38
Shift Supervisor/Manager	\$ 47,400	0.0	\$ 22.79	0	\$ 34.18
System Operator	\$ 30,400	0.5	\$ 14.62	0	\$ 21.92
Software Programmer	\$ 46,200	0.0	\$ 22.21	0	\$ 33.32
Communications Specialist	\$ 46,200	0.0	\$ 22.21	0	\$ 33.32
Technician, Control Center	\$ 36,500	0.5	\$ 17.55	0	\$ 26.32
Subtotal		1.0	\$ 16.08	0	NA
Annual Total, Unloaded			\$ 33,500		\$ -
Benefits Package	60%		\$ 20,100	0%	\$ -
Annual Total			\$ 53,600		\$ -
<b>Total Personnel Operations Cost for a Year</b>					<b>\$ 53,600</b>

Notes:

- a. Overtime operations are 12 holidays during the normal work year at 8 hours per person per holiday.
- b. This table does not include the effects of vacations and sick time.
- c. This table is for a special event/incident response operation control center.
- d. Personnel typically have other responsibilities in addition to these.

Physical Plant Costs	Unit Costs (1)	Size or Quantity	Yearly Cost
<b>Monthly Building Operating Costs</b>			
Rent (Yearly)	\$ 12 /ft <sup>2</sup>	150 ft <sup>2</sup>	\$ 1,800
HVAC & Electric (Daily)	\$ 0.103 /kW	38.0 kW/day	\$ 1,400
Maintenance	\$ 135 /month	12 months	\$ 1,600
General Supplies	\$ 27 /month	12 months	\$ 300
<b>Communications, Telephone (General)</b>			
Regular Phone Service	\$ 405 /month	1 units	\$ 4,900
Cellular Phones	\$ 608 /month	1 units	\$ 7,300
800 Number Service	\$ 1,217 /month	1 number	\$ 14,600
<b>Communications, Modem Links</b>			
Dial-up	\$ 25 /drop/month (3)	2 locations	\$ 500
Leased Lines	\$ 122 /drop/month	3 agencies	\$ 4,900
T-1 Lines (Video)	\$ 700 /line/month (3)	1 agency	\$ 700
<b>Computers</b> ( \$ 27,000.00 Initial Cost)			
Supplies	\$ 82 /month	12 months	\$ 1,000
Maintenance	10% of initial cost/year	1 year	\$ 2,700
Replacements	10% of initial cost/year	1 year	\$ 2,700
<b>Miscellaneous</b>			
Training	\$ 500 /person	1 year	\$ 500
Monthly Vehicle Costs	\$ 0.61 /mile	278 mi/month	\$ 2,000
<b>Total Physical Plant Operations Cost for a Year</b>			<b>\$ 46,900</b>

Notes:

- 1. All costs were in 1994 dollars, unless otherwise noted. All costs have been converted to 2002 dollars based on the Consumer Price Index (CPI).
- 2. CPI conversion factor = 1.217
- 3. Based on ITS Unit Cost Database (as of September 30, 2002)
- 4. All costs are hypothetical and need to be determined for each location.

Source: MAG Regional Concept of Transportation Operations – Technical Memorandum No. 5/6 (May 7, 2003)

Once the funding requirements are known, it is useful to present the costs in a timeline format, such as the one shown in **Figure 9-4**. Such a timeline will enable capital and operating budgets to be established for each fiscal year, including beyond the immediate near-term needs. These opinions of costs are then in a useful format for agency budgeting purposes.

SCHEDULE OF FUNDING						
TMC Strategies	Annual Budgets					
	FY 1		FY 2		FY 3	
	Capital	O&M	Capital	O&M	Capital	O&M
Planning and Conceptual Design						
Design						
Land						
Construction						
Furnishings						
Central System						
Staff						
Building Maintenance						
Utilities						
Upgrades						

**Figure 9-4: Sample Budget/Timeline**

## 9.2 Budgeting and Funding Definitions, Issues, and Challenges

Once the financial needs have been established, the applicable funding sources have to be identified. Funding sources can be federal, state, or local. Federal funding is generally used for TMC projects. Several federal fund categories can be used both for the initial capital investment and for the on-going operations. The issue becomes whether the state is willing to use federal funds in a category designated for construction and spend those funds for operations and maintenance. Currently available and applicable general funding programs are summarized in **Figure 9-5**.

SUMMARY OF FUNDING SOURCES			
Funding Sources	Eligibility		Qualifying Conditions
	Capital Expenditures	Operating Expenditures	
National Highway System (NHS)	a	a	80/20 percent federal/local match with no time limit on operations.
Surface Transportation Program (STP)	a	a	80/20 percent federal/local match within the initial project scope.
Interstate Maintenance (IM)	a	a	90/10 percent federal/local match
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	a	a	80/20 percent federal/local match for 2 years or longer if improvements are demonstrated.
SAFETEA/TEA-LU (TEA-21 Reauthorization)	a	a	
ITS Integration	a		50 percent fed integration funds 20 percent local funds 30 percent other federal or non federal funds
National Corridor Planning and Development Program and Coordinated Border Infrastructure Program	a		80/20 percent federal/local match

**Figure 9-5: Summary of Funding Sources**

**National Highway System (NHS)** – Provides for capital and operating costs for traffic monitoring, management, and control facilities and programs. Funds provided on an 80/20 percent federal/local match basis with no time limit for operations.

**Surface Transportation Program (STP)** – Provides for capital and operating costs for traffic monitoring, management, and control facilities and programs. Funds provided on an 80/20 percent federal/local match basis within the initial project scope.

**Congestion Mitigation and Air Quality Improvement Program (CMAQ)** – Provides funds for the establishment or operation of traffic monitoring, management, and control facility or program in non-attainment areas. Explicitly includes, as an eligible condition for funding, programs or projects that improve traffic flow. Funds provided for O&M on an 80/20 percent federal/local match basis for 2 years, or longer if the project demonstrates air quality improvement benefits on a continuing basis.

**Interstate Maintenance** – The Interstate Maintenance Program was created to provide funds to states to maintain previously-completed sections of the Interstate System. Some states have used these funds for capital investments in Traffic Management Centers and operations that serve the Interstate System. Funds are provided on a 90/10 percent federal/local match basis.

**SAFETEA/TEA-LU (2004 Reauthorization Bill)** – will also authorize several additional Federal funding mechanisms which are available specifically to aid in the deployment and operation of ITS.

**ITS Integration** – This component of the ITS Deployment Program provides funding for activities necessary to integrate ITS infrastructure components that are either deployed (existing) or will be deployed with other sources of funds. This may include the integration of different ITS systems or sub-systems (e.g., freeway management, arterial management, etc.) or the integration of like ITS components across jurisdictions. Eligible activities include the system design and integration, creation of data sharing/archiving capabilities, deployment of components that support integration with systems outside of metropolitan areas. The ITS Integration Program can fund up to 50 percent of an integration project's costs with a minimum of 20 percent of the local match to come from non-federally derived sources. The other 30% match could come from other federal funds or non-federal funds.

The **National Corridor Planning and Development Program and Coordinated Border Infrastructure Program** – was established under Sections 1118 and 1119 of the Transportation Equity Act for the 21st Century (TEA-21). The Coordinated Border Infrastructure Program aims to improve border infrastructure and transportation telecommunications to facilitate the safe and efficient movement of people and goods at or across the U.S.-Canada and the U.S.-Mexico borders. The National Corridor Planning and Development Program provides DOT authority to allocate dollars to states and metropolitan planning organizations (MPOs) for coordinated planning, design and construction of highway corridors. Criteria under which the Border Program project funding applications will be reviewed include reduction in travel time through a major international facility, potential for improvements in border crossing vehicle safety and cargo security, and the applicability of innovative techniques and technology to other border crossing facilities. The Federal share for projects funded through these programs is 80% (sliding scale applies).



### 9.3 Budget Planning Processes

When federal funds are involved, it is important to understand the budgeting process very early in the TMC program. As most agencies know, there is typically a long lead time associated with getting the budgets approved. The budgets must go through the approval process to be included in the MPO Transportation Improvement Program, then in the State Transportation Improvement Program, and finally to get the federal money programmed.

The process to get a project included in the MPO Transportation Improvement Program varies from agency to agency, but it can take up to a year. In most cases, the TIP is for a three to five year period and if a project misses the update cycle, either it has to wait for the next TIP update or go through a process to amend the TIP during the life of the TIP. It is important to identify and understand the defined process for decision-making in the agency/region/state that includes the linkage to budget-cycles/processes of all partner agencies, application procedures, prioritization procedures, etc.

A typical timeline is presented in **Figure 9-6** to illustrate the general time periods that might be involved.

