THE COLLABORATIVE ADVANTAGE

REALIZING THE TANGIBLE BENEFITS OF REGIONAL TRANSPORTATION OPERATIONS COLLABORATION

A REFERENCE MANUAL





U.S. Department of Transportation
Federal Highway Administration

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16. Abstract

Agencies can realize a range of tangible benefits from participating in multi-agency collaborative efforts for regional transportation operations. These benefits include access to funding and other resources, improvements in agency operations and productivity, and outcomes that help agencies achieve their mobility and safety goals. This manual uses nine collaborative efforts across the U.S. to illustrate the tangible benefits gained through key strategies such as sharing resources and expertise, performing joint operations, using common operations procedures, and exchanging real-time information. The manual includes a six-step process to allow agencies to estimate their benefits of collaboration.

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U.S. Department of Transportation
Federal Highway Administration

1200 New Jersey Avenue, SE.
Washington, DC 20590

FEB 28 2008

Dear Colleague:

In May of 2006, the U.S. Department of Transportation (DOT) announced the National Strategy to Reduce Congestion on America's Transportation Network, a plan based on multi-jurisdictional, interagency, and public/private collaboration and new technologies to improve transportation system performance. By advancing a new strategy for smarter capital investments and transportation network management, the DOT believes that we can actually reduce congestion and its negative impact on our economy.

As recommended in the DOT's strategy to reduce congestion, transportation entities are increasingly turning to integrated and innovative approaches that reflect a regional perspective, leverage available technology, and build upon collaborative relationships that transcend agency and jurisdictional boundaries. Collaboration between agencies involved in transportation operations and public safety brings tangible benefits not only to the transportation system users through improved mobility and safety, but also to the participating agencies.

This reference manual "The Collaborative Advantage" is intended to help public agencies identify the specific benefits that they can realize when working with other agencies to improve transportation system operations. Developed by the Federal Highway Administration's (FHWA) Office of Operations, with the support of the Office of Planning, Environment, and Realty, this manual illustrates tangible benefits an agency will potentially realize by participating in a collaborative venture with other agencies. Such benefits include access to funding and other resources, improvements in agency operations and productivity, and outcomes that help agencies achieve their mobility and safety goals. Research conducted on nine collaborative efforts across the U.S. is used to highlight the benefits gained through strategies such as sharing resources and expertise, performing joint operations, using common operations procedures, and exchanging real-time information. The manual also offers a six-step process that can be used by agencies to estimate the potential benefits that their organizations can realize through collaboration.

We believe that multi-agency collaboration is a critical key element to developing 21st century solutions for 21st century transportation challenges, such as reducing traffic congestion. We look forward to working with organizations, agencies, and interest groups to advance collaborative efforts that improve regional transportation operations.

Sincerely,

Jeffrey F. Paniati
Associate Administrator for Operations

MOVING THE AMERICAN ECONOMY

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This manual lays the foundation for agencies involved in transportation operations to understand how they can benefit in tangible ways from engaging in collaborative activities with other agencies.

1.0 Introduction

1.1 What's In It for Us?

Is "collaboration" just the latest buzzword in management, or could it be that there are actually benefits to be gained by an agency when working with other agencies toward a common goal? Agencies faced with diminishing resources, "doing more with less," organizational streamlining, and expectations for increased efficiency . . . are now asked to "work well with others"! But many agencies contend that they are doing the best they can with what they have. Why should they spend time going to meetings, developing plans, and expending valuable resources when they struggle to do their jobs as best they can with what they have? Won't they be expected to give up autonomy and resources to help others get what they want? They want to know "What's in it for us?"

In order to answer that question, agencies need to be able to identify the tangible benefits to collaboration. Public agencies tend to assess their activities in terms of how they benefit the public. When examining opportunities for collaboration, an agency can have difficulty determining whether participation makes good business sense for it and how collaboration can be pursued in a way that brings benefit to the agency. With knowledge of potential benefits, agencies have a more complete understanding of whether or not to pursue collaborative endeavors.

The potential benefits to collaboration increase as the challenges faced by local, regional, and State transportation and public safety agencies grow in terms of both demand—more people driving more vehicles—and expectations for safe, secure, and reliable transportation, including on-time deliveries, less traveler delay, more accurate and timely information, and fewer crashes. Many of the ways for satisfying both growing demand and rising expectations require well-coordinated regional responses which no single agency or jurisdiction can fully accomplish alone. For example, traffic incident management, traveler information, freeway and arterial management, area-wide traffic signal coordination, and seamless regional public transportation services can rarely be implemented without the cooperation and participation of multiple agencies and jurisdictions. Even actions typically viewed as being within the purview of a single agency or jurisdiction (e.g., winter roadway maintenance, right-of-way maintenance) can benefit from collaboration when the collaborative effort is directed toward improving resource use or agency efficiency.

Illustrative Tangible Benefits of Collaboration

Increases the quantity or quality of resources available

- access to funding
- joint training
- shared expertise
- group purchasing
- technology standards
- shared infrastructure
- better technology

Improvements in agency operations and productivity

- expanded service area
- increaseed operating hours
- routine information sharing
- standard protocols and procedures
- improved responsiveness
- greater efficiency

Better outcomes that help agencies achieve goals

- fewer crashes
- improved air quality
- lower fuel consumption
- shorter travel times
- better travel decisions

1.2 Discovering the Benefits

The benefits and collaborative strategies highlighted in this manual represent the combined input of over 50 transportation and public safety professionals across the U.S. Nine collaborative efforts were selected for this manual to illustrate tangible benefits gained through participating in multi-agency operations activities ranging from incident management to transit operations. Operations and intelligent transportation systems (ITS) managers, supervisors, engineers, planners, and public safety officials from Federal, State, regional, city, and county agencies who participated in the nine efforts were interviewed about the tangible benefits their agencies received as a result of the collaboration. During the research benefits were quantified whenever possible, however when data was unavailable, qualitative descriptions of benefits were documented. Some of the top benefits to agencies participating in collaborative efforts are

highlighted in the text box on the previous page. Some more specific examples of benefits discovered through this research include:

- Operating agencies increase access to funding by participating in joint funding applications.
- Agencies undertake larger, more technologically advanced projects by leveraging their expertise and resources with other agencies.
- Regional partners effectively utilize their resources during emergencies through joint incident response plans that expand access to emergency resources and equipment, and provide primary contact information.
- Participating agencies help meet regional goals to reduce delay, fuel consumption, and emissions through coordinated initiatives, such as signal timing programs.
- Operating agencies share data and information that enables better system management and early warnings to travelers about road conditions in neighboring jurisdictions.
- Partner agencies improve public safety and decrease incident response time by sharing traffic camera feeds with local 911 dispatch centers that provide direction to first responders.
- Partners share communications assets to save money and raise their collective ability to manage traffic on a regional level.
- Agencies coordinate services such as transit to eliminate duplication of overhead costs and reduce operating expenses while responding to growing demand and offering increased service levels.
- Administrative and overtime costs are reduced during special events through coordinated event management that reduces the time to clear parking lots while traffic volumes escalate.
- Multi-agency collaboration has enabled the creation of joint dispatching that has resulted in decreased response time to requests for field assistance from partnering agencies.

These benefits and others are described more fully in this reference guide. Read on to discover how your agency can garner benefits through regional transportation operations collaboration and coordination!

1.3 Purpose of the Manual

The Collaborative Advantage: Realizing the Tangible Benefits of Regional Transportation Operations Collaboration—A Reference Manual is designed to help managers and decision makers within local, regional, and State agencies who participate in transportation operations and planning to understand the range of benefits that can be gained from participating in multi-agency collaborative efforts. It illustrates how agencies can benefit by collaborating with other agencies to address transportation problems of regional significance and what common collaborative strategies are used to take advantage of opportunities for improving regional transportation systems performance. This guide aims to help agency managers and other transportation operators and decision makers identify opportunities for effective collaboration, anticipate tangible benefits to their agencies and jurisdictions, and make the case for collaboration with other agencies.

1.4 Overview of the Manual

This guide lays the foundation for agencies involved in transportation operations to understand how they can benefit in tangible ways from engaging in collaborative activities with other agencies.

- Section 2 offers a framework for describing the benefits of collaboration. It explains how benefits to an agency are based on what the agency wants to accomplish—its goals and objectives. It describes a simple way to classify benefits and offers a sample of benefits measures.
- In Section 3, tangible benefits realized through key collaborative strategies and actions are described more fully along with examples of current collaborative arrangements that employ these strategies and the tangible benefits realized by the participating agencies.
- Section 4 gives a six-step process for agencies interested in getting a firm grasp on the tangible benefits they may realize from participating in a collaborative effort.
- Section 5 summarizes the benefits gained from examining current collaborative arrangements that others may find helpful in anticipating the tangible benefits of collaboration.
- Appendix A provides brief descriptions of the collaborative efforts and partnerships used to illustrate strategies and benefits in Section 3.

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By working together on regional transportation operations, agencies can realize the tangible benefits of increased productivity, improved access to resources, and greater outcomes that allow them to reach their mobility and safety goals.

2.0 A Framework for Describing Benefits

2.1 Anchoring Benefits to Agency Goals and Measurable Objectives

Agencies can realize "tangible benefits" (e.g., cost reductions, increased access to equipment) through a variety of actions, including arbitrary cost cutting or unfocused technology investments. However, the tangible benefits reported in this reference manual are derived from collaborative activities that help agencies achieve their goals. For example, a city public works department benefits from a collaborative effort on signal timing by participating in a joint application for Congestion Mitigation and Air Quality (CMAQ) Program funding[1] for an area-wide communications network. The network allows the city to retime its signals using fewer staff hours. In this case, the increased access to funding helps the agency achieve its goal of improving mobility on arterials, a clear benefit to the agency. Linking benefits to goals and objectives helps agencies enter into collaborative activities with an appreciation for how the arrangement benefits them.

Figure 1 depicts the connection between collaborative activities for managing a special event, some of the tangible benefits that accrue to the agency from those activities, and the agency goals that the activities support.

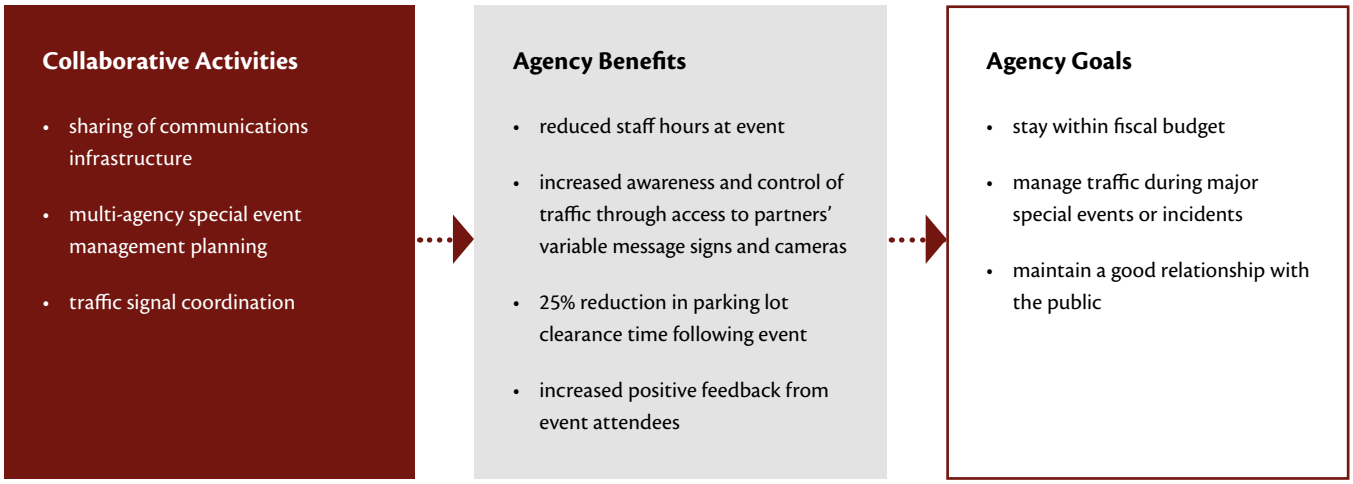

Figure 1. Benefits to a public safety agency participating in a collaborative effort to manage traffic during a special event.

1 *Congestion Mitigation & Air Quality Improvement Program (CMAQ) is a categorical Federal-aid funding program that directs funding to projects that contribute to meeting National air quality standards. CMAQ funds generally may not be used for projects that result in the construction of new capacity available to SOVs (single-occupant vehicles).*

2.2 Areas of Benefit to Individual Agencies

Agencies accrue benefits from collaborative activities in multiple ways: inputs/resources, operations, and outcomes/results (Figure 2). A benefit in the area of agency inputs or resources increases the quantity or quality of resources available for the agency to achieve its goals and objectives. This includes cost savings and increased access to funding, staff, equipment, facilities, and operating procedures.

A second area of benefit refers to improvements in an agency's operation or functioning. Operational benefits include decreased incident verification time, increased operating hours or coverage area, new services offered, decreased funding application approval time, or increased quality of traveler information, as well as many other functions performed by the agency. This area primarily covers benefits that increase agency efficiency or productivity in day-to-day operations achieved through collaboration among agencies.

A third area of collaborative benefits encompasses the outcomes or results of the collaborative effort that bring agencies closer to achieving their goals and objectives. For example, an agency may benefit in terms of achieving its goal to reduce motorist delay (e.g., increase mobility) by implementing a signal synchronization effort that reduces delay on specific corridors.

Agencies may accrue benefits in all three benefit areas when participating in collaborative activities. For example, by participating in a multi-agency special event management effort an agency may gain access to a partner's dynamic message signs (inputs/resources benefit) that result in reduced time to clear the parking lot after the event (operations benefit), and ultimately creates increased customer satisfaction (outcome/results benefit).

Source: Niagara International Transportation Technology Coalition

Variable message sign on the Queen Elizabeth Way that links Buffalo, New York with Toronto, Ontario.

