



MULTISTATE TRANSPORTATION OPERATIONS PROGRAMS

Critical Issues and Opportunities

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Introduction

The safe and efficient operation of the National Highway System involves coordination between state departments of transportation. These coordinated highway operations have been effectively supported and enhanced through the development and administration of Multi-state Transportation Operations Programs (MSTOPs). Early MSTOPs included the I-95 Corridor Coalition and the Gary-Chicago-Milwaukee Corridor Coalition which were Intelligent Transportation System (ITS) Priority Corridors enabled under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991.

MSTOPs are vital to the surveillance, security, and reliability of key interstate corridors. Traffic incident management, emergency traffic operations, and transportation security have been substantially enhanced through interstate relationships and partnerships that typically engage the transportation and public safety communities. These interstate partnerships improve the detection of hazardous highway conditions and security threats and the quality and timeliness of traveler warning and information services.

MSTOPs also offer an institutional framework for regional operations collaboration and coordination across state borders. MSTOPs are likely to be critical in the planning, deployment, and operation of an expanding Integrated Network of Transportation Information (INTI) and related traffic management infrastructure. MSTOPs provide benefits through improved road weather surveillance and highway weather management strategies and successful multi-state regional 511 traveler information systems and services.

Realizing the full national benefit of MSTOPs will require their programmatic maturity and administrative sustainability, as well as their geographic expansion. Ultimately, a nationwide "quilt" of active MSTOPs could be a core institutional component of a national transportation operations agenda.

MSTOPs Evaluated

This research resulted from a series of case studies is intended to provide a brief summary of the benefits of these programs. The MSTOPs evaluated in this report are identified in Table 1.

Table 1 – MSTOPs Evaluated

Metropolitan Area With Multiple Jurisdictions	Interstate Corridor	Partnerships For A Specific Technical Or Operational Issue
ARTIMIS	High Plains Corridor Coalition	AMBER Alert System
Greater Detroit 511	CANAMEX	Aurora Weather Information
	North American Superhighway Corridor Coalition	Multi-State Security Partnerships
	Northwest Passage Corridor Coalition	National Automated Highway System Consortium
	I-10 Freight Corridor	Norpass and PrePass CVO
	I-5 CASCADIA Freight ITS	Trio 511 Partnership
	I-69 Corridor	CARS/Enterprise Partnership
I-95 Corridor Coalition		E-Z Pass Electronic Toll Collection
Gary-Chicago-Milwaukee Corridor Coalition		Meridian 511
		Yellowstone ATIS

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Disclaimer

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Additional Information

Additional information is available on MSTOPs through the research report provided by the project. The report provides case studies on several MSTOPs that are highlighted in this executive summary and documents the lessons learned, successes, and failures. In addition, the report provides a set of critical success factors for agencies considering developing an MSTOP to ensure its sustainability. This report is available from the Transportation Research Board.

National Program Needs for MSTOPs

The following actions are recommended to support MSTOPs.

- Provide funding for program start-up and organization, with a commitment from multiple jurisdictions to support the continued information sharing, cooperation, and operations. When an organization has proven that a sustainable model of cooperation, coordination, and communications exists, flexibility with funding sources should be made available to sustain the organization.
- Avoid implementing national standards or detailed requirements for MSTOPs to allow the flexibility and innovation needed to be successful. Each MSTOP will be a unique organization facing unique issues. Best practices and studies that highlight lessons learned provide a foundation for new organizations to be successful.
- Continue development of national standards for ITS and best practices for operations strategies are important for all operational programs.
- Encourage merging MSTOPs to focus on a single or limited set of priorities. Once early winners have been established within an emerging MSTOP, program expansion into diverse opportunities such as transit and rail should be considered. Attempting to provide too broad a focus in the establishment of an MSTOP too early in its development will likely lead to a lack of focus and consensus on priorities. Only after some early winners have been identified and this core competency is demonstrated should expansion be considered.
- Conduct a national conference on MSTOPs. This workshop shall provide for a continuing discussion and sharing of information between the more mature MSTOPs and emerging MSTOPs that can help the emerging MSTOPs achieve success and sustainable partnerships. Sharing of information between mature MSTOPs may also result in advancement of the state of practice.
- Expand the opportunities for state departments of transportation and metropolitan planning organizations to fund the continued operations and management of MSTOPs using new programs in the federal transportation legislation reauthorization.
- Promote the use of agency and operational performance measures for MSTOPs that will demonstrate accountability for the resources dedicated to operations and information sharing programs. These performance measures can be used to refine existing MSTOPs and help focus emerging MSTOPs to provide the greatest return on investment.
- Involve MSTOPs in homeland security and evacuation coordination planning. The perspectives of the member organizations and the synergistic effects that may result from the interagency communications and cooperation may promote a more robust plan for event prevention and response.
- Promote the linkage of the Integrated Network of Transportation Information Program to key corridors and MSTOPs as a priority to develop the national ITS infrastructure.