Activities	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
Submit Federal Project Request	█												
Review Federal Projects		█											
Finalize Recommended Federal Projects				█									
Submit Local Projects				█									
Approval of Federal Projects					█								
Draft TIP						█							
Review of TIP							█						
Committee and Council Reviews								█	█				
Recommended TIP										█			
Public Hearings											█		
Final Approval of TIP												█	
TIP is Submitted to the STIP													█

**Figure 9-6: Sample Budgeting Process Timeline**

It is important to view the TMC program as part of a larger strategic vision for transportation management, incident management, emergency management, and homeland security for the region or state. With this perspective, it may be possible to establish funding linkages to larger goals for the area and have the TMC funded as part of other programs. The TMCs vital role in a number of important regional transportation, operations and incident management functions could greatly help support funding justification for improvements, expansions, additional functions, and integration strategies.

Another factor to consider in the planning is the fact that any new building for a TMC may be the responsibility of the Finance and Administration Department of state government or local government. As such, there are additional steps and approvals that are necessary in getting budgets approved before going to the MPO for inclusion in the TIP.

When designing a new TMC site, the building architect and interior building designer may consider these factors to ensure the building is functional for TMC purposes:

Clear objectives for building the TMC;  
Agencies to work in the TMC building;  
Prioritized functions of the TMC;  
Staff to work in the TMC building;  
Rooms for functions and staff;  
Equipment and number of staff in each room; and  
Sizes of each room and the building.

In leading a TMC program, it is also important to plan for multi-year strategic plans that determine the direction of budgeting activities over a multi-year time horizon (Examples: Houston TranStar, TRANSCOM). These are essential for obtaining political and funding support as well as for establishing internal funding priorities.

The budgeting process is often quite lengthy; however, there are numerous steps that follow to obligate the budgeted funds. This process of obligating the funds and establishing a “project” with the FHWA (if federal funds are being used) and in the agency’s accounting system can add six months to the overall process. It is important to recognize this as the overall schedule for financing and deploying a TMC is developed in the Business Plan. A typical process for a state to obligate funds when federal funds are involved is described below:

1. Project manager prepares a request for federal funds and submits the request to the administrative office which handles the requests for authorization with the FHWA.
2. The agency administrative office prepares and submits to the FHWA a *Letter of Authorization and Project Agreement*. At this time a state project number and a federal project number is assigned.
3. FHWA reviews and approves the authorization request.
4. Project Manager schedules a presentation and presents the project to the agency’s project review committee for approval before moving forward.
5. Following approval by the project review committee, the Project Manager proceeds to present the project to a program project authorization committee.
6. Once the project has been approved by staff through the above steps, it is ready for submittal to the state transportation board (appointed officials) for final approval.
7. When the state transportation board approves the project, it becomes an authorized project and the next steps of design can begin.

The above typical process illustrates the importance of understanding the total breadth of activities that are involved in getting funding approved. The success of a timely deployment of a Transportation Management Center is dependent on many things, not the least of which is having a proactive approach to getting approval of the financial side of the TMC deployment.

## 9.4 Fund Sharing Models

Transportation Management Center program funding models range from a single agency funding the initial capital costs and the annual operations and maintenance costs to a public/private arrangement where the private partner provides improvements to the TMC, provides the operators and the maintenance in exchange for traveler information. In the latter, the traveler information is then used as a means to sell advertising for the broadcast media.

**Single Agency Funding** – The simplest funding model is for a situation where one agency funds the entire implementation and operations costs, such as the INFORM center on Long Island, NY. This has the advantage of the owning agency having full control and thus no interagency coordination to contend with, but it also requires that the owning agency obtain all the funding either locally or from other federal or state funds.

**Funding Allocation Based On TMC Utilization** – A funding model used in some large TMCs such as Houston TranStar splits operating costs for facilities, computer systems, and telecommunications systems among agencies co-located within the TMC according to utilization of floor space, computer space and telecommunications usage.

**Funding Allocation Based on TMC Coverages** – When multiple agencies utilize one TMC, it is possible to share the costs among the agencies based on the number of field devices in each jurisdiction that is sharing the TMC. The Las Vegas region's program, FAST, uses a 'fair-share' funding formula based on the number of devices in each jurisdiction.

**Funding From User Fees or Dues** – Depending on the nature of the TMC functions, it may be possible for the users of the TMC or the ones benefiting from the TMC to support it with user fees. Operating costs for TRANSCOM's Traffic Operations Center are funded from member agency dues, which are based on direct benefit and ability to pay. TRANSCOM is a 501c3 (non-profit) corporation dedicated to coordinating traffic information among members in the New York and New Jersey areas. They effectively fund their program using user fees paid by those benefiting from the TRANSCOM traveler information.

Intentionally Left Blank



## Chapter 10: Using and Managing the TMC Business Plan

### Chapter Purpose and Objectives:

This chapter provides guidance for agencies to use the TMC Business Plan as an important tool for continued TMC operations and expansion. This chapter also discusses the importance of developing a strategy and timeframe for reviewing and updating the TMC Business Plan. Key considerations for when agencies should revisit, and potentially update, the TMC Business Plan are explored.

### Key Messages/Themes:

The overall usefulness and success of the TMC Business Plan rest on effective implementation and continued monitoring. Monitoring and managing the Business Plan is an ongoing process with specific milestones. A key element of the implementation process is measuring progress toward goals (i.e., how strategies, goals and end states defined in the Business Plan are being implemented, or how they are performing in relation to the Value Propositions) to demonstrate continued value and benefit of the role and function of the TMC.

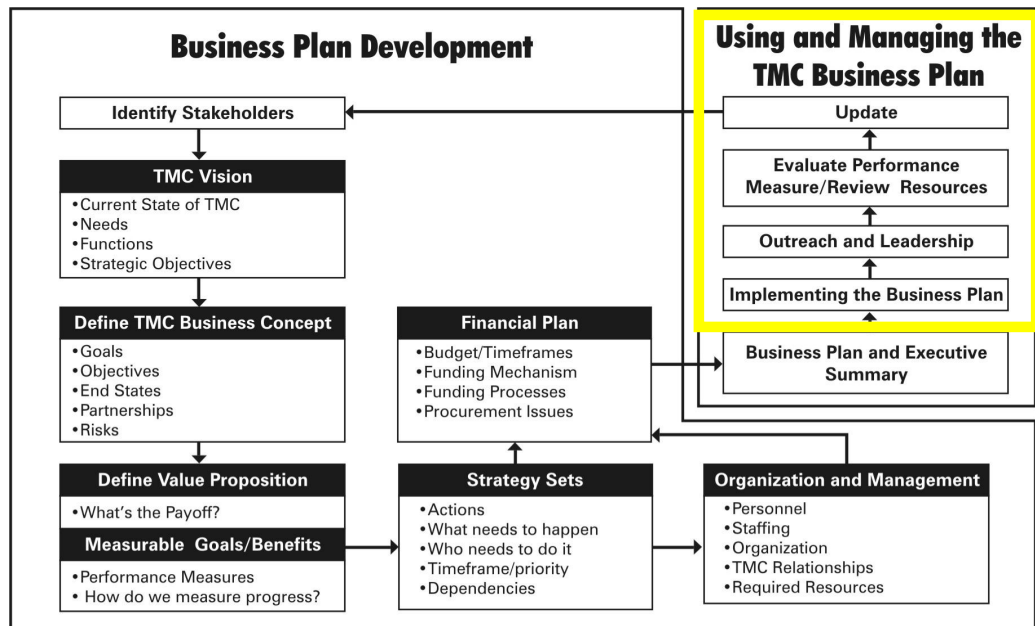
### Key Topics and Issues to be Covered:

Chapter 10 addresses the procedures for using, managing, and updating the TMC Business Plan. A major focus of this chapter is the importance of using the TMC Business Plan to guide ongoing planning and expansion of the TMC, and for setting clear milestones to review and measure the success or progress of the directives outlined in the TMC Business Plan. The need to communicate these milestones and successes to stakeholders also is stressed. Finally, this chapter discusses the importance of treating the TMC Business Plan as a living document that needs to be periodically reviewed and updated based on changing priorities or new functional capabilities.

### How This Chapter Relates to Other Chapters:

The previous chapters show how to develop an effective TMC Business Plan, including engaging stakeholders in visioning and developing a sound business concept, identifying key strategies and timeframes, articulating value propositions and anticipated benefits, implementing an organization and management structure to support the strategies, and developing a financial plan and funding strategy. This chapter provides guidance on the processes that follow after completing the Business Plan and how to use the plan as a management tool.

As illustrated in the following graphic, the implementation and management of the TMC Business Plan is the next logical step after the completion of the Business Plan. Each update to the Business Plan starts the Business Plan Development cycle all over again, beginning with the identification of stakeholders.



Remaining Sections:

- 10.1 Implementing the TMC Business Plan
  - 10.1.1 Business Plans as a Management Resource
  - 10.1.2 Monitoring Progress
- 10.2 Updating the Plan
  - 10.2.1 General Principles
  - 10.2.2 Approaches and Methods for Updating the Business Plan

**10.1 Implementing the TMC Business Plan**

Once all of the core components of the TMC Business Plan have been developed, the next step is to put the Plan into action. Implementing the Plan involves setting Business Plan implementation milestones based on strategies, organization and management structure and the financial plan and periodically reviewing the progress of these items toward the desired end-states outlined in the Business Concept; in essence, measuring how (or if) the milestones are being achieved. It also involves communicating to internal and external stakeholders about the Plan and its purpose and measuring progress towards meeting the Plans' objectives.