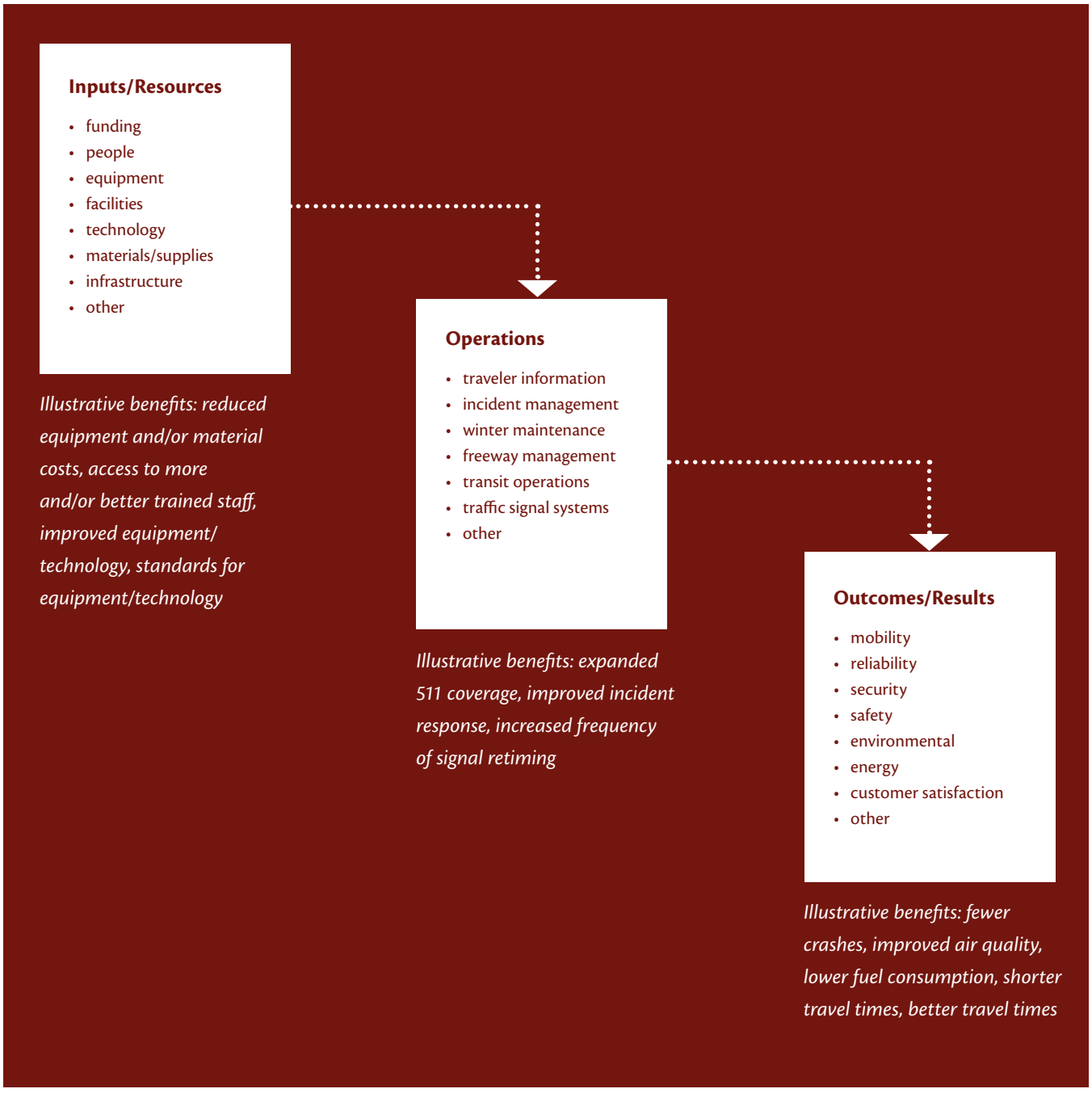

Figure 2. Potential benefit areas for collaboration. Benefits accrue to agencies in multiple ways—greater access to better quality inputs, improvements in day-to-day operations, and better service to system users.

2.3 Collaborative Strategies of Obtaining Benefits

Agencies benefit from a collaborative effort as a result of the strategies and actions they pursue together to achieve their respective goals and objectives. Many of the strategies and actions complement each other and can be used in combination. For example, a partnership may be formed to improve mobility through more timely detection and response to traffic incidents. The strategies used may begin with applying for funding by one or more agencies to support planning and implementation of improved traffic incident response capabilities, establishing area-wide communications through joint protocols and equipment standardization, acquiring technology through centralized purchasing arrangements, and establishing joint operations centers for detecting incidents and dispatching appropriate response resources.

Collaborative strategies may produce benefits that fall into one or more of the areas described in Section 2.2. Some strategies target obtaining benefits in one area; for example, "Follow the Money" or "Sharing the Wealth" strategies are designed to achieve resources benefits.

Section 3 highlights 10 collaborative strategies and actions agencies commonly use in their efforts to improve transportation systems performance. These strategies and actions to realize benefits are:

- "Follow the Money": collaborative pursuit of funding.
- "Get Smart": sharing expertise and joint learning.
- "With One Voice": coordinating communications and giving a consistent message.
- "On the Same Page": developing common procedures, protocols, and plans.
- "Measuring Up": jointly measuring performance.
- "You Ought to Know": sharing transportation information.
- "Can You Hear Me Now?": developing tools for efficient communications.
- "Sharing the Wealth": sharing resources.
- "Building Economies of Scale": consolidating services.
- "All Together Now": performing joint operations.

2.4 Benefit Measures

Agencies can use specific measures to estimate or track benefits of collaboration. Table 1 contains sample measures for identifying the benefits of collaboration that are likely the result of the typical strategies and actions shown. Benefit measures selected depend on the nature of the collaboration activity and the goals of individual agencies.

BENEFIT AREA	TYPICAL STRATEGIES and ACTIONS	ILLUSTRATIVE MEASURE
Inputs/Resources • Funding • Training • Equipment • Standards • Personnel • Communications • Other	• Follow the Money • Get Smart • Sharing the Wealth • Building Economies of Scale • All Together Now	• Reduction in cost for service or equipment • Reduction in staff time needed for service • Reduction in maintenance costs • Increase in funding • Increase in staff • Increase in use of partners' staff • Increase in use of partners' systems or equipment
Agency operations • Productivity • Service area • Operating hours • Services • Information • Protocols and procedures • Other	• Get Smart • With One Voice • On the Same Page • Measuring Up • You Ought to Know • Can You Hear Me Now? • All Together Now	• Decreased response time • Decreased clearance time • Increased quality of traveler information • Increased timeliness of traveler information • Improved accuracy of traffic signal timing • Improved coordination of traffic signals with neighboring jurisdictions • Increased operating hours • Increased coverage area for operations • New services offered • Decreased time to resolve stranded motorists' issues • Increased frequency of traffic light timing • Frequency of staff injuries or deaths
Agency outcomes/results	• Get Smart • With One Voice • On the Same Page • Measuring Up • You Ought to Know • Can You Hear Me Now? • All Together Now	(Following measures are from U.S. Department of Transportation's ITS Evaluation Guidelines.)
Safety • Crashes • Injuries • Fatalities • Damage • Other		• Reduction in the overall rate of crashes • Reduction in the rate of crashes resulting in fatalities • Reduction in the rate of crashes resulting in injuries
Mobility • Delay • Travel time		• Reduction in delay • Reduction in transit time variability
Efficiency • Throughput • Availability • Effective capacity		• Improvement in customer satisfaction • Increases in freeway and arterial throughput or effective capacity
Energy and Environment • Air quality • Energy		• Decrease in emissions levels • Decrease in energy consumption

Table 1. Illustrative measures for benefits associated with collaborative strategies and actions.

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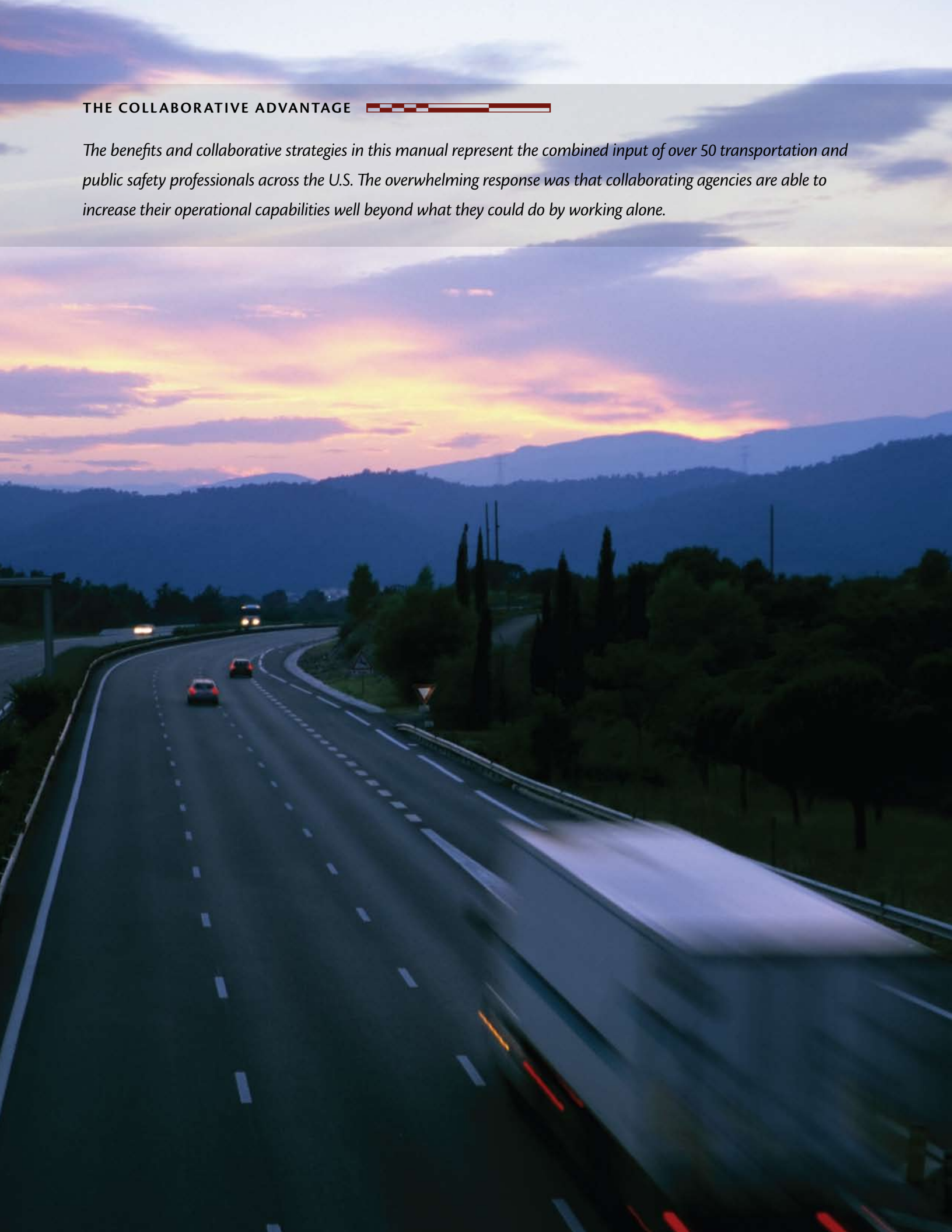
The benefits and collaborative strategies in this manual represent the combined input of over 50 transportation and public safety professionals across the U.S. The overwhelming response was that collaborating agencies are able to increase their operational capabilities well beyond what they could do by working alone.



3.0 Realizing Tangible Benefits: Key Strategies

This section describes 10 common collaborative strategies used in partnerships and other collaborative arrangements to obtain benefits. The benefits realized by the strategies are highlighted within each section using examples from research performed on the following nine collaborative efforts for this manual:

- Hampton Roads ITS Committee
- High Plains Corridor Coalition
- Merced County Transit—"The Bus"
- Vancouver Area Smart Trek (VAST)
- Denver Region Traffic Signal System Improvement Program (TSSIP)
- Niagara International Transportation Technology Coalition (NITTEC)
- AZTech
- Maryland National Capital Region - Regional Operations Coordination Committee (ROCC)
- Virginia, Minnesota Transportation Operations Communications Center

A profile of each partnership is featured in Appendix A.

Insights highlighted throughout this chapter offer observations on how to best apply the strategy to create benefits for participants.

3.1 Follow the Money

The research is clear that agencies find participating in joint funding applications to be an effective way to bring in additional funding for regional or agency-specific operations projects.

Individual ***agencies that collaborate with regional partners for funding applications enjoy increased access to outside funding.*** This is one of the most commonly reported benefits by agencies in many of the collaborations studied for this project. For example, joint applications for CMAQ funds can have advantages over individual project applications because they can show greater expected air quality and mobility benefits—a key evaluation criterion for CMAQ funds—than individual projects can. Also, some metropolitan planning organizations (MPO) explicitly reward multi-agency projects in their evaluation. Collaborative efforts championed by the MPO often enjoy the extra benefit of assistance by the MPO, an organization intimately familiar with preparing competitive funding applications.

"By forming together, we were able to carve out a pool of funding to be spent on traffic signal activities that wouldn't otherwise compete well against construction projects such as intersection improvements."

—Local traffic engineer participating in Denver TSSIP

Some examples:

- Operating agencies participating in the Denver region's **Traffic Signal System Improvement Program (TSSIP)** share upwards of $3.9 million per year for traffic signal system improvements. Partners acknowledge they could not receive this level of funding support—which benefits the region—going it alone.

- The Southwest Washington Regional Transportation Council (RTC), the region's MPO in the Vancouver, WA area helps the individual partner agencies in **Vancouver Area Smart Trek (VAST)** "bundle" together their respective project needs into a joint funding application, while the agencies provide the local match for their projects. Partners also pursue funding for joint projects. The VAST partners include the cities of Vancouver and Camas, Clark County, Clark County Public Transit Benefit Area (C-TRAN), Washington State Department of Transportation (DOT), and Southwest Washington RTC. They have received approximately $6 to $7 million in CMAQ funds and $5 million in earmarks since VAST's inception and reduced staff time to prepare applications. The VAST manager at RTC reports that some stand-alone ITS projects (such as fiber communications) have trouble competing in terms of congestion reduction and air quality improvements, so by bundling them together with directly competitive ITS projects, agencies are able to get more funding for ITS. In addition, RTC gives extra points for partnership projects.

- In the **Hampton Roads (VA) ITS Committee,** participating agencies report that they are able to increase their chances of receiving funding for operations and ITS through ongoing participation in the Committee, which serves as a collaborative forum for operations and ITS. The ITS Committee assesses ITS project applications for CMAQ funding prior to formal MPO evaluation and provides its recommendations to the MPO. The support of the ITS Committee increases the chances that a project of technical merit will be successful in being placed on the TIP and receiving CMAQ funding. The region receives $16 to $17 million in CMAQ funding annually and approximately half of those funds are allocated to ITS/operations projects.

- In 2005, the Denver Regional Transportation District (RTD) received dollar-for-dollar matching funds from **TSSIP** for a transit signal priority pilot project which will allow RTD and the region as a whole to gain an overall better understanding of the impacts of transit signal priority on general traffic. This represents a major step forward for the region, and would not have been possible had the agencies involved not applied for funding collectively.

Source: William Hoople, Regional Transportation District

An early example of transit signal priority in Denver, Colorado.

Agencies that participate in collaborative funding applications often have a greater influence over how funding is spent in the region. Instead of competing with each other for a limited amount of funds, the partner agencies work together to set regional priorities and make decisions on funding applications or support applications based on these priorities. Partners may assist others in obtaining funds by jointly recommending another partner's application one year, but the next year, when one of their big priorities rolls around, they enjoy the support of the partnership for their priority project. In some cases, collaborative partners may establish a revolving loan fund from which member agencies may apply for loans to improve their operations.