Benefits of MSTOPs

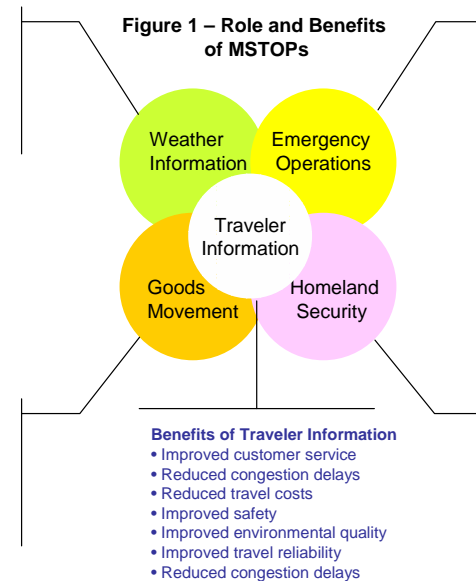
MSTOPs provide a wide range of beneficial activities and technical programs. Some of the more mature organizations that function in highly congested interstate corridors coordinate multimodal and intermodal services. Many MSTOPs have found success by joining together to share information on weather- and accident- induced road closures and coordinating the emergency management of personnel to respond to and address these incidents. Coordination of homeland security and commercial vehicle operations are another common role for MSTOPs. These partnerships usually result in a cooperative approach to providing traveler information through 511 services or roadside traveler information services such as dynamic message signs and highway advisory radio. The benefits from these programs include

- Enhanced effectiveness of agency operations
- Reduced agency operating costs
- Reduced congestion delays
- Improved safety
- Improved customer service by providing better traveler information
- Enhanced national security and preparedness
- Enhanced personal security and safety
- Improved the efficiency and reliability of the movement of commerce
- Managed risk and sharing benefits from new technology applications
- Improved environmental quality

Figure 1 shows the common roles and benefits of MSTOPs.

- Benefits of Weather Information**
- Enhanced effectiveness of agency operations
 - Reduced congestion delays
 - Improved safety
 - Managed risk and sharing benefits from new technology applications

Figure 1 – Role and Benefits of MSTOPs



- Benefits of Emergency Operations**
- Enhanced effectiveness of agency operations
 - Reduced agency operating costs
 - Reduced congestion delays
 - Improved safety
 - Improved environmental quality

- Benefits for Goods Movement**
- Improved travel reliability
 - Reduced congestion delays
 - Reduced travel costs
 - Improved safety
 - Improved environmental quality

- Benefits of Traveler Information**
- Improved customer service
 - Reduced congestion delays
 - Reduced travel costs
 - Improved safety
 - Improved environmental quality
 - Improved travel reliability
 - Reduced congestion delays

- Benefits for Homeland Security**
- Enhanced national security and preparedness
 - Enhanced personal security and safety

MSTOPs Success Stories

The following case studies highlight some of the benefits provided by MSTOPs

High Plains Corridor Coalition - Improving the Efficacy of Agency Operations

The High Plains Corridor Coalition led the development of a shared-resource agreement between several states to allow maintenance crews to cross state lines and clear roadway in adjacent jurisdictions during road closures. This successful partnership has saved each agency significant time and resources and results in a higher quality of service to travelers during weather-related emergency operations.