An important question TMC managers and agency management will be asking is "Are we achieving what we set out to achieve?" The Business Plan implementation process is a systematic means of periodically asking that question, and reviewing successes, challenges or identifying obstacles that could impede the goals and vision set forth in the Business Concept.

### 10.1.1 Business Plans as a Management Resource

The TMC Business Plan is an effective resource for managers. The TMC Business Plan:

Presents a clear direction of where the TMC is heading in relation to its key functions;  
Defines the key strategies that must be undertaken in order to get there; and  
Maps out the personnel, organization, and resources required to meet its goals and objectives.

The TMC Business Plan also is a key tool for the annual budget process. In particular, the Financial Plan element includes financial information that will be very helpful to managers when determining their budget needs. The Financial Plan, contained in Chapter 9 of this handbook, showed TMC managers how to outline significant near-term and future TMC requirements in terms of technology needs, staffing, and related capital and operating expenses.

The financial component of the TMC Business Plan is more than a 'laundry list' of funding needs; it provides a carefully thought-out and integrated funding strategy to address the TMC operations, staffing, technology, and facility requirements. As an example, if one of the key strategies and functions of the TMC is to expand from operating 12 hours per day to 24/7 operations, these costs would not likely be reflected in infrastructure-specific systems costs, but the additional staffing and facility costs would need to be accounted for in the TMC Business Plan. Tying these operational needs back to desired operational roles and benefits, as identified earlier in the process, will help to substantiate the need for funding for this specific function.

A key benefit of the Financial Plan component of the Business Plan, and one that is particularly useful for annual budgeting processes is that it establishes funding linkages and timeframes, which allows TMC managers to be able to incorporate TMC funding requirements into local, regional and state funding and programming schedules.

If the TMC Business Plan is to be used effectively, it will be essential to identify the key staff or stakeholders responsible for implementing and managing the plan. This "champion", or group of champions, will be responsible for reviewing the key implementation milestones in the TMC Business Plan to assess whether or not they are being met, and review progress in relation to the established timeline for implementing specific strategies or carrying out specific actions. In general, the milestones involve:

Following the strategies set forth in the TMC Business Plan;  
Establishing the organizational and management structure defined in the Plan; and  
Meeting the budgetary goals laid out in the Financial Plan.

If milestones are not being met, or there are obstacles to implementing specific strategies, it will be up to the champion(s) to bring this to the attention of key decision makers and managers so that appropriate actions can be taken. The next section, Monitoring Progress, provides some monitoring and reporting strategies to help champions assess how well the components of the Business Plan are supporting the Business Concept, and progress toward reaching the goals and desired end states for the TMC.

### 10.1.2 Monitoring Progress

Demonstrating progress toward established objectives and anticipated benefits is fundamental to the long-term success and viability of the TMC. To accomplish this, the TMC Business Plan should clearly state which entities and individuals are responsible for monitoring and reporting on performance. These individuals will likely be the same

**If the TMC Business Plan is to be used effectively, it will be essential to identify the key staff or stakeholders responsible for implementing and managing the plan.**

as the individuals responsible for implementing the Plan since the two tasks are closely intertwined. It is also likely that other individuals representing other functional areas within the TMC would be involved in assessing and reporting on progress and status. These could include:

Human resources;  
Budgeting and fiscal resources representatives;  
Information technology;  
Private contractors, if applicable; and  
Facilities management.

To effectively monitor and assess progress, the Plan will need to define a process for reviewing, monitoring and reporting. These assessments should include measurements of how the Business Plan is performing in relation the Value Propositions, reports on progress toward the objectives, inhibiting factors and constraints, and the resources and needs to overcome them. The Plan must specify who will be responsible for monitoring and reporting, as well as how the results will be documented and distributed to management and decision makers.

Measuring or monitoring performance could be presented in the form of annual reports or presented to subcommittees, leadership groups and other meetings to which entities belong. The frequency, timeframes, and details for reporting progress, status or results will vary. While weekly, monthly, or quarterly reports are typically operations focused and intended for internal audiences, annual reports are better suited for management and can document key impacts and performance.

*Example 10a – Arizona Department of Transportation Strategic Action Plan*

As part of its Strategic Plan, the Arizona Department of Transportation requires each of its divisions to provide quarterly status reports on specific goals that have been identified for the divisions or groups. For each goal, strategies, performance measures, action steps, milestone dates and timeframes, and owners (those responsible for the actions) are established. The Transportation Technology Group, which includes the ITS program, reports quarterly to ADOT management on progress for each of the actions and measures. In this context, the measures are very specific to system performance and operations, such as:

Goal: Provide Statewide Incident Management

Strategies:

- Continue to improve incident management procedures at the Traffic Operations Center.
- Replace pagers and upgrade ADOT's pager system.

*Example 10a – Arizona Department of Transportation Strategic Action Plan  
(continued)*

Objectives:

- For FY 2005, to provide incident management acknowledgement, response, and closure times of 10, 30, and 120 minutes respectively in Phoenix, and 15, 60, and 120 minutes in other areas.

Measures:

- Number of incidents entered into the system
- Average incident acknowledgement time (urban)
- Average incident acknowledgment time (rural)
- Average response time (rural)
- Average closure time (rural)

Other goals focus on such items as workforce training, project design and bidding, as well as improving public and political support through outreach. ADOT staff responsible for the Strategic Plan quarterly reporting also provide a summary of action items completed, delayed and percent complete. These Strategic Plans are updated each year, but the interim reporting provides TMC staff as well as State DOT Managers with regular assessments of how well divisions and groups are performing against established goals, and how well systems are performing against specific measures.

Most facets of the TMC Business Plan will likely require longer periods of time to allow for deployment, integration and operations prior to assessing progress or impacts of a specific strategy.

There is a risk of overlap between the TMC performance monitoring and other monitoring activities such as Concept of Operations monitoring and Operations performance measurement. Such overlap will allow assessment of multiple processes with the same set of performance measures. It will be important to coordinate these efforts and realize that the focus of the TMC Business Plan assessment and monitoring is on Business Plan impacts, achievements, and milestones.

## 10.2 Updating the Plan

The TMC Business Plan will need to be modified and updated on a regular basis to reflect constraints, to address identified deficiencies and areas for improvement, or to redefine a TMCs mission and core purpose based on broader agency goals and priorities. The performance monitoring process described in the previous section will drive the need for many of these updates, although shifts in agency goals and priorities, major reorganizations of staff or divisional responsibilities, or funding issues could be significant impetus to updating or making substantial revisions to the Business Plan. The rest of this chapter discusses the general principles involved in updating the Plan, and presents various methodologies for agencies to consider when formulating a Plan update process.

### 10.2.1 General Principles

There are a number of factors that must be considered in developing a process for updating the TMC Business Plan. These include the following:

- Update frequency;
- Factors resulting in the need for updates;
- Identifying who will make updates;
- Responsibilities of the Plan maintainer; and
- Critical components of the Plan that needs updating.

One of the first things to consider in the plan update process is to determine when the Plan needs to be updated. This can be accomplished either by setting a fixed timeframe for updates to occur (such as every five years) or by updating the Plan as conditions necessitate.

One method in determining the update frequency is identifying the key events that will drive the need for updates. These regionally significant triggers may include major planning milestones such as:

- Updates to the Transportation Improvement Program (TIP);
- Updates to the regional ITS Architecture; or
- Major system deployments such as a new central traffic signal system or a new CCTV system.

It is also necessary to assess the staff and resources required to update the TMC Business Plan. Since this responsibility may be taxing for a single person, it often makes sense to establish a TMC Business Plan update committee. This committee should be made up of various stakeholders familiar with various aspects of the Business Plan such as planning, operations, management, performance measures, and the Financial Plan. If a committee is used, it will be necessary to identify one person to be the coordinator of the update effort.

Another important principle in the update process is knowing what is expected of the person or committee responsible for maintenance of the Plan. The committee coordinator or person identified to maintain the TMC Business Plan will need to be responsible for the following, at a minimum:

- Keeping the electronic and/or paper copies of the latest version of the TMC Business Plan;
- Tracking the update schedule and initiating updates to the Plan;
- Soliciting input from the TMC Business Plan stakeholders before major updates; and
- Reviewing the latest version of the Plan and making revisions to reflect any developments or changes since the last update (or overseeing the update process if done by an outside consultant).

It is also important for the person or committee responsible for the updates to know which parts of the TMC Business Plan are most likely to require frequent updates and reviews. These sections of the Business Plan will need to be the focus of every update, whereas the other sections may not change much over time. In most cases, the Strategy Sets, Organization and Management, and Financial Plan are the parts of the Business Plan most likely to change and require updating. On the other hand, the TMC Vision and TMC Business Concept are probably less likely to change over time.