Some examples:

- The **Maryland National Capital Region's Regional Operations Coordination Committee (ROCC)** undertook a study to determine what was needed for the three main entities, Maryland State Highway Administration (SHA), Montgomery County, and Prince George's County along with the Maryland State Police to coordinate in real-time to mitigate congestion with an emphasis on non-recurrent congestion and improved safety. While Montgomery County and Maryland SHA had field assets, communications infrastructure, and central control facilities to support the regional coordination, Prince George's County did not. The partners decided that from a regional perspective it was important to assist Prince George's County in acquiring a Traffic Response and Information Partnership (TRIP) Center. The partners developed functional requirements and Prince George's County and the State of Maryland jointly pursued a Federal earmark grant. Prince George's County received $1.5 million from the earmark and Maryland and Prince George's County provided additional funds.

- In the Buffalo-Niagara region of New York State, **NITTEC** administers a $5.3 million revolving loan fund provided by a grant from the Federal Highway Administration (FHWA) in 1994 to enhance mobility in the region through ITS. Agencies may apply to borrow funding from the loan fund. Applications are reviewed by peers from multiple agencies at the NITTEC Technology and Systems Subcommittee. The New York State Thruway Authority received a $3.7 million loan for ITS construction and the City of Buffalo was recently granted a $2.5 million loan to upgrade its signal system and provide centralized signal operations within the NITTEC center.

Source: www.istockphoto.com

Finally, ***agencies that collaborate for joint funding applications report experiencing both time and cost savings in the preparation of a funding application.*** Completing funding applications can be quite costly for large applications and often requires external consultant support. Agencies that collaborate on joint applications are able to share the expense of this. In some examples, a convener such as the MPO prepares the joint application as in the examples below.

Some examples:

- In Denver, DRCOG prepares the applications for **TSSIP** funding after determining regional needs and priorities with the participating agencies.
- RTC develops **VAST** grant applications with input from the agencies. VAST's transit member, C-TRAN, remarked that coordinated grant requests save participating agencies time in writing individual requests.

Perhaps the greatest testament to the benefits of collaboration in joint funding applications is that agencies that have chosen to collaborate with regional partners in funding applications have seen sufficient benefit to motivate them to ***work together collaboratively on future initiatives.***

Some examples:

- The model of **TSSIP** is considered so successful by the participating agencies that they are looking to develop a similar program for ITS.
- Since the FHWA Model Deployment Initiative grant ended in 2003, **AZTech** partners have continued to implement innovative operations strategies. They still apply for and receive funding for future work such as a regional communications system.

INSIGHTS

Collaborative participants found it helpful to have an open forum where all of the partnering agencies' needs can be discussed.

Partnerships that are repeatedly successful in obtaining outside funding for their initiatives often establish a formal strategy for improving regional operations that contains a prioritized list of projects or actions to pursue in the short- and long-term. In some cases, this list serves as input to the regional transportation planning process.

3.2 Get Smart

One of the most fundamental activities of a collaborative group is to share knowledge and learn together. Collaborative groups that meet on a regular basis provide an excellent opportunity for operations staff to talk to their peers and share solutions to common problems. Peers may share ways they have discovered to work with new technology or give recommendations on procuring specific equipment. Technology-savvy staff may help bring other agencies' staff up to speed with regard to a certain technology.

Agencies are increasingly developing joint training programs and products that are used across their region. Agencies may also use a collaborative forum to come together after major incidents and review their operations. This kind of collaboration benefits agencies in a number of tangible ways.

Agencies advance their operational capabilities. By coming together to review and develop solutions for current operations practices and learning from agencies who have successfully implemented similar concepts, practices, or technologies, agencies can increase the efficiency and effectiveness with which they operate by putting in place better practices.

Some examples:

- The **Hampton Roads** RCTO Incident Management Working Group holds monthly after-action meetings to review selected incidents between the agencies involved in the response, including local and State police, local fire/emergency medical, and transportation departments. They share photos and statistics to develop an objective "picture" of what happened. The participants identified hazardous materials (HAZMAT) reporting as a specific area where improvements could increase efficiency in incident handling. They developed a standard procedure for HAZMAT reporting in the region that has increased the efficiency of HAZMAT incident response. The Virginia Department of Transportation reports that after-action reviews have helped make it more effective in incident management.

- In the **AZTech** partnership, when an agency is trying something for the first time such as developing a traffic management center (TMC), it can look to collaborative partners that already have TMCs for assistance in answering questions familiar to more experienced agencies. Operations staff from the City of Peoria made good use of neighboring TMCs when developing a plan for its own. In another example, the City of Glendale relied on a contact at the AZTech partnership for information on purchasing wireless technology, enabling the city to make a good decision for its needs. AZTech agencies will also call upon each other to serve on hiring boards to evaluate candidates when an agency lacks the technical capacity to adequately assess candidates for a position.

- Montgomery County was able to start an arterial service patrol as a direct benefit of its participation in the **Maryland National Capital Region ROCC.** The ROCC conducted a study and developed reports on how Montgomery County and the region could use an arterial service patrol to help police and fire/rescue agencies to manage traffic incidents. Montgomery County used this study to convince the county council to approve the program and it now has two service patrol trucks on the street.

Source: Maricopa County Department of Transportation

Arterial incident management performed by service patrol in Arizona.

Agencies retain their best employees by creating more stimulating working environments for their staff. The employees interviewed in the collaborative efforts featured in this research were unanimous in the high value they placed on the opportunity they felt their agency's "collaborative" attitude provides them to meet and interact with fellow professionals from a diverse range of partner agencies across their region. In today's global economy and workplace, employees increasingly expect, and seek, opportunities for exposure to innovative ways of solving problems, specialized expertise, and diverse perspectives. Peter Drucker, legendary management guru, predicted the emergence of the "knowledge worker" and the value employees would increasingly place on the opportunity to feel challenged and exposed to new ideas and ways of doing things.[2]

An example:

- DRCOG, the leader of Denver **TSSIP,** has been able to attract talented people to work at DRCOG because they are so impressed with the traffic signal program. It is a rare opportu-

2 *The Essential Drucker, 2005.*

nity for a traffic engineer to be involved with advancing signal systems from an MPO. One DRCOG engineer even took a pay cut to come work on TSSIP.

Agencies avoid "re-inventing the wheel," which saves staff time and money. Agencies that collaborate to share knowledge report saving staff time by learning from partners who have already developed solutions to their current problems. Agencies also save funding by not having to hire outside assistance. Collaborative development of joint training programs saves money because a substantial amount of the training content comes from the partners and does not need to be obtained from an outside source. This results in higher quality training programs for a lower cost.

Some examples:

- Through its membership in the **Maryland National Capital Region ROCC,** Maryland SHA assisted Montgomery County in training its patrol staff and provided them specifications for patrol vehicles. The Montgomery County incident management patrol has also helped Maryland SHA by reducing the number of requests that it receives to provide incident management support to Montgomery County. Both of these agencies are saving time and money through the mutual assistance they receive from each other in this partnership.

- The **NITTEC** Incident Management Subcommittee members from fire, police, towing, and transportation professions decided to pool their expertise and time to develop an incident management training program aimed at first responders. The training is developed from both the perspective of public safety officials and transportation professionals and gives first responders the tools and knowledge to be more effective when working together on a scene. This comprehensive 3-hour program is now offered to member organizations at no cost.

- The ITS manager from the City of Glendale reports that partner agencies are able to undertake larger, more advanced projects through the **AZTech** partnership than any could undertake alone by leveraging its expertise and resources. Instead of hiring a consultant when an AZTech partner agency lacks expertise in a particular area, the agency can tap into the AZTech partnership to find someone who may have that expertise. The trust and common experiences between the members increases the value of the information shared.

INSIGHTS

While it seems like smaller or less technologically advanced agencies are primarily on the receiving end of benefits when expertise is shared, elevating those agencies and increasing their operating capabilities allows them to be stronger partners in providing support to the other agencies during incident management and in sharing traffic information. This is an insight ingrained in the attitudes of partners in many successful collaborative efforts.

One commonality of collaborative groups that share learning and expertise is that the members hold regular, face-to-face meetings on an ongoing basis. The meetings provide members the opportunity to assist one another in problem-solving, and over time, trust, an important component to accepting advice, develops between members.

3.3 With One Voice

Agencies that speak "with one voice" are able to enjoy greater leverage and influence. Speaking with one voice means that agencies coordinate communications, provide the same message, or combine their individual messages through a unified interface. This benefits individual agencies in two concrete ways:

Agencies often improve their outcomes in negotiations with vendors. Agencies are able to get better service from a vendor because of combined requests and problem-solving discussions. This directly improves operational effectiveness and efficiency by enabling the participating agencies to do more. In another example, by communicating in a unified manner, agencies can more efficiently problem solve with vendors.

Some examples:

- When issues arise with traffic signal equipment on Denver's arterials, the multi-jurisdictional partner agencies in **TSSIP** are able to get support from their fellow TSSIP partners when working with vendors to find solutions. In one example, several signal operators discovered they were having similar problems with their traffic control systems. DRCOG, their regional MPO, helped to facilitate users' group meetings on behalf of TSSIP agencies and the vendor to jointly discuss the issues and find solutions. The vendor was especially responsive knowing that multiple agencies and jurisdictions were involved. More recently, an FHWA representative has provided a single interface between traffic signal operators and vendors, helping the operators to acquire equipment and services.
- Intergovernmental Cooperative Purchasing Agreements were established through **AZTech** so that public partners could purchase ITS equipment and services through Maricopa County DOT or Arizona DOT contracts at a discounted rate. The agencies of AZTech use a joint procurement vehicle for buying closed circuit television (CCTV) cameras and dynamic message signs. By using a statewide CCTV camera software license, AZTech partners and other participating agencies realized a combined savings of just under $1.2 million.[3]

Source: Niagara International Transportation Technology Coalition.

View from CCTV camera.

Agencies increase customer satisfaction and motorist response by providing consistent information and a single interface. The public appreciates that their public agencies are working together and value having a single, consistent interface for transportation services such as traveler information or incident management.

Some examples:

- Through their joint Maryland "Move It" Program, **ROCC** agencies have developed a set of outreach brochures that officials give to drivers in traffic incidents. These forms not only help to streamline the incident documentation requirements for people, they have resulted in quicker compliance with requests for people to move their cars after a "fender bender" type of accident with no injuries, therefore freeing up the roadway more quickly.
- Partner agencies of **VAST** in the Vancouver area of Washington State know that their travelers do not want to factor in the various jurisdictional boundaries when using traveler information websites. This multi-agency, multi-jurisdictional partnership developed a VAST unified traveler information website that allows customers to go to one site for seamless access to Vancouver area traffic information.

INSIGHTS

Standardized interfaces, such as a "Move It" form, offer more credibility for personnel who must work with the public but do not have a badge.

Speaking with one voice enhances a group's ability to advocate for change and facilitates working with those who desire a single, efficient interface such as the public or vendors.

3 *AZTech, "AZTech MDI Return on Investment: Still Paying Dividends," January 2005, unpublished.*

3.4 On the Same Page

The collaborative strategy "On the Same Page" refers to developing a common plan, procedure, protocol, or standard that agencies use to maintain coordination in the field during incidents, in making investment decisions, and in routine operations.

Agencies that work together in incident management, special events, and emergency planning recognize the importance of following common procedures when working together in time-critical situations. Although challenging at times, these agencies find it highly beneficial to develop common strategies or protocols for managing traffic for anticipated events. Freeway and arterial transportation agencies may develop joint "game plans" for mobilizing equipment and staff to reroute traffic off of one facility onto another during a major incident. Partnering agencies will often set up a call tree with a list of contacts to allow agencies to request assistance from their partners during emergencies. Major sporting or entertainment events appear to jump-start multi-agency event planning to create a successful and enjoyable experience for the fans, circumstances that help ensure revenue for the agencies.

Agencies develop regional plans for developing operations capabilities often through ITS ranging from near to long-term in scope. These collaborative plans contain a vision for future operations in the region, general agreements on how partners will coordinate, and even a prioritized listing of projects or initiatives to advance the partners' vision. Additionally, partners agree to joint standards for signal timing, VMS messages, traffic cameras, and other traffic management systems for mutual benefit.

Source: Virginia Department of Transportation

Variable message sign for Hampton Roads I-64 Bridge Tunnel.

"We all knew what we had to do... it's almost like we don't have to talk to each other."

—John Riehl, Traffic Engineering Design Operations Team Manager, Montgomery County, Maryland

Agencies that collaborate to develop joint traffic plans are able to move traffic more efficiently in and out of the area.

Some examples:

- The partner agencies in the **Maryland National Capital Region ROCC** have developed joint incident response manuals that contain a list of available resources and equipment in the region that could be used in an emergency and a list of primary contacts to be used in certain situations. Each of the members of the ROCC has the incident response manual. Recognizing the need to coordinate freeway incident management with arterials, Maryland SHA, with the assistance of Montgomery and Prince George's Counties, developed common transportation management plans for incidents occurring on two of the major freeways in the region. On September 11, 2001, the partners felt they were able to evacuate the area more efficiently because of these plans and shared incident management experience. The ROCC partners could predict what roads needed to be kept open and where equipment should be placed for quick response.

  The ROCC has been involved in developing transportation evacuation plans for the Maryland National Capital Region since 9/11. The ROCC has been able to identify all of the routes in the ROCC region that can be used for evacuation. It has identified shelter locations and developed a list of available resources. Maryland ROCC has conducted several regional emergency exercises that have helped familiarize everyone with standard operating procedures and prepare for emergencies. The ROCC has used its plan to augment the District of Columbia's plan and the overall National Capital Region's plan developed through the region's MPO. The jointly developed plans and procedures were helpful during special events such as the Kemper Golf Tournament and the annual July 4th fireworks.

- Through the **VAST** effort, the City of Vancouver has been able to bring most of its signals into a new central system developed through collaboration with its partners. In 2007, it began to retime those signals. The agencies work together through VAST to decide on signal controllers and software and then they go to the corridors and replace their equipment. The City of Vancouver expects to see measurable improvements in traffic flow by 2008 and believes it is now able to provide a more efficient service to the public, improving flow through the corridors regardless of jurisdiction.

Source: www.istockphoto.com

Agencies that develop collaborative plans for ITS/operations reduce duplicative efforts and ensure compatible systems.

An example:

- Initiated by the City of Vancouver, the **VAST** partners created a 20-year Intelligent Transportation System (ITS) Plan to direct their collaborative efforts over the next two decades. Through the VAST ITS 20-Year Plan, now managed by the Southwest Washington Regional Transportation Council, the partnering agencies reached a consensus on their collaborative purpose, developed a shared vision and goals, and identified specific projects they wanted to pursue to reach those goals. Examples of major program areas they consider within the scope of their collaboration include traveler information, transit operations and management, and freeway operations and management. Agencies report that the collaboration has reduced duplicative efforts among them and helped to ensure compatible systems, which increases the efficiency with which these agencies can work together in traffic signal timing and traffic data sharing — a benefit they all enjoy.