Gary-Chicago-Milwaukee Corridor Coalition - Reducing Congestion Delays

Incident management systems are one of the fundamental building blocks of MSTOPs. These programs reduce the effects of incident-related congestion by decreasing the time to detect incidents, the time for responding vehicles to arrive, and the time required for traffic to return to normal conditions. Incident management systems make use of a variety of surveillance technologies, often shared with freeway and arterial management systems, as well as enhanced communications and other technologies that facilitate coordinated responses to incidents. A study of the Coordinated Highways Action Response Team (CHART) in Maryland found that the system reduced average incident duration 57% in 2000 and 55% in 1999. Delay savings identified in studies of systems in Minnesota, Colorado, and Indiana yield benefits of \$1.2-\$1.8 million per year. Motorist assistance patrols, an important component of many incident management systems, are well received by the public. The Virginia Department of Transportation has published hundreds of "thank you" letters received regarding its Safety Service Patrol. Incident management programs are key elements of many of the MSTOPs evaluated.

Northwest Passage Corridor Coalition - Improving Safety

Road weather management activities that are coordinated by MSTOPs such as the Northwest Passage Corridor Coalition and High Plains Corridor Coalition include road weather information systems (RWIS), winter maintenance technologies, and coordination of operations within and between state Departments of Transportation (DOTs). ITS applications assist with the monitoring and forecasting of roadway and atmospheric conditions, dissemination of weather-related information to travelers, and weather-related traffic control measures such as variable speed limits and both fixed and mobile winter maintenance activities. An Idaho DOT study found significant speed reductions when weather-related warnings were posted on dynamic message signs. During periods of high winds and snow-covered pavement, vehicle speeds dropped 35% to 35 mph when warning messages were displayed, compared with a 9% drop to 44 mph without the dynamic message signs. Washington State DOT has implemented three highway advisory radios along the Blewett/Stevens Pass to provide weather and road condition information to travelers and maintenance crews.

CANAMEX - Improving Customer Service by Providing Better Traveler Information

In 1999, the Governors of Montana, Idaho, Utah, Nevada, and Arizona created the CANAMEX Corridor Coalition to spur economic development along the corridor. The number one need of travelers along this corridor is *information*: what are the traffic and weather conditions on the road, what can we do, and where can we stay along the way? The Smart Tourist Corridor developed by CANAMEX uses a combination of emerging technologies and interstate/interagency coordination to provide seamless safety and tourism information to corridor travelers. This program has produced benefits in the order \$506 million from a \$71 million program, or a 7.1:1 benefit-to-cost ratio.

Aurora – Surface Transportation Weather Information

The Aurora Program is a consortium of agencies focused on collaborative research, evaluation, and deployment of advanced technologies for detailed road weather monitoring and forecasting. The 13 members of Aurora, which include representatives of two foreign nations and the private sector, seek to implement advanced road weather information systems (RWIS) that fully integrate state-of-the-art roadway and weather forecasting technologies with coordinated, multi-agency weather monitoring infrastructures. Aurora's projects are designed to improve the efficiency of highway maintenance operations and distribute effective real-time information to travelers. These initiatives have resulted in technological advancement and improvement of existing RWIS to reduce the congestion and improve safety resulting from adverse winter driving conditions.

High Plains Corridor Coalition – Emergency Transportation Operations

The High Plains Corridor Coalition consists of six midwest states that coordinate responses to consist of emergency transportation operations and share resources to respond to roadway closures due to adverse weather. The agency has successfully reduced the costs of emergency transportation operations for the member organizations and demonstrated the safety benefits and travel time savings to travelers and commercial vehicle operations through more reliable operations and providing traveler information.



U.S. Department of Transportation's 2004 ITS Program Objectives

The following highlights several of the U.S. DOT's ITS Program Objectives for 2004.

Mobility Services for All Americans

Improved transportation services for the elderly and disadvantaged. Increased mobility, accessibility, and ridership will be achieved by integrating transportation services, via ITS transit technologies, and extending transit service partnerships beyond the health and human services community to other federal funding agencies.

Integrated Corridor Management Systems

A model corridor management system will be developed to demonstrate how ITS technologies can efficiently and proactively manage the movement of people and goods in major transportation corridors within and between large metropolitan areas. The model corridor management system will demonstrate how proven and promising ITS technologies can be used to improve mobility and productivity in these corridors.

Nationwide Surface Transportation Weather Observation System

Reduce the impact of adverse weather for all road users and operators by designing and initiating deployment of a nationwide, integrated road weather observational network and data management system.