### 10.2.2 Approaches and Methods for Updating the Business Plan

The previous section reviewed some the basic principles involved with updating a TMC Business Plan. The next step is to develop an approach for updating the Plan. The approach and method for updating the TMC Business Plan is likely to vary for different types of TMCs based on scale and function. Larger TMCs with many different agencies involved, or rapidly growing TMCs, are more likely to require a stringent update procedure than smaller or more mature TMCs. This is because as TMCs grow and take on new functions, their Business Plans will likely need to be updated to reflect these changes.

A basic methodology for updating the Plan can be developed by following the key principles defined above. The first step is to determine when to update the Plan. If a fixed update cycle is set, it should take into consideration the key regional triggers and schedule the updates around these events. For instance, an agency may decide to tie their TMC Business Plan updates to their local programming process. Under this scenario, the Plan could be updated approximately six months prior to the region's Transportation Improvement Program (TIP) update.

Another approach could be to update the Plan as conditions necessitate. This will often occur as a result of a new system being implemented, new partners being introduced to the TMC, or other operational expansions. An increase in the scale and/or scope of functional responsibilities of the TMC will require an update of the TMC Business Plan in context with the new level of responsibilities. As traveler information systems, integration with emergency management, or other operational expansions (e.g. jurisdictional expansion, hours of operation, new partners collocated in TMC, interfaces with other partners required), or focus areas are brought on-line, a shift or update of the TMC Business Plan assess the additional needs and resources required. If the TIP update process is a significant target date, TMC Business Plan revision should be complete at least six months prior to the TIP or Capital Improvement revision so that funding needs in the Business Plan can be considered as part of these processes. As Chapter 9 described, there is often a long lead time between an element being added to a TIP and funding actually becoming available.

Once the need for an update has been identified, the next step is to identify the person or group of people who will review the TMC Business Plan and make the necessary revisions. As discussed in the previous section, this can be assigned to either a single person or an update committee but if a committee is used, there should be a single person identified as the coordinator. If an agency does not have the resources to actually do the work involved with the update, the work could be outsourced to a consultant. In this scenario, the consultant would be in charge reviewing the latest version of the Plan and making the necessary revisions under the direction of the update committee or maintainer.

Finally, there needs to be a general understanding of what responsibilities are involved in maintaining the TMC Business Plan and which parts of the Plan are the most likely to change. Aside from keeping track of when the updates need to occur, the maintainer will need to keep copies of the latest version of the Plan on hand, solicit input from the stakeholders, and either make the revisions themselves or oversee this work if it is done by an outside consultant.

In conclusion, it will be essential that the TMC Business is treated as a living document and updated and revised on a regular basis. A TMC is a dynamic entity and its success depends on having a current Business Plan that can be used as a management



resource, not left on a shelf. The objective should be to maintain the TMC Business Plan as a useful, relevant document that will enhance the ability of the TMC to meet its stated goals and objectives, and in turn, meet the objectives of the agency or region it serves.



Intentionally Left Blank



## Chapter 11: INFORM, Long Island, New York – A Regional TMC Operated through a Contracted Operations Model

### 11.1 Introduction

The INFORM (INformation FOR Motorists) system is one of the nation's largest and most advanced traffic management systems for motorists. At the core of INFORM is the Transportation Management Center located at the New York State Department of Transportation (NYSDOT), District 10, Long Island Regional Headquarters in Hauppauge, New York. Unique system features, as it relates to business planning, include:

Operational and technical support of the system is performed by private transportation firms, under contract to the New York State Department of Transportation. The contracted operations staff is present in the TMC 24 hours a day, 7 days a week, 365 days a year.

INFORM has a significant 'history' of implementation and maintenance costs, facilitating the justification process for system expansion.

An ITS Strategic Deployment Plan is the primary document used for prioritizing system functions, enhancements and expansion, including field devices and capabilities within the TMC.

#### 11.1.1 General System Description

The INFORM corridor currently contains two major freeway facilities and a number of parallel and crossing arterial streets and freeways. The system consists of video and electronic traffic surveillance and monitoring, communications, signing, and control components that provide motorist information for warning and route diversion, ramp control, and signal control. INFORM operators also dispatch Highway Emergency Local Patrol (HELP) vehicles.

#### 11.1.2 General Objectives of System

The objectives of the INFORM system include:

Identifying traffic congestion and incidents likely to cause congestion; and  
Providing information to motorists and incident management personnel.

### 11.2 Design and Implementation

Planning studies completed in the 1970's and 1980's laid the framework for the \$30 million initial demonstration deployment that first went operational in 1987. The original system covered 140 centerline miles of roadway, instrumented with dynamic message signs and vehicle detection devices, including over 2400 loop detectors. While the initial system did not include CCTV, over 80 CCTV cameras have since been deployed.

#### Geographic Area Covered

All roadways within the INFORM system are operated and maintained by the New York State Department of Transportation. The system extends from the

Borough of Queens in New York City through Nassau County into Suffolk County. The INFORM corridor contains two major freeway facilities, I-495 (Long Island Expressway) and the Northern State Parkway/Grand Central Parkway, plus a number of parallel and crossing arterial streets and freeways, for a total of 140 miles of controlled roadways. Ultimate build-out will consist of 320 centerline miles of controlled roadways.

#### Participating Agencies and Stakeholders

The NYSDOT is the only agency located at the INFORM TMC. However, INFORM coordinates, via telephone, with six different law enforcement agencies responsible for enforcement on the roads covered by the system. Fire and emergency management agencies are contacted through the respective police departments. A new TMC will include the collocation of New York State Police Communications and Dispatch with the NYSDOT. INFORM staff meets on a quarterly basis with State, county and local city police to discuss operational issues and to prepare for special events.

INFORM coordinates extensively with TRANSCOM, the regional travel information provider. Through TRANSCOM, information is shared and disseminated to transit agencies, other agencies, and to the public.

#### TMC Functions

##### Incident Management Coordination

Entry of incident information into computer system

Entry of dynamic message sign messages based on incident/congestion observations and reports

Towing dispatch

##### Travel Information Coordination

Gathering and distributing information regarding construction and lane closures to media and to other agencies

Faxing information on travel delays and accidents every 15 minutes during peak periods to the 26 partner agencies and the media

#### Number and Type of Field Elements

The INFORM system includes:

Fiber and coaxial cable – 140 miles

Loop detectors – 2,400

Dynamic message signs – 113

Ramp meters – 75

Intersection traffic signals – 177

Closed-circuit television – 84

Citizen band radios – 22

Help vehicles – 15

Weather monitors – 9

Highway Advisory Radio – 2

### **11.3 Organization and Management Structure**

The NYSDOT contracts to a private consulting firm to provide operators and technical support to INFORM to support its 24-hour operations. The contracted operations staff includes three operators plus two motorist assistance patrol staff

during peak hours. The operations contractor has a total staff of nine operations personnel plus three for motorist assistance patrols.

#### 11.4 Implications for Business Plan

INFORM receives strong support for future system expansion and for on-going maintenance needs. Because of the highly congested conditions on NYSDOT roadways, and the necessity to manage them more efficiently, INFORM staff do little 'selling' of the system to receive funding for future expansion.

NYSDOT regularly allocates funding to INFORM system expansion and upgrades. An ITS Deployment Plan, most recently updated in October, 2003, provides short-term and long-term prioritization for system expansion on limited access and arterial facilities. As INFORM 'receives' money, the next project listed in the deployment plan is selected for design and construction. A typical project life cycle is approximately two years – one year to design, and one year to build the project. INFORM typically has 3 projects in either design or construction at any given time.

A common challenge often expressed by TMC managers is that while adequate funding is allocated for system expansion, the operations and maintenance budgets do not keep pace with the expanding operations needs. INFORM managers overcome this challenge by demonstrating, with nearly 20 years of historical data, the incremental funding required to properly maintain each new centerline mile of roadway infrastructure. In their case, INFORM receives 7% of the present net worth of the system for operations and maintenance.

Many TMCs, including INFORM, lack in-house expertise and resources to repair technical systems. They are required to out-source maintenance to private-sector vendors and technicians. INFORM has again been able to utilize 20 years of historical data to establish a lump sum repair cost, time and materials included, of nearly every system element. Rather than letting maintenance contracts on a time and materials basis, INFORM pays a pre-set lump-sum amount for the repair.

System operators are provided to the NYSDOT by a private sector firm through a contract with the NYSDOT, placing the burden of recruiting, hiring, training, and firing, if necessary, on the private contractor.

**To secure adequate maintenance budgets, INFORM managers have demonstrated, with nearly 20 years of historical data, the incremental funding required to properly maintain each new centerline mile of roadway infrastructure.**



Intentionally Left Blank





## Chapter 12: Mn/DOT's Regional Transportation Management Center, Roseville, Minnesota – A Statewide TMC Operated by the Public Sector

### 12.1 Introduction

The Regional Transportation Management Center (RTMC), located adjacent to the Metropolitan District headquarters of the Minnesota Department of Transportation (Mn/DOT) in Roseville, Minnesota, opened for operation in the spring of 2003. The new center replaces an existing facility, built in the early 1970's, that was unable to meet the growth demands in the existing freeway management program, resulting in the inability to:

Effectively manage an expanded incident management program;  
Accommodate all equipment needs for a regional freeway management system;  
and  
Locate appropriate staff at existing TMC.