Agencies that have developed common operating standards benefit from optimized cross-jurisdictional operations such as signal timing and traveler information.

An example:

- One of the most important benefits to Clark County of participating in **VAST** has been progress towards its goal of standardizing traffic signal operations in the area. Agencies in the region previously used different and often incompatible approaches to signal operations. Clark County and the VAST partners obtained CMAQ grants to purchase compatible signal equipment and optimized the signals along corridors that cut across multiple jurisdictions. Clark County contributes funding and staff to work on corridor signal optimization projects primarily with WSDOT and the City of Vancouver. For one of their most recent projects, the county contributed about $30,000 in funding and labor. For this investment, Clark County reports that the projects have greatly improved signal coordination in the region.

INSIGHTS

Several collaborative efforts have found it useful to conduct exercises that allow agencies to practice operating procedures developed for emergencies. This allows everyone to become familiar with what is required and improve the procedures.

To make progress on multiple initiatives or projects identified within a collaborative plan, partnerships appoint individual champions for each initiative who are responsible for regularly reporting back to the main group on the initiative.

3.5 Measuring Up

Partner agencies must have shared goals and objectives for collaboration to be productive and mutually beneficial. When mutual goals are advanced, participating agencies should also define together what will constitute success — outcome-oriented measures or indicators of effectiveness should be delineated for each objective. Developing a shared set of performance measures benefits collaborating agencies because it enables them to more readily assess the outcomes of their collaborative efforts. It also makes it much easier to piece the picture together when assessing the regional benefits or impacts of a specific strategy, plan, or technology. Shared performance measures can also help to quickly pinpoint and curtail any unproductive or counterproductive activities. These agreed-upon performance measures can help to promote future collaborative efforts by establishing both the value of the collaboration to the participating agencies (e.g., more effective use of available resources) and the payoff of investments in collaborative activities (e.g., access to funding, joint operations) in terms of operational improvements in system performance.

"People who aren't tooting their horn about their benefits are missing the boat."

—Steve Rudy, Transportation Operations Manager, Denver Regional Council of Governments

Performance measurement within a collaborative effort helps agencies to sustain funding for their efforts.

An example:

- Partner agencies in **Denver's TSSIP** work together to develop performance measures for projects funded through this collaborative effort to enable an understanding of the benefits of the project. At the completion of each project, DRCOG, the TSSIP management entity, conducts a project review. DRCOG measures the benefits, develops a 1- to 2-page full-color benefits summary for the project, and then publicizes the results by distributing the summary sheets to stakeholders and elected officials in the affected jurisdictions. In the case of large projects, DRCOG will develop a press release.

  By implementing this kind of discipline, DRCOG is able to report, for example, that from 2003 through 2006, TSSIP reduced delay by nearly 36,000 vehicle hours per day, reduced fuel consumption by more than 15,000 gallons per day, and reduced air pollution emissions by more than 45,000 pounds per day.[4] Measuring performance and publicizing the improvements to the region has helped to bring CMAQ dollars in the region through TSSIP. These performance measures benefit each agency by sustaining funding for the program.

Performance measuring enables agencies to evaluate the effectiveness of their collaborative efforts and make adjustments to reach their agency goals and objectives.

Some examples:

- **NITTEC** staff began incident management performance measuring in May of 2006 to bring awareness of the importance of quick clearance of incidents to responding agencies. The findings are shared with their incident management committee and published in NITTEC's Annual Report. NITTEC assists partnering agencies through performance measuring by giving them the information that they need to make decisions on the best practices to improve incident management efficiency. Performance measuring will allow NITTEC to

4 *Denver Regional Council of Governments, "Traffic Signal System Improvement Program Draft 2007 Update Summary Report."*

estimate the impacts of changes that it makes, such as new call-out procedures or first responder training. NITTEC partners believe that by developing and tracking common performance measures, they can focus their efforts toward their shared goals, reinforce each other, and increase their likelihood of success.

- The incident management working group of the **Hampton Roads ITS Committee** established three common performance measures to use as a group to evaluate the effectiveness of their work. In order to analyze the incident management data that will be needed for these measures and others, the Virginia DOT hired a staff member to work exclusively on analyzing incident management data. The group has begun to track incident duration, response time, and volume with the assistance of Virginia DOT and reports this to local agency leaders at the MPO. Partner agencies believe that common incident management performance measures show local elected leaders that they are accountable and are improving their performance—they understand traffic crosses jurisdictional boundaries and they are dedicated to making life easier for the traveling public. Developing shared performance measures also helps to focus the incident management working group on collaborative operations strategies that help the members reach their agency goals.

INSIGHT

The keys to obtaining the benefits of measuring performance are sharing the results among the partners and finding effective ways to illustrate progress to the public and decision makers. Partnerships may use quarterly briefings to executive councils or project-oriented graphical brochures.

3.6 You Ought to Know

Sharing transportation information in real-time or nearly real-time is a common strategy that operators use to improve their transportation management capabilities. Sharing information occurs both between agencies within a single jurisdiction, such as between departments of transportation and police, and across jurisdictions, such as between local and State transportation management centers. Agencies may share traffic camera feeds, VMS message status, traffic flow data, weather information from road sensors, public safety dispatch data, or alerts for road closures, incidents, and major congestion. Methods for sharing information range from the simple phone call or cell phone text message to sophisticated fiber connections between transportation management centers transmitting video and sanitized CAD data. Agencies that collaborate to share real-time information are unanimous in their assessment of tangible benefits in this area.

Agencies can better inform travelers and prepare their own facilities to lessen the impacts of congestion spilling over jurisdictional boundaries. Operators can better advise travelers on route choice, divert traffic, or adjust signal timing to mitigate impacts of transportation problems within the region.

Some examples:

- The **High Plains Corridor Coalition** States provide essential traveler information on interstate conditions and are developing a system to automate information exchange. These Midwest States share long expanses of rural roadways and have problems with travelers being stranded due to the severe weather patterns the region experiences. They have few alternative route options available to the high volume of commercial freight traffic that traverses the interstate roadways. By sharing information with each other, these States

provide early warning to travelers about road conditions in the state ahead of them, which allows them to more easily make decisions to detour or delay their trips while they still have options for lodging or detour routes.

In the summer of 2003, a bridge on I-80 was washed out due to a flash flood. Coalition partners called each other and the States of Nebraska, Colorado, and Wyoming immediately posted signs to warn travelers. They received many phone calls from truckers and other travelers thanking them. Due to increased communication, the State of Kansas can now alert truck drivers traveling on I-70 more often about severe road weather conditions in time for them to make decisions to divert early and wait out the storm while they still have lodging options. Previously, drivers often had no way of learning that Colorado's roadway was closed due to weather until they arrived at the border where there were few lodging options.

Source: Niagara International Transportation Technology Coalition

- Local and State traffic management centers in **Hampton Roads** exchange video feeds. Additionally, the Virginia DOT Smart Traffic Center sends text messages via cell phone to local ITS Committee partners, enabling them to issue appropriate traveler warnings quickly on VMS or implement incident signal timing plans to help mediate the congestion.
- Through the **Maryland National Capital Region ROCC,** both the Montgomery County Traffic Management Center and Prince George's County TRIP Center share traffic videos and other real-time traffic information through the Maryland SHA's CHART (Coordinated Highways Action Response Team) system. Montgomery County shares traffic information with the Maryland State Police and Maryland SHA from the airplane that they use during rush hour to monitor traffic. These agencies report that this expanded and more comprehensive "visibility" into roadway conditions across the region has enabled them to improve the effectiveness of their operations, and one agency describes this partnership as "vital" to its own operational effectiveness.

Agencies save time in responding to incidents. By sharing incident information in real-time with first responders, arrival time to an incident can be decreased. Responding agencies can also arrive with the appropriate equipment to handle the emergency.

An example:

- The City of Hampton and the City of Norfolk transportation management centers share traffic camera feeds with the local 911 dispatch centers, a direct result of their participation in the **Hampton Roads ITS Committee.** Emergency dispatchers use the real-time video to pinpoint the exact location of an incident and provide better directions to first responders, allowing them to save valuable time.

INSIGHT

Building communications systems to share traffic data, advisories, or camera feeds takes a substantial amount of time and investment. While working toward a more efficient system to share information, collaborative partners have been able to realize benefits through simple phone calls or text messages. The former Colorado DOT transportation center manager emphasized to staff that improving operations is first a "people game" and that technology is there to enhance that.

3.7 Can You Hear Me Now?

Transportation and public safety agencies in many regions of the United States are increasingly seeking better ways to communicate with each other and the public when they are working out in the field. Communications tools may involve high-technology, state-of-the-art wireless networks or decidedly "low-tech" tools such as a simple booklet that translates crucial phrases from English into Spanish. Transportation operations field staff need to communicate quickly with each other and with the public in the event of a traffic incident or emergency and they are increasingly leveraging their resources to create new pathways for effective communication. These tools allow field staff to get the resources and support they need within a shorter period of time, save time, and increase the safety of their workers by reducing the amount of time they are in harm's way, which all agencies appreciate.

Agencies increase efficiency in assisting stranded motorists. By developing a tool to communicate with motorists, motorist assistance/service patrol workers can quickly assess a problem, deliver the needed assistance, and move on to the next request.

"I would never want to go back to the old way. Our response is much better. We assist the patrol and they assist us."

—Tim Sheehy, District 1 Superintendent, Minnesota DOT

An example:

- Maryland National Capital Region ROCC addressed a common problem that many of its responders were encountering—difficulty communicating with motorists who only spoke Spanish. The members of the ROCC decided to develop a Spanish aid guide with funding from Maryland SHA that they could all use to talk to motorists who were either stranded or involved in an incident.

Agencies more easily exchange information and assistance with partners in the field. By developing a tool that allows agency personnel to communicate in the field, partners can give and receive assistance with less effort and in a shorter period of time. Additionally, staff safety can be increased with better access to information.

Some examples:

Source: www.istockphoto.com

Increased communication between public safety and transportation personnel improves efficiency and safety.

- In the Arrowhead region of northeast Minnesota, the Minnesota State Patrol (MSP) and Minnesota DOT have collaborated to share a consolidated communications center located in the City of Virginia to increase the efficiency and effectiveness of staff response to emergencies and save money for ongoing operations. The joint communications center was developed in 1996 as a Federal operational test and was the first model of the Transportation Operations Communications Centers (TOCC) in rural Minnesota.

  Prior to the joint communications center, each agency maintained its own dispatching. Now, both enjoy a single point of contact for emergencies. The dispatcher uses a phone tree to efficiently obtain a response to a request. Both MSP and Minnesota DOT benefit by receiving a faster response to requests for assistance that has been facilitated by both the close relationships formed between the agencies and the consolidated dispatch service. MSP gained use of a new facility and an upgraded communications systems. As the concept is rolled out to eight other locations throughout Minnesota, MSP will also benefit from a statewide wireless data network acquired for its exclusive use and automated vehicle location (AVL) systems that will be installed in each patrol car. These systems were funded by Federal earmarks and a grant from the National Highway Traffic Safety Administration (NHTSA).

- The **ROCC** developed specifications for a system that would provide direct communications between responders and other field personnel from multiple agencies. This made so much sense that the initiative soon expanded outside the scope of the ROCC to become the precursor to CapWIN (Capital Wireless Integrated Network), an "interoperable first responder data communication and information sharing network" between the State of Maryland, the Commonwealth of Virginia, and the District of Columbia. CapWIN now allows first responders from multiple jurisdictions in the National Capital Region to communicate efficiently during incidents or special events and has become a model for this sort of interagency interoperability.

INSIGHT

Several collaborative groups have taken a measured approach to the development of tools for communication. They start by creating a smaller model with only a few agencies and get that working well. Then they expand the tool to more agencies once the costs and benefits are better understood.

3.8 Sharing the Wealth

Transportation and public safety agencies in the same or neighboring jurisdictions have similar responsibilities and often need similar resources to carry out those responsibilities effectively. In some cases, these agencies require assets that are prohibitively expensive for a single agency to acquire alone. The investment required to obtain equipment, install infrastructure, or develop and maintain technology is not affordable. Or, the "opportunity cost" of the investment is perceived as high, and acquiring an asset would come at the expense of accomplishing other objectives.

By sharing assets, agencies save money and boost their operations capabilities. Collaborating to share mutually beneficial resources often helps agencies achieve more of their objectives at a better "price" than they can on their own. In some cases, the "sharing" is designed to bring together complementary assets from collaborating agencies that can work together toward a common goal (e.g., sharing assets that support a regional traveler information system). In other cases, collaborating agencies agree to share specific assets that can assist them in achieving their individual goals (e.g., sharing infrastructure such as fiber optics networks that support individual agencies), or, agreements may be formed in which agencies each exchange rights to access specialized assets possessed by the others.

An example:

- The partner agencies in **VAST** share their excess fiber communications assets with each other as part of a formal inter-local agreement to save money and amplify their ability to manage traffic on a regional level. The agreement identifies available fibers that the City of Vancouver, Washington State DOT, and Clark County have available to share. The resource-sharing agreement saves the agencies time because they no longer have to go to their attorney general's office every time they want to share fiber. It has saved them money because they are not duplicating purchase and installation investments in infrastructure that they knew could just as easily be shared for mutual benefit, or unnecessarily leasing assets that have been purchased by partner agencies. Resource sharing was a major incentive for the Washington State DOT to join VAST. Washington State DOT desired to work with local agencies to leverage existing infrastructure, such as fiber lines that the City of Vancouver had already installed.

Beyond saving money though, the fiber resource sharing agreement has also enabled the member agencies to make significant progress coordinating operations in real-time, such as traffic redirection during incidents. Access to these fiber lines has already increased the county traffic engineers' efficiency in detecting and managing problems on the road through remote access to any county signal and camera feeds from county and State cameras. s

Sharing assets enables agencies to create a better product than they could by working alone.

Some examples:

Source: Steve Uzzell

Regional traveler information sign at the Phoenix Sky Harbor International Airport.

- Three transportation agencies in the **AZTech** partnership combined their resources to develop surface transportation traveler information consoles for travelers leaving the Sky Harbor Airport in rental cars. Each agency contributes resources to provide a level of service to travelers that would be much more difficult for any agency to do alone. Maricopa County DOT provides most of the funding. The City of Phoenix contributes some operations funding, maintains power, and maintains communications facilities. The Arizona DOT supplies the traveler data and hosts the computer server. The project makes use of data from a regional archiving project to which all agencies contribute.
- In the **High Plains Corridor Coalition,** three partnering States share the cost of developing an information system that none could afford alone. The States of Nebraska, Colorado, and Kansas have committed to providing $350,000 each over a 5-year period as part of a Transportation Pooled Fund Study to create and maintain a web-based traveler information network that will provide information to travelers on road weather and highway conditions. In addition, Nebraska and Colorado have each contributed $25,000 to perform the first steps in the engineering process. Individually, the States are investing to acquire the field equipment that will allow them to fully make use of the joint information system in managing safe and efficient interstate travel. By jointly investing in a shared system, and by each contributing resources to the system, the States will be able to offer commercial and non-commercial travelers a seamless service across the multi-state area.