Emergency Transportation Operations

Effective management of all forms of transportation emergencies through the application of ITS resulting in faster and better-prepared responses to major incidents; shorter incident durations; and quicker, more accurate and better-prepared hazmat responses.

Universal Electronic Freight Manifest

Improved operational efficiency and productivity of the transportation system through the implementation of a common electronic freight manifest.

Source: FHWA

MSTOPs Link to National Operations Objectives

The nation has achieved substantial progress toward the national goal of deploying ITS infrastructure in the nation's largest metropolitan areas by 2005. As the U.S. Department of Transportation, state departments of transportation, and metropolitan planning organizations work to meet the goal of completing ITS to address congestion and incident management and traveler information needs in metropolitan areas, MSTOPs are needed to create a national infrastructure of intelligent transportation systems by providing coordinated, reliable, and cost-effective operations management on the key interurban and interstate routes that connect metropolitan populations and economic centers.

MSTOPs provide the successful combination of human and technological infrastructure across jurisdictions to achieve many of the U.S. Department of Transportation's ITS Program Office's Objectives for 2004 (shown to the right).

I-95 Corridor Coalition – Mobility Services for All Americans

In the early 1990s, visionary leadership was critically needed to address transportation problems in the Nation's heavily populated northeastern corridor. The corridor's transportation network was pushed to capacity limits and the economic and physical health in the region was in jeopardy as a result of the region's rapid housing development growth, population shifts from urban to sprawling suburban areas, increased commercial vehicle travel, and congestion delays. State transportation leaders in the corridor recognized that new cooperative approaches were required to address these developing and complex transportation challenges. They believed that existing capacity could be better utilized and management and operation of the entire transportation network could be improved through institutional cooperative arrangements and technology systems. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 provided initial funding to support the formation of this ITS corridor coalition.

The I-95 Corridor Coalition has now expanded its areas of cooperation and communication to include freight movement and mobility needs of all travelers. Several port and rail operators are active participants in the I-95 Corridor Coalition's Program Track Committees. Ports in the Corridor from Norfolk to New Jersey/New York to Maine receive over 575 million tons of goods each year (about 2 million tons each day) that must be carried by rail or truck to and from various destinations throughout the country. AMTRAK and several regional transit agencies now also participate in the Program Track Committees to address the total mobility needs of travelers within the corridor.

Gary-Chicago-Milwaukee Corridor Coalition – Integrated Corridor Management

The Gary-Chicago-Milwaukee (GCM) Intelligent Transportation Systems (ITS) Priority Corridor was designated in 1993 by the states of Illinois, Indiana, and Wisconsin. These states work together closely on solutions to transportation problems in this 130-mile-long, 16-county corridor that is home to more than 10 million people. Through the deployment of advanced technologies, the use of existing transportation services and infrastructure, and the cooperative efforts of several transportation and planning agencies in the three states, the GCM Corridor Program is making transportation in the corridor smarter, safer, better coordinated, and more efficient. By taking a coordinated multi-state approach, the three states integrate ITS programs beyond their borders, pool funds and deploy projects that benefit the entire region. The corridor is defined to allow for a wide range of solutions throughout the corridor, including toll-ways, public transit, and CVO. This corridor coalition has achieved success through developing an overall strategy for the corridor and having a more streamlined program that focuses effort and resources on a defined set of activities and investments.

I-95 Corridor Coalition - Enhancing National Security and Preparedness

The National System of Interstate and Defense Highways (Interstate System), established under the leadership of President Eisenhower in 1957, recognized the importance of a reliable surface transportation network to our nation's security and preparedness. As the Interstate System nears completion, many of the anticipated benefits of the national "interstate" system for national defense and preparedness have been eroded through urban traffic congestion. Being able to rapidly deploy and respond to major incidents and events is critical to our nation. In the event of a mobilization resulting from a man-made or natural disaster, MSTOPs can successfully support the scale and magnitude of issues involved. The I-95 Corridor Coalition has identified this as a critical success factor and recognizes that I-95 would be a lifeline through which personnel and freight would have to deploy quickly. Much of this movement would be to support the deployment of personnel and materials to the northeast's major air and seaports for subsequent movement overseas. Military bases such as Fort Lee and Fort Eustis in Virginia, Fort Drum in New York, and the Navy Complexes in Hampton Roads, Virginia, are all-important installations from which military operations would be staged.