(Regional Transportation Management Center, Implementation Plan, March 17, 2000)

The new Minnesota Regional Transportation Center provides a successful example of how an existing TMC is expanded and 'rebuilt' to accommodate the ever increasing activities of a viable TMC. The new RTMC combines the original TMC's singular purpose – freeway operations – with roadway maintenance, traffic signal control for major arterials, and state police dispatch. In fact, the freeway operations role now takes up only slightly more than a quarter of the 23 workstations on the RTMC's control room floor; six workstations are dedicated to freeway operations, eight to police dispatch, six to maintenance, two to Mn/DOT Metro Division's traffic signal control, and one to traffic radio (Newsletter of the ITS Cooperative Deployment Network, Discussion with Nick Thompson, July 1, 2003).

#### 12.1.1 General System Description

Collocated within the RTMC facility are the Mn/DOT Metro District Maintenance Dispatch, MnDOT's office of Traffic, Security, and Operations, and the Minnesota Department of Public Safety's State Patrol Dispatch, providing a coordinated approach to traffic and incident management for the Twin Cities' freeways and state arterials.

Though the vast majority of activities conducted at the RTMC pertain to freeways, the RTMC serves as a back-up center to other regional traffic management centers located in rural areas of the state. Statewide traveler information systems, including 511, are operated and maintained by RTMC staff. A local radio station broadcasts directly from the RTMC.

**The Regional Traffic Management Center replaced the original TMC built in the early 1970's. The RTMC, with a total size of 54,000 square feet, includes an 18,000 square foot operations center, 7,500 square foot computer and network center, and 12,000 square feet of office space for support staff.**

### 12.1.2 General Objectives of System

The objective of the Mn/DOT RTMC is to provide motorists with a faster and safer trip on metro-area freeways through utilization of Intelligent Transportation Systems, including real-time delivery of traveler information.

## 12.2 Design and Implementation

Traffic management efforts in Minnesota began in the 1970's. As systems were developed and deployed, Mn/DOT saw a need for a central control facility. In 1972, the original TMC was built to manage freeway operations in the Twin Cities area. In 2003, a new facility, the RTMC in Roseville, Minnesota, began operations.

The design process for the new RTMC began in 1997 with the development of a vision for regional traffic management. A design oversight team, consisting of representatives from the existing Metro TMC, Maintenance, and State Patrol, were asked to document existing operations and projections for future growth. Based upon the concepts and vision that the project team developed for a shared operation, a set of design criteria were developed, including criteria for training rooms, tour accommodations, computer equipment room, and a layout that would facilitate information sharing while keeping noise and disruption to a minimum.

### Geographic Area Covered

The Regional Traffic Management Center is responsible for freeway operations within the Mn/DOT's Metropolitan district. The District includes seven counties in the Twin Cities area; the two largest cities in the state, Minneapolis and St. Paul; and numerous cities and townships with a combined population of more than 2.8 million people.

### Participating Agencies and Stakeholders

Multiple agencies and disciplines cooperatively work toward improved metropolitan area freeway operations. These include:

Minnesota State Patrol Dispatch;  
Mn/DOT Maintenance Dispatch; and  
Mn/DOT Traffic Operations.

During the design and planning phases of the RTMC, Mn/DOT staff invited numerous cities and counties to participate in the RTMC. However, they all decided, for a variety of reasons, not to participate. While cities, counties, and Mn/DOT mutually agree that they must work together towards improved transportation operations, they also routinely work with other city and county departments, and need to be located near them. A similar invitation was also issued to the Transit Department, and Mn/DOT does provide video images to the local transit agency.

### TMC Functions

Freeway Traffic Management

**Mn/DOT and its partners established key concepts and a vision for how the TMC needed to function, operate and grow to meet the demands of regional and statewide traffic management. Criteria were developed ranging from how systems needed to operate, down to TMC layout for optimum functional capacity.**

- Ramp metering
- CCTV surveillance
- Dynamic Message Signs

Maintenance Dispatch for freeways and state maintained arterials (Mn/DOT facilities)

Incident Management

Traveler Information

- Delivering timely and accurate information during peak hours and during major incidents via radio, television, and the internet.
- The traffic radio station broadcasts directly from the RTMC. Traffic reports are provided every 10 minutes during morning and afternoon peak periods. During incidents, reports are broadcast continuously.

FIRST (Freeway Incident Response Safety Team) Program. The FIRST program includes several bright-green pick up trucks equipped with the tools necessary to help stranded motorists and to provide traffic control during an incident. FIRST vehicles currently patrol 8 routes covering 160 miles of centerline roadway between the hours of 5:30 a.m. and 7:30 p.m. Monday through Friday. Some limited coverage is provided on the weekends.

#### Number and Type of Field Elements

CCTV Cameras – 285

Loop Detectors – 4,000

Ramp Meters – 419 ramp meters, of which 213 meters have the potential to operate during the morning peak and 266 meters have the potential to operate in the evening peak

Dynamic Message Signs – 70

Lane Control Signals – 23 mounted outside of the Lowry Hill Tunnel in downtown Minneapolis

FIRST (Freeway Incident Response Safety Team) Program, including 6 to 8 freeway patrols patrolling freeways on 8 routes, covering 160 miles of metro area freeways

### **12.3 Implications for Business Plan**

#### Procurement

Implementation of the RTMC utilized several different types of procurement methods and techniques, dependent upon the items or services being procured. Specialized services such as implementation of a video display system was procured utilizing a system manager approach; while furniture for the TMC was purchased under an existing state requisition contract. The procurement techniques utilized include:

Sole-source;  
Engineer/Contractor;  
Systems Manager;  
State Contract;  
State Requisition; and  
Consultant Agreement.

#### Staffing

As with many other TMCs, recruiting, hiring, and training qualified staff is a challenge. Furthermore, agencies often encounter difficulties receiving approval

for additional personnel to staff the RTMC. Mn/DOT has, in part, addressed staffing of the RTMC by utilizing a 'rotating of staff' approach. Freeway system operators are 'shifted-in' from other departments within the Metropolitan District. Staff who desire the opportunity to work in the RTMC commit to a 1-year term during which they generally work 1 or more 2 to 4 hour shifts per week. In addition to being able to fully staff the TMC, the 'shifting-in' of agency staff from other departments facilitates increased awareness and understanding of TMC operations among those with other responsibilities, resulting in improved coordination and collaboration throughout the district. University personnel, taking advantage of the data collection and research opportunities, have also volunteered as shift operators.

## **Chapter 13: City of Tucson, Arizona, Regional Transportation Control Center – A Multiple Jurisdiction TMC Operated through a Public-Private Partnership**

### **13.1 Introduction**

The Tucson Regional Transportation Control Center (TRTCC) combines the transportation management resources of the City of Tucson, Pima County, the State of Arizona, surrounding jurisdictions, and private industry into a single, integrated operation. Unique to the TRTCC is that the City of Tucson has entered into a public/private contract where a private company, MetroNetworks, receives exclusive rights to traffic and transit data received at the TRTCC. MetroNetworks, in turn, constructed the TRTCC at the City of Tucson transportation department facility, and provides operators to the TRTCC at no expense to the City of Tucson. The arrangement exemplifies an innovative solution that other TMCs may build upon for the continued operations of a Traffic Management Center.

#### **13.1.1 General System Description**

The TRTCC provides traveler information to motorists throughout the greater Tucson metropolitan area. Video images and data from cameras on I-10, I-19 and city streets enable operators to update radio, television, and internet reports with the latest traffic conditions information. The City of Tucson traffic signal system is operated from this facility as well as the Arizona DOT Freeway Management System during office hours.

#### **13.1.2 General Objectives of System**

The primary purposes of the TRTCC are to manage traffic and provide real-time, accurate travel and traffic information to Tucson area motorists, and to support operations of the Tucson Freeway Management System.

### **13.2 Design and Implementation**

The first step towards a regional TMC was the procurement of a common traffic signal system for metropolitan agencies within the greater Tucson area, including the City of Tucson, Pima County, Town of Marana, and the City of South Tucson. To maximize the potential benefits of the common traffic signal system, a working group identified the need for a regional traffic management center; however, no single agency was able to financially support a regional TMC.

To address the funding for operations and maintenance of the TMC, Tucson entered into a public/private partnership with MetroNetworks, a private-sector traffic information and media company. Real time video and data feed from ADOT cameras deployed on Interstate 10, Interstate 19, and city streets is continuously transmitted to the TRTCC. TRTCC operators, who are MetroNetworks staff, constantly monitor events, update Internet, radio and television advisories, and visually confirm reported events by video or by air to determine the actual traffic impacts. The report is then broadcast over

commercial radio and television, giving commuters reliable information. Traffic operations (e.g. signal system modifications) are performed by City of Tucson staff.