INSIGHT

Agencies with experience in sharing assets have found that it is important to establish written expectations for roles and responsibilities before sharing significant assets. This may include working out maintenance agreements and protocols for shared control.

3.9 Building Economies of Scale

The "Building Economies of Scale" collaborative strategy is similar to, yet distinct from "Sharing the Wealth." When "Sharing the Wealth," agencies receive access to assets owned by other agencies. In "Building Economies of Scale," agencies develop agreements that create consolidated operations services that fill a common need.

Large corporations often centralize administrative services to achieve economies of scale and the operational efficiencies that come from this. Similarly, transportation and public safety agencies can sometimes consolidate similar services and gain efficiencies for operations that may be provided on a regional basis. Agencies that collaborate in these kinds of consolidations report that they are able to reduce their costs to provide the service. Some also report being able to provide users with a service that feels more uniform and less fragmented.

Agencies benefit by consolidating services through reduced operating costs and enhanced services and, in the case of incident management, increased responder safety.

Some examples:

- Faced with a severe reduction in local revenue, four public transit systems serving the agricultural community of Merced County, CA found their services severely threatened. Elected officials from Merced County and its six incorporated cities realized consolidating the services of the four transit systems could reduce their collective operating costs enough to preserve the transit service to customers in this community. These discussions led to the formation of **"The Bus"—Merced County Transit,** and the signing of a joint powers agreement between the various transit agencies and jurisdictions. Through the consolidation, these agencies decreased combined annual operating expenses by over $150,000 in the first year while growing ridership by approximately 17 percent.[5] They eliminated duplication of administrative and overhead costs and managed to increase levels of service, particularly to senior citizens, disabled residents, and smaller communities. The new partnership has also increased customer service by providing a seamless transit network and single place to call for transit service. As an added benefit, they have also increased access to additional funding. Over the last 8 years, Merced County has received almost all of the CMAQ funds for the region to update its fleet and acquire environmentally friendly buses. The Merced County Transportation Manager reports that if these agencies had not consolidated their transit services, they would need to compete for those dollars and the money would not go nearly as far. The consolidation has shifted the momentum of Merced County Transit from one in which transit was threatened, to one in which the service is thriving.

Source: Merced County Transit

Through collaboration, Merced County has been able to increase levels of service, particularly to elderly and disabled through Dial-A-Ride.

- Six cities in the Phoenix metropolitan area hold intergovernmental agreements with Maricopa County DOT to participate in **REACT,** a regional emergency response team operated by Maricopa County DOT that responds to major arterial incidents within their jurisdictions. REACT provides equipment and trained personnel to manage traffic during incidents that are expected to last at least 1 hour and require the closure of at least one traffic lane. REACT teams respond in trucks fully equipped with electronic signs and barricades to quickly and skillfully manage the scene. The City of Glendale calls on REACT at least once a week, which relieves at least four officers from the responsibility to manage traffic for around 5 to 10 hours each. That saves the City of Glendale 20 to 40 staff hours at least once a week. The service provided by REACT helps to protect public safety personnel. Prior to REACT, the City of Glendale reports it had drivers "plow through" incident scenes and into police cars. A 2002 cost/benefit study of REACT reported a benefit-cost ratio of 6.4:1. [6]

Source: Maricopa Department of Transportation

REACT responds to an incident in the Phoenix metropolitan area.

- **NITTEC** provides its member agencies with a 24/7 Traffic Operations Center. NITTEC employees operate selected ITS equipment for members, disseminate information to the public and member agencies, and provide call-out services for incident response, road weather management, and ITS infrastructure maintenance.

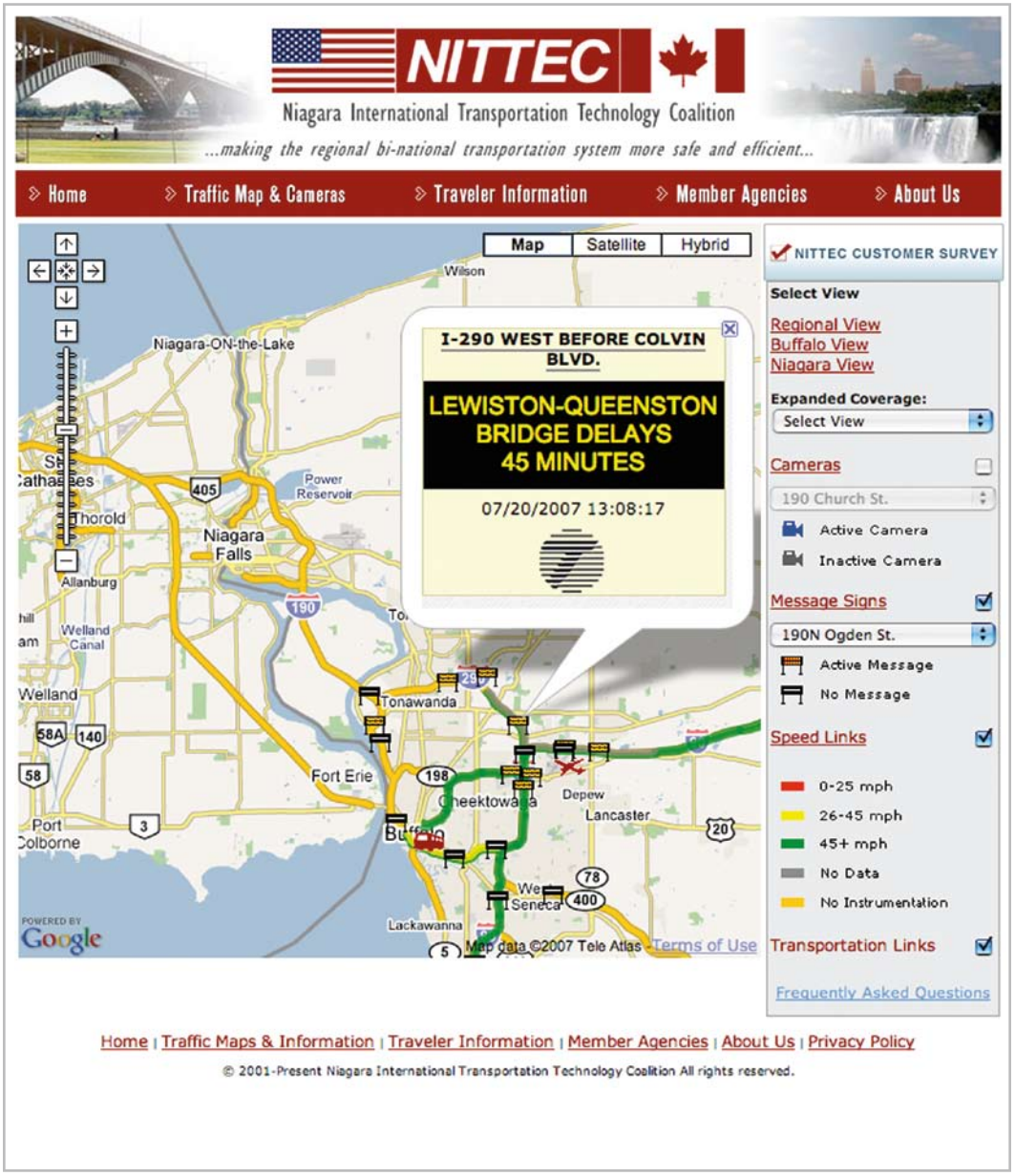
  NITTEC serves as a traveler information clearinghouse that gathers real-time video of roads in and around the region with cameras, incident data using vehicle detector stations, travel times with TRANSMIT readers, and road weather information with a series of sensors. This information is then shared with the NITTEC partners and the public through a single, state-of-the-art website. By pooling their transportation information through NITTEC, the agencies are able to provide the traveler with a comprehensive view of the region and a greater level of customer service than any one agency could alone. NITTEC partners are also able to perform their operations more efficiently. The road weather information is used by maintenance crews to efficiently treat the road surfaces. The live camera images provide valuable information to first responders on the location of incidents, making their work more efficient.

5 *1997 National Transit Database and Shankland, Larry, Transit Consolidation "The Bus"—Merced County Transit's Story, 1997, unpublished.*

6 *Battelle Memorial Institute for the Maricopa County Department of Transportation, Regional Emergency Action Coordination Team (REACT) Evaluation (Phoenix, Arizona, 2002).*

INSIGHT

A common fear of agencies considering consolidated services is loss of control. Providers of joint services such as NITTEC and Merced County Transit help to resolve this issue by setting up a governance structure that allows each agency to have a voice in the direction of the service. Additionally, directors who work closely with member agencies and are responsive to their individual needs significantly reduce issues of control.



3.10 All Together Now

Agencies performing joint operations, working side-by-side to manage and operate the transportation system, increase their efficiency and effectiveness. Conducting joint operations often means sharing assets, leveraging staff, sharing information, and working from common procedures. This kind of joint operation may be routine in the case of a shared TMC or may occur on an as-needed basis to handle an intense but short-lived incident, special event, or emergency. Combining several collaborative strategies has been shown to be remarkably effective in increasing operational productivity and effectiveness.

Benefits realized by agencies that collaborate in joint operations include ***reduced staff time and operating costs, increased access to specialized equipment, improved effectiveness, and improved service to the traveling public.***

An example:

- A host of agencies in Arizona decided to execute joint operations for **Phoenix International Raceway (PIR) Special Events Management.** The 400-acre PIR is situated in the southwest part of the Phoenix metropolitan area with limited freeway and arterial street access. It is host to several major events such as NASCAR races that can attract more than 200,000 people. It is an understatement to say that traffic management is challenging.

  These partners—which include Maricopa County DOT, Maricopa County Sheriff's Office, Arizona DOT, the Arizona Department of Public Safety, PIR officials, and M&M Parking Consultants—conduct joint operations to plan and implement effective event management strategies to get out timely and accurate motorist information, manage traffic, and reduce demand.

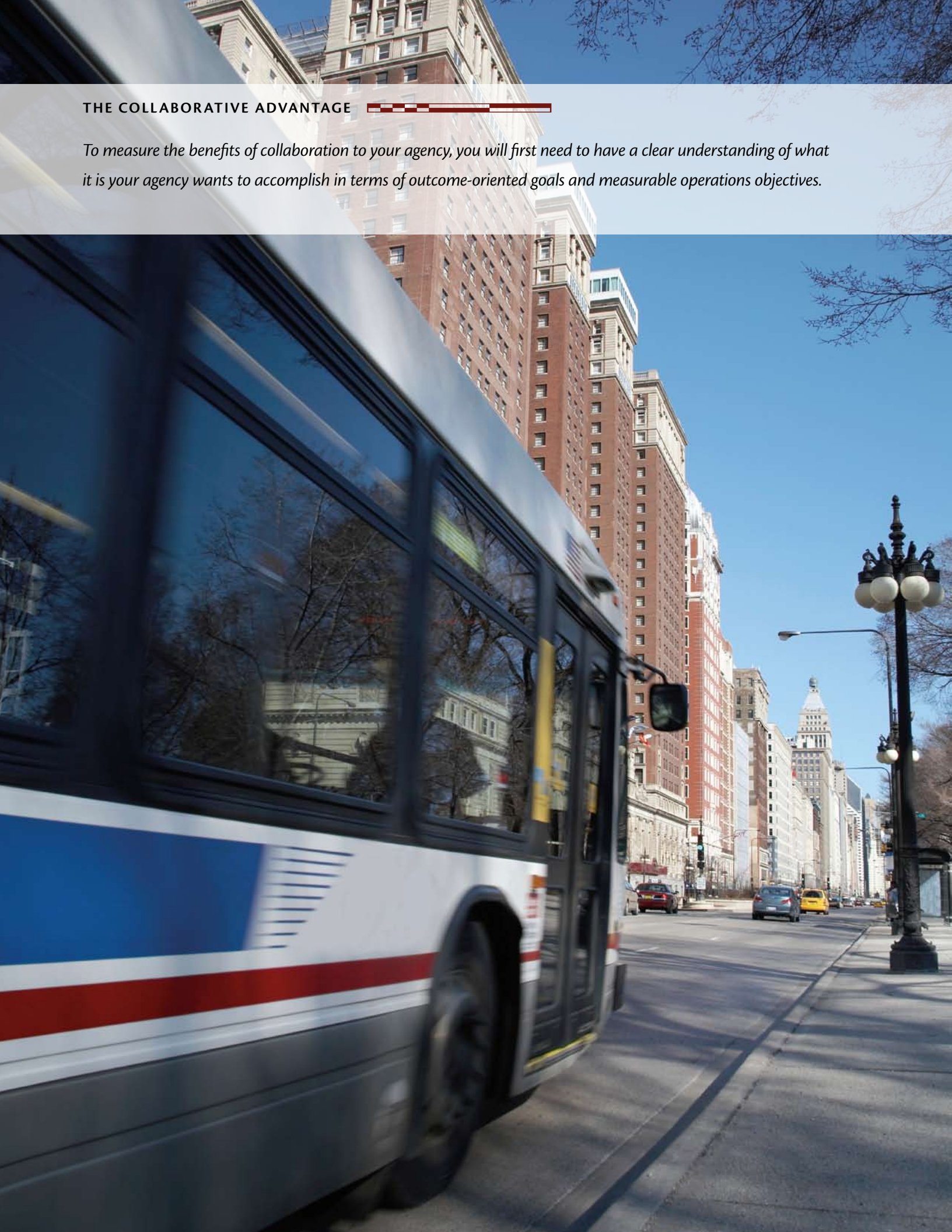
Source: Maricopa County Department of Transportation

Attendees arriving at the Phoenix International Raceway.

A CLEAR BENEFIT

The joint traffic management strategies at Phoenix International Raceway (PIR) special events have reduced total time to clear the parking lot after a NASCAR Winston Cup Race from 5.5 hours in 1998 to 2.5 hours in 2005—a remarkable improvement given that traffic volume more than tripled over the three-day event.[7]

7 *Swart, Nicolaas, Maricopa County Department of Transportation, "Phoenix International Raceway Traffic Management," Talking Operations Web Seminar, April 26, 2006.*



THE COLLABORATIVE ADVANTAGE

To measure the benefits of collaboration to your agency, you will first need to have a clear understanding of what it is your agency wants to accomplish in terms of outcome-oriented goals and measurable operations objectives.

4.0 Identifying the Tangible Benefits of Collaboration to Your Agency in Six Steps

By definition, collaboration requires an investment among its partners. It requires some investment of staff time and some investment in relationships in order to work effectively within a collaborative partnership. The question for agencies involved in transportation operations is whether the investment in a given collaboration will yield sufficient benefits to them to make it worthwhile.