#### Geographic Area Covered

The TRTCC supports travel information dissemination throughout the entire Tucson metropolitan area, including the following geographic jurisdictions:

City of Tucson;  
City of South Tucson;  
Town of Sahuarita;  
Pima County;  
Town of Oro Valley; and  
Town of Marana.

#### Participating Agencies and Stakeholders

Participating agencies and organizations include:

City of Tucson Traffic Engineering;  
MetroNetworks;  
Arizona Department of Public Safety;  
City of South Tucson;  
Town of Sahuarita;  
Pima County;  
Town of Oro Valley;  
Town of Marana;  
University of Arizona; and  
Arizona Department of Transportation.

#### TMC Functions

Monitoring of traffic information on Interstate and arterial routes  
Dissemination of traffic information to the public via radio and television  
Provides secondary control to cameras and dynamic message signs during normal business hours. Primary control is maintained at the Arizona Department of Public Safety.

While a central signal system is located at the TMC facility, individual agencies perform their own control of traffic signal timing plans via remotely located signal system workstations. Traffic signal system is operated by City staff.

#### Number and Type of Field Elements

The TRTCC central signal system control all signals.  
The TRTCC receives video images from ADOT CCTV cameras on I-10 and I-19.  
The TRTCC has secondary control of eight dynamic message signs located on Interstate-10 and Interstate-19.

### 13.3 Organization and Management Structure

Development of a consistent revenue stream for the operation and maintenance of Intelligent Transportation Systems is a challenge for many public agencies. The City of Tucson Traffic Engineering Department recognized that they would be unable to provide City personnel to staff the TRTCC on a regular basis. City Engineering staff searched for financially sustainable alternatives to a city-operated and maintained traffic management center. An FHWA-sponsored scanning tour of Traffic Management Centers provided the impetus for developing an innovative public-private partnership agreement for the operations of the TRTCC.

Under the agreement, which is similar to a ‘concession’ or ‘franchise’ agreement, the private business entity receives sole and exclusive rights to the traffic data being provided to the TRTCC. The business entity operates the center for a profit. In exchange for the use of all the traffic information in the TRTCC, the City of Tucson receives:

- Full remodeling of the computer center and Traffic Engineering Division offices;
- Flight time in MetroNetwork’s airplane for City staff to observe traffic conditions and other transportation issues;
- Prime time commercial slots for peak-hour transportation announcements;
- Percentage of sales of video data;
- Special air support to transportation, law enforcement, fire and emergency storm response crews; and
- Personnel to monitor and operate the control center.

The agreement is similar to a “concession” or “franchise” contract as is commonly procured for the operation of a sports park. Under the agreement, the business entity operates the center for a profit.

### 13.4 Implications for Business Plan

City of Tucson developed a ‘concessionaire’ agreement with MetroNetworks for the staffing and operations of the TRTCC. MetroNetworks provides operators to staff the control room of the TRCC a minimum of 6 hours a day, each weekday. MetroNetworks staff are also available during ‘off-hours’ for special events or coverage of major incidents. The resources of MetroNetworks, including aircraft, significantly enhance the amount and quality of traffic information that would otherwise be available.

In addition to providing operators, MetroNetworks provides the City of Tucson with additional ‘non-cash’ benefits, including prime time commercial slots for peak-hour transportation announcements, flight-time in MetroNetworks aircraft, and they remodeled the TMC.

**Recognizing that financial constraints would make it difficult for the City of Tucson to operate and maintain a city-owned and operated facility, The City of Tucson entered into an innovative public-private partnership agreement for the operations of the TRTCC.**





Intentionally Left Blank



## **Chapter 14: Freeway and Arterial System of Transportation (FAST), Clark County, Las Vegas, Nevada – A Regional TMC Operated Through a Separate Public Sector Operating Entity**

### **14.1 Introduction**

The Freeway and Arterial System of Transportation (FAST) combines the existing metropolitan area signal system (Las Vegas Area Computer Traffic System, LVACTS) and the region's freeway management system (FMS), currently under construction under a single roof. The Las Vegas area's success in combining the operations of the arterial management system (AMS) and freeway management system under a single organization provides an example of the planning process for a truly multi-jurisdictional, multi-disciplinary Traffic Management Center.

#### **14.1.1 General System Description**

FAST will serve as the regional intelligent transportation system, serving the multiple jurisdictions of the Las Vegas Valley. The FAST TMC, upon completion, will serve as the central operations point for the freeway management, arterial management, and traveler information systems, and will be a key incident management hub. The TMC will also provide interfaces of these systems to various other components and stakeholders including transit, airport, emergency management, and media services.

The FAST TMC, scheduled for completion in 2005, will be collocated in a facility with the Southern Command of the Nevada Highway Patrol. The FAST TMC will occupy approximately 16,200 square feet of the 66,500 square foot building.

#### **14.1.2 General Objectives of System**

A regional system combining arterial and freeway traffic operations was presented early in the FAST TMC planning process. Area stakeholders, who already had been cooperating for over 20 years through the Las Vegas Area Computer Traffic System (LVACTS), viewed freeway management as a natural extension to the existing arterial and traffic signal management system. Stakeholders recognized the operational advantage of managing the freeway and arterial systems from a single TMC, and the reduced maintenance costs that could be realized through shared administrative, technical, and professional staff resources.

Early in the process, a primary objective of the TMC was to provide a facility adequate in size and functionality to house the arterial and freeway management central systems and support staff. As additional stakeholders were engaged, notably the Nevada Highway Patrol, the system objectives expanded commensurately. The TMC became multi-disciplinary and multi-jurisdictional with the primary objective of the FAST TMC to be to facilitate coordination between NHP dispatch and NDOT in the response and management of freeway incidents.

## 14.2 Design and Implementation

Planning for the FAST TMC began in the early phases of the freeway management system design. While NDOT did not complete a stand-alone TMC Business Plan, critical facility and financial planning steps were developed as part of a High Level System Design (HLSD) and during the FMS design phases.

The HLSD contains two tasks specific to the TMC. The first task included a summary of FMS functions and features. Detailed interviews with transportation system managers, and stakeholder “scanning tours”, were conducted.

The second task resulted in the preparation the *FAST Center Requirements* document. The document includes a discussion of TMC objectives, space planning, location requirements, and cost. Based upon the recommendations of the *FAST Center Requirements* document, building construction, operations and maintenance budgets were included in the NDOT annual and long-range work program.

### Geographic Area Covered

The FAST TMC serves the entire Las Vegas Valley, including the following jurisdictions:

Nevada Department of Transportation (freeways);  
City of Henderson;  
City of Las Vegas;  
City of North Las Vegas; and  
Clark County.

### Participating Agencies and Stakeholders

The FAST TMC will be collocated in a joint facility with the Nevada Highway Patrol, Southern Command. Three separate organizations will be collocated within NHP/FAST facility:

NHP Headquarters and dispatch personnel;  
FAST (arterial and freeway management systems) personnel; and  
Las Vegas area Freeway Service Patrol (FSP).

The privately contracted Freeway Service Patrol will have office space and store their service vehicles on site at the FAST TMC. The primary supporting agencies include:

Nevada Department of Transportation;  
LVACTS, (the region’s existing arterial management system);  
City of Henderson;  
City of Las Vegas;  
City of North Las Vegas;  
Clark County;  
Regional Transportation Commission of Southern Nevada; and  
Nevada Highway Patrol.

### TMC Functions

The FAST TMC will be responsible for:

Arterial traffic signal system;

Freeway management system;  
Advanced traveler information system;  
Archived data system; and  
Incident Management.

In addition to the FMS and AMS operations, the TMC will house the FAST maintenance personnel, ITS field equipment repair shops, and storage facilities for spare parts. NHP dispatch will be collocated within the TMC, and are able to view CCTV camera images to aid in the dispatch of appropriate response personnel to the incident scene. As necessary, FAST operators collaborate with NHP on-scene responders to devise appropriate traffic control and diversion strategies –including modifications to ramp metering rates, traffic signal timing modifications, and posting messages to dynamic message signs.

#### Number and type of field elements

The arterial management system (AMS) operates approximately:

750 traffic signals (to expand to 1200 signals);  
More than 80 CCTV cameras; and  
11 dynamic message signs.

The 17-mile pilot corridor for the freeway management system is currently under construction, with completion anticipated in the Fall of 2005. Stage 1 of the initial FMS will contain:

12 CCTV cameras;  
3 dynamic message signs;  
8 loop detectors stations;  
30 non-intrusive detection stations; and  
4 ramp meters.

Stage 2 will include 12 new CCTV cameras, integration of 2 existing cameras, 9 dynamic message signs, 6 additional mainline loop detector stations, 22 video image detectors, and 74 radar detection locations. Full build-out will contain nearly 135 centerline miles of freeway management system.

### **14.3 Organization and Management Structure**

FAST represents a very unique partnership and organizational structure for regional transportation management and operations. Building on the successful, multi-jurisdictional LVACTS formal arrangement, it is a separate, multi-jurisdictional organization, receiving administrative support from the Regional Transportation Commission of Southern Nevada (RTC).

An Operating Management Committee (OMC) consisting of one representative from each of the participating agencies oversees FAST. Each agency has a single vote on the OMC, except the Regional Transportation Commission of Southern Nevada, which is a non-voting member. Valley jurisdictions are members of the OMC, and these partners include:

Regional Transportation Commission;  
Nevada Department of Transportation;  
City of Henderson;

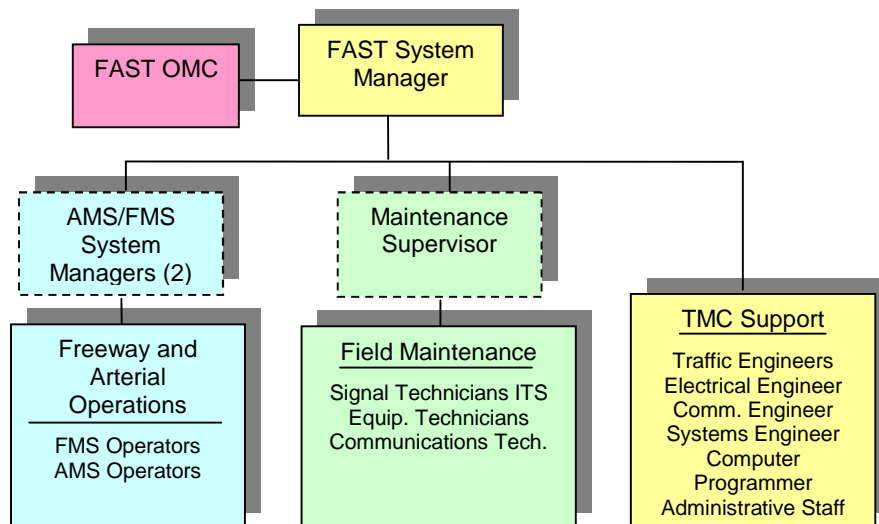
City of Las Vegas;  
City of North Las Vegas; and  
Clark County.

A FAST System Manager reports to the Operating Management Committee and will be responsible for approving any new traffic management infrastructure that is to be operated by the FAST system, selecting the traffic management strategies, and supervising the FAST staff.

**The real advantages of the FAST organizational structure are achieved primarily through combining the two-traffic management systems institutionally into one organization**

FAST staffs are employees of the Regional Transportation Commission, which serves as the FAST Administrator. The FAST Administrator is the financial agent for the system responsible for collecting and disbursing funds for operation and management of the system.

The FAST organizational structure places arterial operations, freeway operations, and maintenance under separate managers. Other professionals, such as traffic and electrical engineering support, are under the supervision of the System Manager. This structure requires the operational managers to make maintenance and other requests to the Maintenance Supervisor, and ultimately to the System Manager. By separating maintenance activities from the supervisory authority of the arterial and freeway operations managers, competing interests between freeway and arterial system managers are minimized. Maintenance and other supporting professional activities, including traffic engineering, are prioritized ultimately by the System Manager, who is ultimately responsible for arterials and freeways. As many ITS field devices are used both on surface streets and freeways, shared maintenance permits a better trained and equipped staff. The structure encourages the System Manager to establish priorities regardless of roadway system.



#### 14.4 Implications for Business Plan

An existing organization, the Las Vegas Area Computer Traffic System served as the foundation for the multi-jurisdictional, multi-disciplinary FAST TMC. The LVACTS, which began operations in the early 1980's, is the traffic signal system

for the Las Vegas valley and has become a model for regional cooperation. Members of LVACTS include City of Las Vegas, Clark County, City of North Las Vegas, City of Henderson, Nevada DOT, and the Regional Transportation Commission. Partner agencies were part of a formal agreement that outlined organizational structure, oversight, and operational responsibilities. This LVACTS Agreement provided the basis for the FAST Agreement, which has been modified to include additional partners, roles, operational functions, and expanded the terms and funding formula of the Agreement to meet the freeway management and operations components.

A primary purpose of the FAST TMC is to share the operations and maintenance of traffic management facilities in the Las Vegas area among those agencies involved. FAST will provide maintenance of traffic management infrastructure including the TMC and communications hardware. Maintenance of field devices can be handled by FAST or by individual agencies if they so desire. It is envisioned that traffic signals will be maintained by each individual agency while CCTV cameras, dynamic message signs, video detection and trailblazer signs will be maintained by FAST.

An Operating Management Committee consisting of one representative from each of the participating agencies oversees FAST. Each agency has a single vote on the Operating Management Committee, except the Regional Transportation Commission of Clark County, which is a non-voting member. The FAST system manager reports to the Operating Management Committee and is responsible for approving any new traffic management infrastructure that is to be operated by the FAST system, selecting the traffic management strategies, and supervising the FAST staff. FAST staff are employees of the Regional Transportation Commission, which serves as the FAST Administrator. The FAST Administrator is the financial agent for the system responsible for collecting and disbursing funds for operation and management of the system.

Operating budgets are developed annually by the FAST System Manager, and are presented to the OMC. The freeway management system budget is also presented to NDOT, and the arterial budget to the Regional Transportation Commission (RTC). If the arterial budget exceeds the RTC programmed allocation, local jurisdictions are requested to meet the shortfall based on a "fair-share" formula which is largely based on the number of traffic management infrastructure field devices located within each participating agency's jurisdiction that are operated and maintained by FAST. This FAST funding structure is based on the successful LVACTS fair-share formula that has been sustaining the arterial management system for more than a decade. This funding structure and formula are outlined in the FAST Agreement, which is signed by all partner agencies.





## Chapter 15: California Department of Transportation, District 12, Orange County, Traffic Management Center – a Regional TMC operated by the Public Sector

### 15.1 Introduction

The California Department of Transportation District 12 Traffic Management Center is the center of operations for freeway and highway facilities throughout the entire region of Orange County, California. The district encompasses a metropolitan area of 34 cities, 2.8 million people, and 137 highway miles, excluding tollways, in a nearly 800 square mile area.

Statewide, Caltrans has teamed extensively with the California Highway Patrol in the planning, design, implementation, and operations of a system of Traffic Management Centers. To provide a statewide approach to TMC planning and implementation, Caltrans has developed over-arching guiding principles and goals for how TMCs need to operate and function as part of regional transportation systems throughout the state. These principles and goals developed at the statewide level provide for enough flexibility for the various Caltrans District TMCs to be able to structure their operations to suit the unique needs of the Districts they serve, whether its hours of operation, specific functions (which will vary depending on how heavily urbanized the District is, and even key partnerships with other agencies. The District 12 TMC is exemplary of the benefits that can be realized when multiple agencies, and in particular the Highway Patrol, team to improve the management and response to incidents on the freeway and highway system.

**The District 12 TMC is exemplary of cooperation among multiple agencies, and in particular the Highway Patrol, to improve the management and response to incidents on the freeway and highway system.**

#### 15.1.1 General System Description

The District 12 TMC gathers real-time information from multiple sources, including in-pavement sensors, CCTV cameras, ramp meter sensors, earthquake monitors, 911 telephone calls, officers on patrol, Caltrans maintenance crews, reports from motorists' cellular phones, and commercial traffic reporters. TMC Operators, in close coordination with CHP dispatchers, implement an appropriate incident response.

#### 15.1.2 General Objectives of System

California has implemented a standardized development of traffic management systems, including traffic management centers. The *TMC Master Plan*, updated in 1997, and supplemented in 2002, defines the mission and vision, goals and objectives, development process, costs and benefits, regionalization, partnerships, management structure, operations, ITS and national architecture, and deployment milestones for the statewide system of traffic management centers. The TMC Master Plan states as goals of the TMC:

To see the future potential and provide better service;  
Standardize systems, operations, and facilities to ensure cost-effectiveness, uniform functionality statewide, and to achieve economies of scale;

Establish a regionalized structure that will provide an integrated, statewide framework for transportation management; and  
Enhance public and private partnerships that promote multimodal transportation activities and services.

Supporting these goals are objectives, including:

Establish communications links to all TMCs to ensure remote operations during an emergency;  
Be proactive in developing new partnerships with other transportation stakeholders; and  
Create and maintain a reliable real-time traveler information system.

Orange County staff specifically stated their objectives of the District 12 TMC as:

Detect incidents as quickly as possible; and  
Reduce freeway congestion.

## 15.2 Design and Implementation

The California Department of Transportation (Caltrans) operates and maintains a statewide system of traffic management centers. The state has directed that every Caltrans district will have a TMC, though the hours of operations, staffing, physical building size, and location will vary dependent upon local conditions and needs.

Caltrans recognizes the value of collocation of transportation and public safety. In fact, every Caltrans TMC must be able to accommodate California Highway Patrol presence, though the scope of the presence will vary depending on local needs. As an example, a TMC located in a large urban area will accommodate CHP presence during peak traffic congestion periods while a rural TMC may only have CHP presence during major emergencies.

### Geographic Area Covered

The District 12 Traffic Management Center provides operations for the freeways throughout the entirety of Orange County.