Most of the individual agencies involved in the collaborations examined for this manual chose to collaborate with neighboring agencies because they intuitively knew they would benefit from the partnership. With a few exceptions (Merced County Transit is one), they did not engage in a formal predictive assessment of the benefits of collaboration. While the agencies in each of the collaborative partnerships examined are unanimous in their conviction that they have benefited, few conducted a formal evaluation to measure benefits of their collaborative partnerships.

Yet, in an era where agencies increasingly desire to undertake performance measurement to baseline and evaluate their operational effectiveness, it is reasonable that agencies may be interested in assessing whether it is worthwhile to pursue a collaborative approach as a means to achieve their goals or whether they are better off working toward them on their own. Further, while collaboration among public agencies in regional transportation operations is on the rise, there are still a number of agencies who may feel uncertain, at best, as to whether it is really in their agency's best interest to collaborate with other agencies and risk diminished control. Finally, agencies may want to evaluate the relative benefits of collaboration to convince their management and key stakeholders to invest in the collaboration.

The following is a step-by-step guide that can be used by agencies to assess whether it is in their best interest to collaborate and to determine what tangible benefits they can anticipate. This approach is designed to be flexible and scalable by agencies—some may choose to apply it for rigorous cost-benefit analysis and others may apply it more loosely to gain a general understanding of the types of benefits they can expect to accrue.

Step 1. Begin With the End in Mind

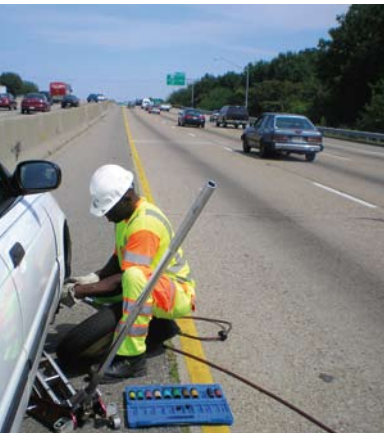
Begin with clearly defined goals and measurable operations objectives for your agency. If you want to measure the benefits to your agency of collaborating with other agencies, you will first need to have a very clear understanding of what it is your agency wants to accomplish. These should be documented as outcome-oriented goals and associated objectives. Skipping this step won't make it impossible to measure benefits, but it will make it harder to measure anything related to effectiveness.

To meaningfully measure the benefits of collaboration (or the effectiveness of any activity), the objectives the agency would like to achieve through a collaborative partnership should be SMART.

A good objective is SMART:

- Specific
- Measurable
- Attainable
- Results-oriented
- Time-constrained

This may be documented in your agency's strategic plan, or your division's annual plan. They may be specific to one operational area, such as traffic incident management or signal coordination, or they may cross multiple operations areas. These are goals and objectives that pertain to an agency—not regional goals and objectives.



Source: Virginia Department of Transportation

Freeway service patrols help to minimize the impact of incidents on transportation system performance.

These steps will allow transportation professionals to:

- Realistically project expected benefits of a proposed collaborative initiative
- Credibly quantify benefits of an existing initiative
- Maximize benefit return to the initiative and the agency through participation.

In order to be able to measure or evaluate the benefits of collaboration, you must begin with measurable objectives that are tied to meaningful goals. You may want to flag goals or objectives that are not attainable alone—those that require collaboration to accomplish. Many of the agencies interviewed for this report were initially attracted to collaborative approaches because they realized that certain goals were not attainable on their own.

Table 2 provides a snapshot of an example goal, objective, and measure of effectiveness. In this example, this objective cannot be attained by a single agency alone. It requires collaboration with other agencies that are involved in incident management. Ideally, they would all share a common goal of ***decreasing incident clearance time*** and so might be open to collaborating to achieve this shared goal. Note that ideally the agency also indicates the sources of data for measuring the effectiveness (and in many cases, this, too, requires collaboration if the objective is one that cannot be done alone).

GOAL	OBJECTIVE	MEASURE OF EFFECTIVENESS (MOE)
Improve traffic flow through city.	After non-HAZMAT incidents, clear the roadway of all evidence of an incident within 90 minutes 80% of the time.	Roadway is clear and all responders have left the scene within 90 minutes of an incident in 80% of cases.

Table 2: Snapshot of an agency's goal, objective, and measure of effectiveness.

Step 2. Know What You Need

Identify the activities and resources needed to achieve your goals and objectives within the necessary timeline. Next, you will want to have a sense for what is involved in accomplishing those goals and objectives—either generally or more specifically. Needed resources may include agreements or information in a timely manner as well as specialized equipment or expertise.

You likely would go through this step, regardless of whether you choose to pursue a collaborative strategy to achieve your goals and objectives. It is helpful in measuring benefits, because this is where you define tangible resources that are needed to accomplish specific goals and objectives. In many cases, these resources may only be available through partnering, or resources may be able to go farther because of partnering.

GOAL	OBJECTIVE	MOE	NEEDED RESOURCES
Improve traffic flow through city.	After non-HAZMAT incidents, clear the roadway of all evidence of an incident within 90 minutes 80% of the time.	Roadway is clear and all responders have left the scene within 90 minutes of an incident in 80% of non-HAZMAT cases.	Agreements with law enforcement to notify us of an incident.
			Agreements with medical examiner to communicate status including once they've left the scene.
			CAD data sharing agreements with law enforcement.
			Real-time information exchange capability with law enforcement and TMC, including T1 lines.
			Traffic counts before, during, and after incidents.

Table 3. Description of needed resources for achieving agency's goal and objective.

Step 3. Know Your Options

After you've identified what you need, you'll want to examine your options for accomplishing your goals and objectives. If, like in our example, you require a collaborative arrangement in order to achieve the goals and objectives, you'll want to examine whether there is an existing forum that could be leveraged for this purpose, or whether a new collaborative forum may be needed. You will want to identify potential collaborative partners who possess shared interests and who may possess needed or complementary expertise or resources. This will help to provide a roadmap for engaging in dialogue with these partners and to clarify what support you believe you need in order to accomplish the goals and objectives (bear in mind you are likely on their list as well!). In some cases, this may be a collaborative partnership or forum in which your agency is already a member.

GOAL	OBJECTIVE	MOE	NEEDED RESOURCES	SOURCES
Improve traffic flow through city.	After non-HAZMAT incidents, clear the roadway of all evidence of an incident within 90 minutes 80% of the time.	Roadway is clear and all responders have left the scene within 90 minutes of an incident in 80% of non-HAZMAT cases.	Agreements with law enforcement to notify us of an incident.	This is being done for special events through…. We could leverage this through our TIM Coalition.
			Agreements with medical examiner to communicate status including once they've left the scene.	
			CAD data sharing agreements with law enforcement.	IT Division of State police maintains their CAD system and has offered to make it available to us.
			Real-time information exchange capability with law enforcement and TMC.	This would require a new agreement. State police are planning to upgrade their CAD system. If we talk to them now we could maybe persuade them to build this into the requirements.
			Traffic counts before, during, and after incidents.	We need to put more sensors out on the roads in key incident areas.

Table 4. Example of sources for an agency's needed resources.

Step 4. Estimate Your Options

To actually estimate and ultimately measure the benefits of collaboration requires an understanding of the relative cost of the alternatives—in this case collaborating with partner agencies or going it alone.

An easy way to do this is to simply review the needs identified in Step 2, the resources identified in Step 3, and estimate how you would expect to achieve the various required activities or obtain the various needed resources under both scenarios. Estimate the requirements and the expected operational gains for accomplishing those activities within the necessary timeline.

Nearly all of the agencies interviewed in the collaborative initiatives examined in this report spoke in terms of the perceived benefits of collaboration relative to the alternative of what they could have accomplished alone. As mentioned above, in many cases, these agencies simply could not have accomplished certain objectives alone—such as implementation of seamless multi-jurisdictional traveler information achieved by the High Plains Coalition or the improvements in traffic incident response achieved in the State of Maryland through the Maryland National Capital Region's ROC Committee.

In our example below, this agency will require collaboration to obtain at least four resource inputs that are needed to achieve the objective. This agency will need to either leverage an existing collaborative forum or create a new partnership among agencies that share this common goal. In this case, the agency may choose to address this goal through its existing TIM coalition in which it is already active.

GOAL	OBJECTIVE	MOE	NEEDED RESOURCES	COLLABORATIVE OPTION	ALONE OPTION
Improve traffic flow through city.	After non-HAZMAT incidents, clear the roadway of all evidence of an incident within 90 minutes 80% of the time.	Roadway is clear and all responders have left the scene within 90 minutes of an incident in 80% of non-HAZMAT cases.	Agreements with law enforcement to notify us of an incident.	This is being done for special events through our TIM Coalition.	Can't do alone.
			Agreements with medical examiner to communicate status including once they've left the scene.	Law enforcement has one; maybe we could get them to extend it to include us.	Can't do alone.
			CAD data sharing agreements with law enforcement.	IT Division of State police maintains its CAD system and has offered to make it available to us.	Can't do alone.
			Real-time information exchange capability with law enforcement and TMC.	This would require a new agreement. State police are planning to upgrade their CAD system. If we talk to them now we could maybe persuade them to build this into the requirements.	Can't do alone.
			Traffic counts before, during, and after incidents. We need to put more sensors out on the roads in key incident areas.	We'd need to provide.	Would require 10 more sensors at an estimated cost of $100K/sensor. 0.5 staff person to monitor and maintain the equipment at an estimated cost of $35K/annually.

Table 5. Example showing the options for obtaining needed resources through collaboration or alone.

Step 5: Track Your Strategies

As you meet with your collaborative partners and begin to work towards your goals and objectives, you may want to keep track of some of the strategies you are employing in order to accomplish your objectives, and track the various resources that the strategies are helping to fulfill. Note also the resources your agency is contributing to the collaboration for the various goals and objectives. This represents the link between your agency's contributions to the collaborative endeavor and the benefits it enjoys from the partnership (i.e., resources it is contributing and resources it is accessing to accomplish its goals and objectives). Table 6 depicts a sample of how this might be tracked.

GOAL	OBJECTIVE	MOE	NEEDED RESOURCES	COLLABORATIVE STRATEGIES
Improve traffic flow through city.	After non-HAZMAT incidents, clear the roadway of all evidence of an incident within 90 minutes 80% of the time.	Roadway is clear and all responders have left the scene within 90 minutes of an incident in 80% of non-HAZMAT cases.	Agreements with law enforcement to notify us of an incident.	*On the Same Page*—Creating common procedures, plans, and standards.
			Agreements with medical examiner to communicate status, including once they've left the scene.	
			CAD data sharing agreements with law enforcement.	
			Real-time information exchange capability with law enforcement and TMC.	*All Together Now*—Conducting joint operations.
			Traffic counts before, during, and after incidents.	

Table 6. Example of tracking strategies used to obtain needed resources.

Step 6: Develop an Annual Report

Finally, to actually assess the benefits of collaboration, your agency will want to look back to its goals and objectives, and the measures of effectiveness that it defined for itself at the start (or in the last update cycle). This provides the objective baseline from which to evaluate the benefits of collaboration. For each goal and objective, the agency will evaluate whether the goals and objectives were achieved and how effectively they were achieved.

The agency can review the specific aspects of the achieved goals or objectives as a direct result of the collaboration, as in the case of Denver's TSSIP partners who have acknowledged their traffic signal goals could not have been achieved without this partnership.

This review will also illuminate elements of the agency's goals or objectives that were enhanced as a result of the collaboration, such as gains in operational efficiency or effectiveness that would not have been possible at that level had the agency pursued that activity on its own. An example of this would be Merced County, which was providing services to its residents long before the joint transit operation was established, but was able to increase services as a direct result of its collaboration.

An annual report will help to clearly identify tangible resources your agency was able to procure or access through the collaboration—including specialized equipment, facilities, or additional staff or expertise—that came at a reduced cost or at no cost. It may help to provide a baseline for estimating the time savings of staff members who accomplished the same objectives previously without the collaboration in place.

This kind of review is ideal some time after the collaboration has begun, and ideally annually after it has been underway long enough to bear fruit. An annual report can be an excellent way to not only evaluate the benefits of collaboration towards specific agency objectives and priorities, but also document those benefits to make it easier to obtain the needed support for future collaborative endeavors.

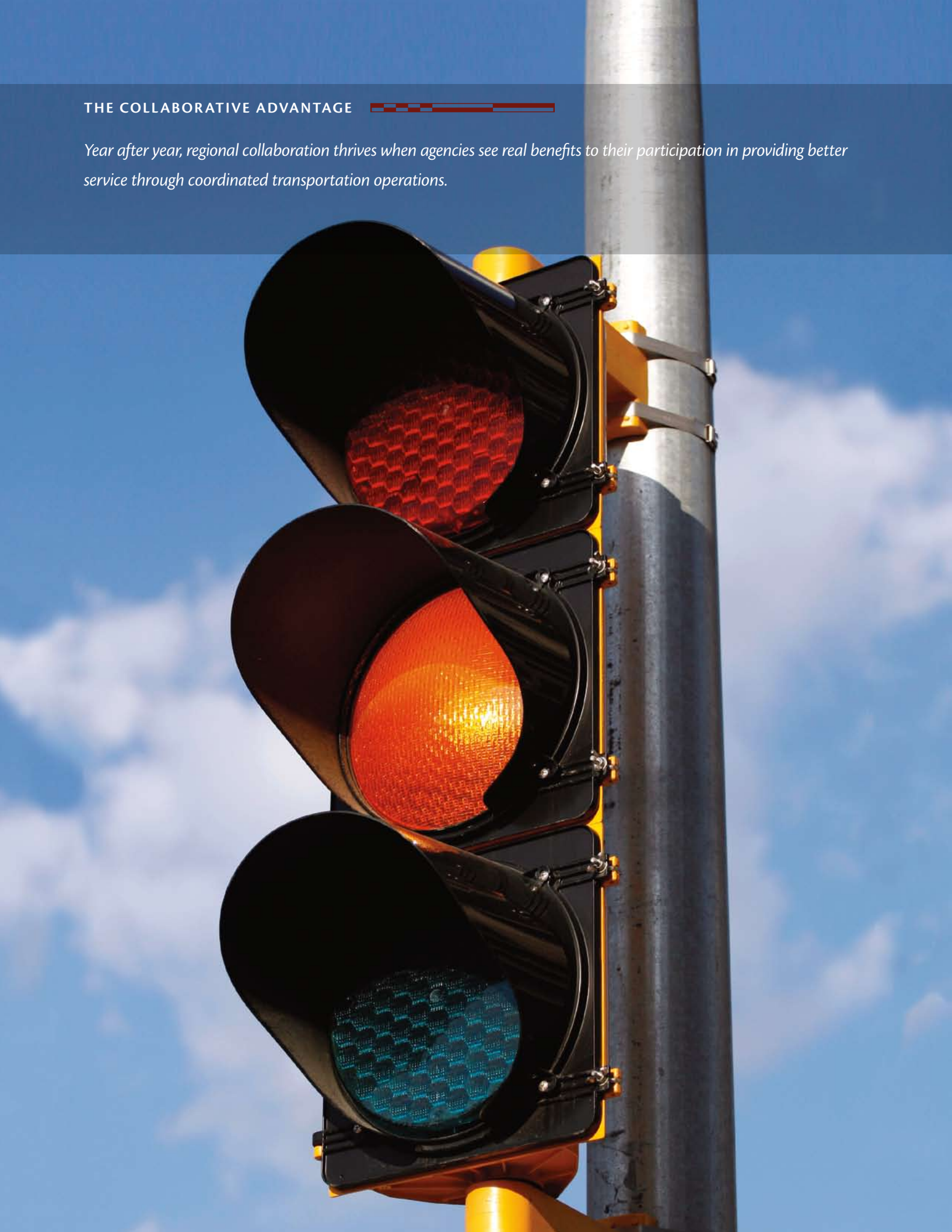
Together, this documentation provides a standard baseline from which the benefits of collaboration to public agencies can be objectively measured and evaluated.