### Participating Agencies and Stakeholders

In addition to the California Department of Transportation, the California Highway Patrol dispatchers are located in the TMC.

While no other jurisdictions or agencies are collocated within the TMC, communications have been established with three cities, and a toll road operator:

City of Anaheim – D12 TMC views cameras and changeable message signs, serving as secondary control;  
City of Santa Ana – D12 receives images of cameras located on arterials;  
City of Irvine – D12 receives images of cameras located on arterials; and  
Orange County Transportation Authority (Toll Road Operator) – D12 TMC provides secondary control of cameras located on 12 miles of toll roads.

### TMC Functions

Freeway Operations  
Caltrans Dispatch  
CHP Dispatch  
Freeway Service Patrol Fleet Management

Centralized Ramp Meter Management  
 Media Information  
 Highway Advisory Radio Broadcast  
 Travel Information  
 Demonstration/Research/Training  
 Emergency Operations Center  
 Local Agencies Intertie  
 Essential Service Standards Facility

Number and Type of Field Elements

CCTV Cameras – 138 operational, 55 under construction, 100 in design  
 Loop Detectors – 536 stations  
 Ramp Meters – 347  
 Changeable Message Signs – 55 operating, 20 in design  
 Portable Changeable Message Sign Trucks – 6  
 Highway Advisory Radio Transmitters – 2

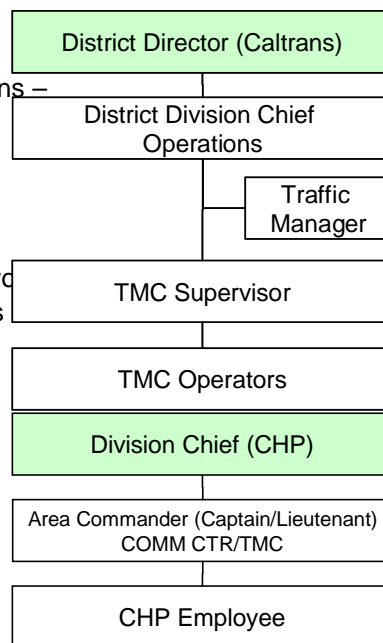
**15.3 Organization and Management Structure**

The District 12 TMC is part of the Caltrans statewide system of Traffic Management Centers. Caltrans has divided the state into three TMC regions – San Francisco Bay Area, Sacramento, and Los Angeles, with each region containing a Regional Traffic Management Center, and one or more Urban TMCs. The Orange County District 12 TMC is an Urban TMC, with communications established with the Regional TMC in Los Angeles.

The D12 TMC is staffed entirely by Caltrans and CHP employees. While working closely together, the CHP and Caltrans employees fall within separate lines of authority.

Other positions at the TMC include:

TMC Communications Dispatchers – Caltrans maintenance dispatch;  
 Lane closures coordinator;  
 Traffic signal operations;  
 Traffic management team; and  
 Freeway Service Patrol.



**15.4 Implications for Business Plan**

Agencies may need to revise their business plan as conditions evolve, as demonstrated by the Caltrans experience. In 1993, Caltrans and the California Highway Patrol jointly developed and approved the first TMC Master Plan. The purpose of the plan was to serve as a blueprint for the coordinated development and deployment of TMCs statewide. In 1997, the TMC Master Plan was revised to include a standardized development process of traffic management systems, including traffic management centers. In 2002, Caltrans supplemented the 1997 TMC Master Plan with the TMC Development Considerations and Constraints document.

The 1997 TMC Master Plan defines a mission and vision, goals and objectives, development process, costs and benefits, regionalization, partnerships, management structure, operations, ITS and national architecture, and deployment milestones for the statewide system of traffic management centers. The Master Plan emphasizes the necessity of statewide standardization in the

establishment of a statewide network of TMCs that work interdependently with local agencies.

The 1997 Master Plan requires TMCs to perform a needs analysis to justify initial development of a TMC, or to expand the role and operations of an existing TMC. The needs analysis should include staffing and space needs, funding sources to be identified, and approval of a detailed project information report.

The 2002 supplement revisited the development phases of TMCs – basic, intermediate, and advanced – proposed in the 1997 TMC Master Plan. These initial stratifications were based on the functions that TMCs perform, their equipment, and staffing levels. The 2002 supplement recognized that TMC activities vary in complexity, rather than whether a particular function is performed or not. The revision recognizes that each TMC serves the same basic, core functions, and that categorizing TMCs into rural and urban is not a particularly useful tool in guiding the development of TMCs.

The 2002 revision eliminated the distinction between urban and rural TMCs, as well as the nomenclature of urban, rural, or satellite operations centers. Rather, the document recommends that each Caltrans district have a TMC, outlines three TMC regions, and three regional TMCs.

The TMC Master Plan emphasizes the role of partnerships to maximize the efficiency of existing transportation facilities, including the roles of Metropolitan Planning Organizations, local agency TMCs, local emergency responders, mass transit, academia, the media, FHWA, and private entities.

## List of References

511 Vision: An Essential and Sustainable Service by 2010. 511 Deployment Coalition, 2002.

ADOT/ITD Strategic Action Plan. Transportation Technology Group, Arizona Department of Transportation, 2005.

Background Technical Memorandum, FAST Center Requirements. Prepared for: Nevada Department of Transportation. Prepared by: Kimley-Horn and Associates in March 1999.

Bhatt, Mahesh. Caltrans District 12. Personal Interview. July 2004.

Bi-State St. Louis Area Intelligent Vehicle Highway System Planning Study. Prepared for: Missouri Highway and Transportation Department. Prepared by: Edwards and Kelsey, Inc. in April 1994.

Caltrans Transportation Management Center Master Plan. Caltrans, December 1997.

California Transportation Plan 2025 Draft. Caltrans, December 2004.

Delivering the Future of Transportation: The National Intelligent Transportation Systems Program Plan: A Ten-Year Vision. The Intelligent Transportation Society of America, January 2002.

Demetsky, Mike et.al. University of Virginia. TMS Performance Monitoring, Evaluation and Reporting Handbook Final Annotated Outline. January 2005.

Fiscal Years 2005-2009 Strategic Plan. Arizona Department of Transportation Arizona Department of Transportation, January 2004.

Freeway Management System, Addendum to Functional Design Technical Memorandum, Central Control Facility. Prepared for: Arizona Department of Transportation. Prepared by: Kimley-Horn and Associates in February 1990.

Intelligent Transportation Systems Strategic Business Plan. Prepared for: Colorado Department of Transportation. Prepared by: Dye Management Group Inc. in March 2001.

Intelligent Transportation Systems Benefits and Costs 2003 Update. Mitretek Systems, May 2003.  
[http://www.mitretek.org/its/benecost/BC\\_Update\\_2003/index.html#app\\_a](http://www.mitretek.org/its/benecost/BC_Update_2003/index.html#app_a)

MAG Regional Concept of Transportation Operations Final Report. Prepared for: Maricopa Association of Governments. Prepared by: Kimley-Horn and Associates in November 2003.

MAG Regional Concept of Transportation Operations Technical Memorandum No. 5/6. Prepared for: Maricopa Association of Governments. Prepared by: Kimley-Horn and Associates in January 2004.

Maricopa County Department of Transportation Traffic Management Center Implementation Plan Action Plan. Prepared for Maricopa County Department of Transportation. Prepared by: Kimley-Horn and Associates in October 2001.

Nassi, Richard. City of Tucson Traffic Engineer, Regional Transportation Control Center. Personal Interview. July 2004.

Nebraska ITS/CVO Business Plan. Nebraska Department of Motor Vehicles, Nebraska Department of Roads, Nebraska State Patrol Carrier Enforcement Division, and Nebraska Motor Carrier Association, August 1998.

Organizing For Regional Transportation Operations: An Executive Guide. Federal Highway Administration, Institute Of Transportation Engineers, August 2001. FHWA-OP-01-137.

Rohleder, Neil. Las Vegas Freeway and Arterial Management System. Personal Interview. July 2004.

Sosa, Emelio. New York State Department of Transportation. Personal Interview. July 2004.

Thompson Nick. Minnesota Department of Transportation. Personal Interview. July 2004.

TMC Master Plan. Caltrans Traffic Operations Program, December 1997.

TMS Transportation Management Centers: Development Considerations and Constraints. Prepared for: Caltrans. Prepared by: International Business Machines Corporation in December 2002.

Traffic Control System Operations – Installation, Management, and Maintenance Institute of Transportation Engineers, 2000.

Traffic Management Division Five Key Missions. Utah Department of Transportation, 2005. <http://www.udot.utah.gov/index.php/m=c/tid=191> .

Transportation Management Center Concepts of Operation Implementation Guide ITS Joint Program Office, Federal Highway Administration, December 1999.

Utah Transportation 2030 State of Utah Long Range Transportation Plan. Utah Department of Transportation, January 2004

Wichita Falls TxDOT District Concept of Operations. TxDOT. Report No. WFS-TMC-COO-1.0.0. May 2004.