GOAL	OBJECTIVE	MOE	NEEDED RESOURCES	COLLABORATIVE STRATEGIES	RESULTS
Improve traffic flow through city.	After non-HAZMAT incidents, clear the roadway of all evidence of an incident within 90 minutes 80% of the time. ACHIEVED The roadway was cleared in an average of 65 minutes for 85% of non-HAZMAT incidents.	Roadway is clear and all responders have left the scene within 90 minutes of an incident in 80% of non-HAZMAT cases.	Agreements with law enforcement to notify us of an incident.	*On the Same Page*—Creating common procedures, plans, and standards.	By co-locating in a shared TMC, DOT is instantly aware of all incidents.
			Agreements with medical examiner to communicate status, including once they've left the scene.		
			CAD data sharing agreements with law enforcement.		We expanded existing agreements to include DOT and are now notified when law enforcement is notified.
			Real-time information exchange capability with law enforcement and TMC.	*All Together Now*—Conducting joint operations.	Data sharing requirements have been included in specs for next CAD version. In the meantime, co-location provides close to real-time information through shared video and dispatch.
			Traffic counts before, during, and after incidents.		The money we saved not having to pay for a separate interface into the CAD system is being used to purchase additional sensors.

Table 7. A quick illustration of items that may be on an agency's annual report about the benefits of a collaborative activity.

THE COLLABORATIVE ADVANTAGE

Year after year, regional collaboration thrives when agencies see real benefits to their participation in providing better service through coordinated transportation operations.



5.0 Summary

This manual helps to illustrate "what's in it" for agencies that choose to collaborate on transportation operations by highlighting the tangible benefits enjoyed by agencies participating in a collaborative activity. Additionally, it offers a framework for understanding the benefits of collaboration to the participating agencies. A collaborative benefit to an agency is an outcome of the collaborative effort that assists that agency in achieving its goals and objectives more efficiently and effectively. These benefits may impact the resources available to the agency for operations, the operations of the agency, and the outcomes the agency is striving for, such as increased mobility or customer service. Finally, a simple six-step process was outlined that will allow agencies to estimate the potential benefits to transportation operations collaboration.

In examining existing collaborative efforts, the following common strategies and associated benefits were discovered:

"FOLLOW THE MONEY"—Collaborative Pursuit of Funding

- Agencies enjoy increased access to additional funding.
- Agencies often have a greater influence over how funding is spent in the region.
- Agencies experience both time and cost savings in the preparation of a funding application.

"GET SMART"—Sharing Expertise and Joint Learning

- Agencies advance their operational capabilities.
- Agencies retain their best employees by creating more stimulating working environments for their staff.
- Agencies avoid "re-inventing the wheel," which saves staff time and money.

"WITH ONE VOICE"—Coordinating Communications and Giving a Consistent Message

- Agencies increase customer satisfaction and motorist response by providing consistent information and a single interface.
- Agencies often improve their outcomes in negotiations with vendors.

"ON THE SAME PAGE"—Developing Common Procedures, Protocols, and Plans

- Agencies that collaborate to develop joint traffic plans are able to move traffic more efficiently in and out of the area.
- Agencies that develop collaborative plans for ITS/operations reduce duplicative efforts and ensure compatible systems.

"ON THE SAME PAGE"—Developing Common Procedures, Protocols, and Plans (cont.)

- Agencies that have developed common operating standards benefit from optimized cross-jurisdictional operations such as signal timing and traveler information.

"MEASURING UP"—Jointly Measuring Performance

- Performance measurement within a collaborative effort helps agencies to sustain funding for their efforts.
- Performance measuring enables agencies to evaluate the effectiveness of their collaborative efforts and make adjustments to reach their agency goals and objectives.

"YOU OUGHT TO KNOW"—Sharing Transportation Information

- Agencies can better inform travelers and prepare their own facilities to lessen the impacts of congestion spilling over jurisdictional boundaries.
- Agencies save time in responding to incidents.

"CAN YOU HEAR ME NOW?"—Developing Tools for Efficient Communications

- Agencies increase efficiency in assisting stranded motorists.
- Agencies more easily exchange information and assistance with partners in the field.

"SHARING THE WEALTH"—Sharing Resources

- Agencies save money and boost their operational capabilities.
- Agencies are enabled to create a better product than they could by working alone.

"BUILDING ECONOMIES OF SCALE"—Consolidating Services

- Agencies benefit by reduced operating costs and enhanced services, and in the case of incident management, increased responder safety.

"ALL TOGETHER NOW"—Performing Joint Operations

- Benefits realized by agencies include reduced staff time and operating costs, increased access to specialized equipment, improved effectiveness, and improved service to the traveling public.

The numerous benefits of collaboration cited by transportation and public safety professionals throughout this manual show that agencies find collaboration to be a highly effective and often a necessary approach to managing and operating the transportation network on a regional level. By working together, agencies save money, use their resources more efficiently, gain valuable knowledge, and avoid duplicating efforts. This enables them to provide a coordinated, seamless experience to the public through improved services such as traveler information, incident management, traffic signal operations, special event management, and transit management. Ultimately, the benefits of multi-agency collaboration extend beyond the agency to all in the form of reduced congestion, improved safety, and greater security.

THE COLLABORATIVE ADVANTAGE

Agencies in our region quickly shifted from "a project mentality to an operations mentality." We realized early on that we could not just build a road and walk away but that we needed to constantly come back to the table to share information and coordinate our operations.

—Faisal Saleem, ITS Supervisor and AZTech Project Manager
Maricopa County Department of Transportation

Appendix A: Collaboration Profiles

In Section 3, examples of benefits gained by nine transportation operations collaborative efforts were highlighted. The partnerships were chosen for their active and ongoing collaborative activities that have resulted in tangible benefits for their participating public agencies. The collaborative efforts span operations areas such as transit, road weather management, and construction coordination, but traveler information, incident management, and traffic signal operations are common themes among collaborative groups. This reflects the multi-agency, multi-jurisdictional nature of these operations activities, which has motivated agencies to work with their neighbors to be more effective in meeting those challenges.

The following collaborative efforts are featured in this manual:

- Hampton Roads ITS Committee
- High Plains Corridor Coalition
- Merced County Transit—"The Bus"
- Vancouver Area Smart Trek (VAST)
- Denver Region Traffic Signal System Improvement Program (TSSIP)
- Niagara International Transportation Technology Coalition (NITTEC)
- AZTech
- Maryland National Capital Region—Regional Operations Coordination Committee (ROCC)
- Virginia, Minnesota, Transportation Operations Communications Center (TOCC)

Hampton Roads ITS Committee

Location

Southeast Virginia.

Description

The Hampton Roads ITS Committee formed in the early 1990s under the guidance of the Hampton Roads MPO to coordinate and guide cross-jurisdictional ITS initiatives. The idea for the ITS committee came out of the development of a long-range ITS plan by a small group of champions in the region. They wanted to strengthen the ties between planning and operations with regard to ITS and coordinate ITS between agencies and modes. The champions brought together local operators and traffic engineers who saw the value in talking with each other about technical and institutional issues and working together to ensure compatibility across jurisdictional boundaries.

The committee has gained strength over the years and now includes public safety participants. A working group to develop an RCTO for incident management was formed in response to a major incident on a bridge that caught the attention of elected officials. In addition, the committee is working on regional data archiving and assesses operations projects that are brought to the MPO for CMAQ and regional STP funds.

Operational Areas

Freeway and arterial management, emergency and incident management, transit management, planned special events, traveler information.

Participating Agencies

Cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg; and the Counties of Gloucester, Isle of Wight, James City, Southampton, Surry, and York; local transit agencies, Virginia Department of Transportation, Virginia State Police, Virginia Port Authority, Department of the Navy, Federal Highway Administration, representatives from first responders/incident management committee, and the Hampton Roads Planning District Commission (MPO).

Benefits

- Improved efficiency of the MPO's CMAQ project solicitation process by substantially reducing the annual number of CMAQ project submittals while at the same time improving the quality of CMAQ project applications. Project submittals became more regional in nature and thus more beneficial to air quality and congestion relief.
- Coordinated road/bridge/tunnel closures and maintenance work across jurisdictional boundaries to reduce congestion impacts of closures and construction/maintenance on major facilities.
- Facilitated regional traffic signal coordination to meet air quality attainment goals.
- Police and fire became aware of the importance of clearing an incident quickly to avoid congestion.
- Joint purchasing arrangements that save money.
- Coordinated security and safety planning for mass evacuation during a hurricane event and access to major naval port facilities.

For More Information

Camelia Ravanbakht, HRPDC. Email: cravanbakht@hrpdcva.gov.
Stephany Hanshaw, Virginia DOT. Email: stephany.hanshaw@vdot.virginia.gov.
Web: http://www.hrpdcva.gov.

High Plains Corridor Coalition

Location

States of Nebraska, Colorado, and Kansas.

Description

The High Plains Corridor Coalition is a partnership led by Nebraska between three predominantly rural States with the mission to "support safe and efficient travel through a cooperative program of multi-state data sharing and dissemination of effective information to travelers." The States came together in 2001 to discuss how the States could better coordinate traveler information on adverse weather conditions and incidents impeding travel on their common interstate highways. A common challenge for these States is the lack of alternate routes available to travelers in this multi-state region and frequently alternate routes must be chosen in a different state before entering the coalition region. Through the monthly meetings and increased inter-agency contacts that have resulted from the coalition, the State departments of transportation have significantly improved the inter-State coordination during major incidents including adverse weather.

The High Plains Corridor Coalition membership has evolved over time as leadership and funding availability in State departments of transportation changed. In 2005, Nebraska, Colorado, and Kansas embarked on a Transportation Pooled Fund Study to realize their vision of a Web-based traveler information network for both the DOT and Department of Roads (DOR) field personnel and the traveling public. As members of the Pooled Fund Study, the States have committed to $100,000 each for the first 2 years and $50,000 each for years three, four, and five.

The coalition consists of an executive committee of State DOT/DOR directors, a steering committee of State ITS managers/coordinators, and a working group of State transportation maintenance superintendents and staff. The working group has met apart from the coalition for the past 20 years on coordinating winter maintenance across state lines.

Operational Areas

Traveler information, road weather management, incident management, commercial vehicle operations.

Participating Agencies

Colorado Department of Transportation, Kansas Department of Transportation, and Nebraska Department of Roads.

Benefits

- Each State is better able to divert travelers from closed or impaired roads with the assistance of its neighboring States that provide information to drivers in time to take an appropriate detour.
- Three States are able to share the cost for developing an information system that none of them would be able to afford alone.
- States gain information from partners on where to place traveler information signs and are generally able to gain permission from partners to place signs in partners' states.
- States are able to make progress towards agency goals of improving highway safety by diverting more travelers from dangerous roads.

For More Information

Rod Mead, Colorado DOT. Email: rod.mead@dot.state.co.us.

Merced County Transit—"The Bus"

Location

Merced County, California.

Description

Merced County Transit is a bus system that was established in July 1996 through the consolidation of the fixed route and/or dial-a-ride services of the City of Merced, Merced County, City of Los Banos, and City of Atwater. Merced County and the cities of Merced, Los Banos, Atwater, Dos Palos, Gustine, and Livingston adopted a joint powers agreement (JPA) forming Merced County Transit (MCT). MCT is governed by a JPA policy board that is the same board as the Merced County Association of Governments, the MPO for the region. The Merced County Department of Public Works manages and administers the program along with maintaining the buses. In the JPA, each jurisdiction agreed to a minimum level of service and a cost-sharing arrangement such that each jurisdiction contributes its State Transportation Development Act (TDA) funds based on the number of service hours in its area.

The idea to consolidate transit services originated in the 1990s during the annual city/county dinner for elected leaders. Area agencies needed to cut costs in order to address a funding shortage and there was interest in providing a better level of transit service throughout the county.

Merced County Transit operates fixed-route service within the city of Merced, intercity fixed routes, dial-a-ride in outlying communities, and services that are compliant with the Americans with Disabilities Act. Merced County Transit's annual ridership is approximately 904,000 on fixed routes and 150,000 on demand responsive services.[8]

Operational Areas

Transit service management.

Participating Agencies

Merced County and the Cities of Merced, Los Banos, Atwater, Dos Palos, Gustine, and Livingston.

Benefits

- Cost savings to participating agencies. Immediately after consolidation, Merced County saved around $150,000 in transit expenses. Administrative costs decreased.
- Increased levels of service. MCT has been growing ever since consolidation. Without consolidation, it is estimated that agencies would have had to significantly cut services. Smaller communities receive more frequent service each day.
- Increased accountability and attention to unmet transit needs.
- MCT has been able to attract almost all of the region's CMAQ funding over the past 8 years.
- Reduced service duplication.

For More Information

Larry Shankland, Merced County Department of Public Works.
Email: hhls@co.merced.ca.us. Web: http://www.mercedthebus.com/.

[8] *2005 National Transit Database*

Vancouver Area Smart Trek (VAST)

Location

Clark County, Washington.

Description

The Vancouver Area Smart Trek (VAST) partnership was formed in 2000 – 2001 during the development of a strategic ITS plan for the transportation agencies of Clark County, Washington. Initiated by the City of Vancouver, VAST leadership was transferred early on to the area's MPO, the Southwest Washington Regional Transportation Council. The partnership was formed to collaboratively implement and use ITS applications to expand services and improve the operation, safety, and efficiency of the transportation system in Clark County. VAST members meet regularly through a steering committee that is in charge of coordinating and endorsing projects and a communications infrastructure committee that works at the technical level to facilitate a shared communications infrastructure.

Members of VAST recently signed a Regional Communication Interoperability and Fiber Agreement to facilitate asset sharing. VAST efforts have also included developing a one-stop local traveler information Web site, integrating traffic signals along major corridors and public outreach to increase the visibility of operations in the region. VAST has partnered with Portland, Oregon, to coordinate traveler information, and has been successful in obtaining $6 million to $7 million in CMAQ funds and $5 million in earmarks.

Operational Areas

Traveler information, transit management, incident management, freeway and arterial operations, and communications.

Participating Agencies

The Southwest Washington Regional Transportation Council, the City of Vancouver, the Washington State Department of Transportation, C-TRAN (transit), Clark County, the City of Camas, and the Oregon Department of Transportation.

Benefits

- Partner agencies "bundle" together their respective project needs into a joint funding application developed by RTC to obtain CMAQ funding and save time preparing their applications.
- VAST agencies provide better information to travelers in a seamless manner through a joint Web site hosted by Washington DOT.
- VAST has enabled the City of Vancouver to save staff time when adjusting signal timing remotely through the communications network and central signal system. The city is now retiming corridors every 3 years.
- Clark County, the City of Vancouver, and Washington State DOT currently share fiber, reducing costs for the agencies and increasing communications capabilities.

For More Information

Bob Hart, Southwest Washington Regional Transportation Council.
Email: bob.hart@rtc.wa.gov. Web: http://www.vastrek.org.

Denver Region Traffic Signal System Improvement Program (TSSIP)

Location

Denver, Colorado, metropolitan area.

Description

The Denver Region Traffic Signal System Improvement Program (TSSIP) is a collaborative effort among Denver Regional Council of Governments (DRCOG) and approximately 30 local signal operating agencies for the primary purpose of implementing cost-effective traffic signal timing and coordination improvements within the Denver region. The program generally includes only signals on principal arterials that are in the long-range transportation plan and signals in the Denver central business district. Through the TSSIP, traffic signal system improvements are pursued through a combination of capital improvements to signal systems, systems studies and design, and timing and coordination. The program has expanded in the past 3 years to include transit signal priority, traffic responsive control, and incident management signal control.

The TSSIP is updated every 3 to 4 years through a collaborative planning process involving representatives from the region's operating agencies. DRCOG serves as the facilitator and its board of directors approves the program. The program is funded through the TIP with CMAQ funding at approximately $3.9 million per year.

DRCOG is responsible for coordinating the program. Regular program updates are made through a collaborative dialogue led by DRCOG and operating agencies work with each other to implement the projects defined in the program. In addition to coordinating the TSSIP, DRCOG typically works with operating agencies on each project in the TSSIP setting objectives, fine-tuning the timing plans, and computing the benefits. In turn, the operating agencies are responsible for maintaining and operating their signals, maintaining the timing, and reviewing and approving plans.

Operational Areas

Arterial management, transit operations, incident management.

Participating Agencies

Denver Regional Council of Governments, 28 local signal operating agencies, and 3 districts of the Colorado DOT.

Benefits

- TSSIP helps the operating agencies to more effectively and efficiently time their signals and improve their signal system infrastructure.
- TSSIP helps partner operating agencies to work towards agency missions and their goals of improving mobility and reducing air pollution. From 2003 through 2006, TSSIP reduced delays by nearly 36,000 vehicle hours per day, reduced fuel consumption by more than 15,000 gallons per day, and reduced air pollution emission by more than 45,000 pounds per day.[9]
- Signal operating agencies receive funding and technical assistance in re-timing traffic signals and capital improvements. Without this service, most agencies would fall behind on signal operations.

For More Information

Jerry Luor, Denver Regional Council of Governments. Email: JLuor@drcog.org. Web: http://www.drcog.org/index.cfm?page=TrafficSignalProgram.

9 *Denver Regional Council of Governments, "Traffic Signal System Improvement Program Draft 2007 Update Summary Report."*

Niagara International Transportation Technology Coalition (NITTEC)

Location

Niagara Frontier region of New York and Niagara region of Ontario, Canada.

Description

The Niagara International Transportation Technology Coalition (NITTEC) is a consortium of 14 agencies, authorities, and municipalities in the Niagara region of New York and Ontario that have come together under an MOU to work toward a common mission to "improve regional and international transportation mobility, promote economic competitiveness, and minimize adverse environmental effects related to the regional transportation system." Funded through Federal CMAQ and STP dollars, NITTEC supports an executive director and a staff of 14. Formally organized in 1995, NITTEC functions to coordinate transportation operations of its member agencies through the in-kind contributions of member executives and staff that serve on oversight councils or at least one of the four subcommittees: Traffic Operations Center, Technology and Systems, Incident Management, and Strategic Planning.

NITTEC provides its members a 24/7 Traffic Operations Center staffed by NITTEC employees who operate selected ITS equipment for members, disseminate information to the public and member agencies, and provide call-out services for incident response, road weather management, and ITS infrastructure maintenance. NITTEC serves as a traveler information clearinghouse that gathers real-time video of roads in and around the region with cameras, incident data using vehicle detector stations, travel times with TRANSMIT readers, and road weather information with a series of sensors. This information is then shared with the NITTEC partners and the public through a single, state-of-the-art Web site.

Operational Areas

Traveler information, incident management, special event planning and management, emergency management, environmental and road weather monitoring, construction coordination.

Participating Agencies

New York State Department of Transportation; New York State Thruway Authority; Ministry of Transportation Ontario; Buffalo and Fort Erie Public Bridge Authority; City of Buffalo; City of Niagara Falls, New York; City of Niagara Falls, Ontario; Erie County; Niagara Falls Bridge Commission; Niagara County; Niagara Parks Commission; Regional Municipality of Niagara; and Town of Fort Erie.

Benefits

- The TOC saves agencies such as the New York State DOT staff time and facilities by operating ITS equipment, providing them regional traveler information, and offering travelers important information.
- Police and fire/rescue agencies also save staff time by having a single point of contact for incident management assistance.
- By pooling their transportation information with the help of NITTEC staff, the agencies create a source of information that allows them to provide the traveler with a comprehensive view of the region and a greater level of customer service than any one agency could alone.
- Information provided through NITTEC allows partners to perform their operations more efficiently. The road weather information is used by maintenance crews to determine when and where to treat road surfaces.

For More Information

Thomas George, Executive Director, NITTEC. Email: tgeorge@nittec.org. Phone: 716-847-2450. Web: http://www.nittec.org.

AZTech

Location

Phoenix, Arizona, metropolitan area.

Description

AZTech is a partnership of Federal, State, local, and private entities led by the Maricopa County Department of Transportation and Arizona DOT to address a variety of regional operations issues in the Phoenix metropolitan area. The group is closely connected to regional transportation planning and includes many of the same agencies represented in the Maricopa Association of Governments ITS Committee. Joint initiatives that the region is pursuing include center-to-center communications, traffic signal optimization, arterial incident management, joint ITS procurements, and improving traveler information and system performance measurement.

AZTech began in 1996 when partners in the Phoenix region were awarded the ITS Metropolitan Model Deployment Initiative (MMDI) grant from the U.S. Department of Transportation. Guiding the direction of AZTech and the implementation of its programs is the AZTech Executive Committee, which meets every other month. In addition, AZTech members participate on an operations committee, an advanced traveler information systems (ATIS) working group, and a TMC operators working group that all meet on a regular basis to share information and carry out joint initiatives.

Below are a select few collaborative efforts that are part of the AZTech partnership.

Sky Harbor Airport ATIS

Traveler Information at the Phoenix Sky Harbor International Airport.

Maricopa County DOT, the City of Phoenix, Arizona DOT, and eight car rental agencies partnered to provide real-time surface transportation traveler information to flyers just before they pick up their rental car. For this effort, Maricopa County DOT provided most of the funding and also capitalized on the current regional archiving project. The City of Phoenix provides operations funding, maintains power, and maintains communications facilities. The Arizona DOT provides the traveler data and hosts the server.

REACT

Regional Emergency Response Team (REACT).

REACT is an emergency response team that focuses on incidents on arterials within multiple jurisdictions in the Maricopa region. It is funded by Maricopa County DOT and provides traffic management assistance during incidents through intergovernmental agreements with six local authorities.

Raceway Event Management

Phoenix International Raceway (PIR) Special Event Management.

The 400-acre PIR is situated in the southwest part of the Phoenix metropolitan area with limited freeway and arterial street access. PIR is host to several major events with attendance ranging from several thousand to more than 200,000. PIR event management stakeholders have partnered to plan and implement effective event management strategies to get out timely and accurate motorist information, manage traffic, and reduce demand. Participants include Maricopa County DOT, Maricopa County Sheriff's Office, Arizona DOT, the Arizona Department of Public Safety, PIR officials, and M&M Parking Consultants. The partners coordinate staff and utilize three control centers, lane reversal, radio, freeway VMS, and limited arterial VMS.

Operational Areas	Freeway and arterial management, incident management, transit management, archived data, center-to-center communications, traveler information, performance measurement.
Participating Agencies	Over 75 public and private agencies. Federal Highway Administration, Arizona DOT, Arizona Department of Public Safety, Arizona State University, Maricopa County, Valley Metro, Cities of Phoenix, Mesa, Glendale, Peoria, Scottsdale, and eight other cities or towns, local police and fire departments.
Benefits	• Saves agencies both time and money through statewide ITS procurement contracts established by Arizona DOT. • Provides transportation operations personnel access to regional fire and EMS dispatch data through center-to-center data integration. • Through the common usage of the same camera technology, agencies in the region are able to improve their operations by accessing cameras in other jurisdictions. This enabled the exchange of control over CCTV cameras per agreed-upon regional guidelines. • First responding agencies save staff time from REACT by freeing their personnel from directing traffic during major arterial incidents. • The jurisdictions that hold intergovernmental agreements (IGA) with REACT benefit by using fewer resources when handling an incident and save time by decreasing the time it takes to clear an incident. • A 2002 cost/benefit study[10] of REACT found that the benefit-to-cost ratio was 6.4:1. The estimated dollar value of benefits per incident was: • Traffic-related (delay, fuel, and emissions) = $1,500 • Safety-related (reduced risk for responders and secondary accidents) = $700 • Productivity-related (savings in police labor) = $240 • Agencies responsible for traffic management during special events at PIR were able to do their jobs more effectively and more efficiently by leveraging their resources and agreeing to a common traffic management plan. • Traffic management reduced total time to clear the parking lot after a NASCAR Winston Cup Race from 5.5 hours in 1998 to 2.5 hours in 2005 while the traffic volume over the 3-day event grew from approximately 86,000 to 264,000.[11]
For More Information	Faisal Saleem (faisalsaleem@mail.maricopa.gov) and Nicolaas Swart (nicolaasswart@mail.maricopa.gov), Maricopa County Department of Transportation. Web: http://www.aztech.org/.

10 Battelle Memorial Institute for the Maricopa County Department of Transportation, Regional Emergency Action Coordination Team (REACT) Evaluation Phoenix, Arizona, 2002.

11 Swart, Nicolaas, Maricopa County Department of Transportation, "Phoenix International Raceway Traffic Management," Talking Operations Web Seminar, April 26, 2006.

Maryland National Capital Region—Regional Operations Coordination Committee (ROCC)

Location

Maryland National Capital Region—Montgomery, Prince George's, Charles, and Frederick Counties.

Description

The Regional Operations Coordination Committee (ROCC) began in 1996 between three transportation agencies, the Maryland State Highway Administration, the Montgomery County DOT, and the Prince George's County DOT under the direction of the State Highway Administrator and the DOT directors who wanted to take action to mitigate traffic congestion caused by incidents. Early on, they included State and county public safety agencies and have since expanded to include surrounding counties.

Agency representatives at the operations and ITS levels attend monthly ROCC meetings staffed by one or two Maryland State Highway Administration employees and supported by consultants funded by Maryland SHA. During the meetings, operations personnel from member agencies review any recent responses to major incidents and identify any areas where inter-agency coordination should be improved. The partners work on moving joint projects forward and address any issues brought up by agencies that are impeding incident response or coordination.

Operational Areas

Transportation incident management and emergency management.

Participating Agencies

Maryland State Police (MSP); Maryland SHA) CHART; Montgomery County Police Department, Fire and Rescue Service, and Department of Public Works and Transportation; Prince George's County Police Department, Fire and Rescue Service, and Department of Public Works and Transportation; Federal Highway Administration (FHWA); U.S. Park Police; University of Maryland; Towing and Recovery Association; Maryland Office of the Chief Medical Examiner; Frederick County Police; Frederick City Police; Charles County Police; Tri-County Council for Southern Maryland; Maryland Emergency Management Association (MEMA).

Benefits

- Partners were able to improve the assistance they could give to Spanish-speaking motorists while sharing the development effort of the Spanish aid guide.
- Partners address the common issue of motorists in minor incidents who cause traffic congestion through the "Move It" program.
- The improvements in mutual aid between State and county police departments have helped the Maryland SHA when it is responding to an incident. SHA responders can now call on more agencies for assistance than before.
- The Montgomery County DOT developed an arterial incident response program with ROCC's guidance.
- Prince George's County benefited from a joint effort to obtain funds to build a traffic operations center in its jurisdiction.

For More Information

Egua Igbinosun, Maryland State Highway Administration.
Email: EIgbinosun@sha.state.md.us.

Virginia, Minnesota Transportation Operations Communications Center (TOCC)

Location

Arrowhead Region of northeastern Minnesota.

Description

The Transportation Operations Communications Center (TOCC) located in the Town of Virginia, Minnesota, is a consolidated communications center used by the Minnesota State Patrol (MSP) and Minnesota Department of Transportation (DOT) to provide joint dispatch service to patrol officers and Minnesota DOT maintenance and operations personnel. This is one of nine TOCCs covering Minnesota's rural and small urban areas that bring together resources from transportation and public safety to provide better service to the public and save money for ongoing operations.

The joint communications center in Virginia, Minnesota, was developed in 1996 as a Federal operational test called the Advanced Rural Transportation Information and Coordination (ARTIC) Operational Test. This served as the model for the TOCCs that were developed around the state. The center is staffed 24 hours a day by a professional dispatcher supplied by MSP. In addition to coordinated dispatch, the center is also used to help manage traffic during special events and control the region's variable message signs.

Operational Areas

Emergency and incident management, planned special events, road weather management, traveler information.

Participating Agencies

Minnesota Department of Transportation and Minnesota State Patrol.

Benefits

- The TOCC has facilitated communications between Minnesota DOT and MSP, enabling quicker responses to requests for assistance.
- More efficient use of resources resulted in cost savings. Minnesota DOT no longer has to maintain separate dispatchers.
- MSP gained access to upgraded communications equipment and a new dispatch center.
- Minnesota DOT saves staff time by utilizing dispatch personnel to post messages on their variable message signs instead of having to go back to their shop and upload a message to the signs.

For More Information

Tim Sheehy, Minnesota DOT, District One.
E-mail: tim.sheehy@dot.state.mn.us. Web: http://www.dot.state.mn.us/oec/tocc/index.html.

U.S. Department of Transportation
Federal Highway Administration
Office of Operations
1200 New Jersey Avenue, SE
Washington, DC 20590

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