Many MSTOPs - Enhancing Personal Security and Safety

The AMBER Alert System began in 1996 when Dallas-Fort Worth broadcasters teamed with local police to develop an early warning system to help find abducted children. AMBER stands for America's Missing Broadcast Emergency Response and was created as a memorial to 9-year-old Amber Hagerman. Other states and communities soon set up their own AMBER plans as the idea was adopted across the nation. The AMBER Plan Program encourages use of the most effective methods to communicate with the public on behalf of abducted children. Dynamic message signs are not always the most effective or safest method to disseminate information related to child abductions. When there is a need to provide extensive information to motorists, other types of traveler-information-based media (511, highway advisory radio, web sites, and commercial radio) have been successfully used. As of March 1, 2004, 48 states have adopted and implemented AMBER Plans. Since 1999, 129 children have been recovered due in part to AMBER program alerts.

NASCO - Improving the Efficiency and Reliability of the Movement of Commerce

Thomas J. Donohue, President and CEO, U.S. Chamber of Commerce and President, National Chamber Foundation stated in 2002, *"The nation's transportation system is the lifeblood of our economy. Without additional investment in our infrastructure, our system of commerce is impaired, our mobility is restricted, our safety is threatened, our environment is endangered, and our way of life is compromised."*

North America's Superhighway Coalition (NASCO) is a not-for-profit corporation that supports the development and management of a NASCO Corridor to become North America's premier trade, security, and transportation corridor. The corridor that all NASCO members are working for will combine smart planning, good maintenance, and the latest technology to secure U.S. borders, promote safer travel, increase business efficiency, and improve the infrastructure and quality of life of U.S. communities. In the process, the NASCO Corridor will be transformed into a high-technology highway system that will give the U.S. and its North American partners, Canada and Mexico, a head start on their global competition. NASCO's mission statement calls for the agency to maximize economic opportunity and investment in the North American mid-continent corridor through development and advocacy of an efficient, seamless, intermodal trade and transportation system.

NASCO is promoting intermodalism and encouraging the application of leading-edge technology (international trade data systems and Intelligent Transportation Systems) through the development of International Trade Processing Centers (ITPCs). Possible locations are Des Moines, Kansas City, Oklahoma City, Dallas/Fort Worth, and San Antonio.

Aurora - Managing Risk and Sharing Benefits From New Technology Applications

The Aurora Program is a collaborative research, development, deployment, and advocacy venture to deploy advanced road weather information systems (RWIS) that fully integrate state-of-the-art roadway and weather forecasting technologies with coordinated, multi-agency weather monitoring infrastructures with the National ITS Architecture. The primary need for Aurora is to help save lives, preserve property, and significantly reduce the adverse impacts of winter driving conditions. The primary users of RWIS information are highway maintenance staff and the traveling public, many of whom have little or no knowledge of meteorology and how to interpret weather information to make effective decisions. Aurora members design and implement decision support systems, which transform weather and road condition data into an easily understandable format such as color-coded graphical displays to allow for informed decision-making capabilities. The primary component of RWIS is the provision of weather and road condition information to the general public to allow for informed travel decisions.

The Aurora Program has been highly successful in testing new technologies and sharing the risks associated with these investments and the benefits resulting from successful tests. Numerous research institutions, private-sector vendors, and the National Center for Atmospheric Research participate. The program has been so successful that international partners have joined the program including Quebec Ministry of Transportation, Ontario Ministry of Transportation, Meteorologic Society of Canada, Swedish National Road Administration, and Swedish Meteorologic and Hydrologic Institute. The Aurora Program has successfully completed eleven projects.

ARTIMIS - Improving Environmental Quality

ARTIMIS (Advanced Regional Traffic Interactive Management and Information System) in metropolitan areas of Northern Kentucky and Cincinnati, Ohio, consists of closed-circuit television cameras (CCTV), portable dynamic message signs (DMS), highway advisory radio (HAR), freeway and ramp reference markers, freeway service patrols, time-saving incident investigation equipment, and advanced traveler advisory telephone services using 511. This MSTOP successfully demonstrated significant benefits to environmental quality through coordination operations. Hydrocarbon emissions were reduced by 3.8 percent during the A.M. peak period and 3.6 percent during the P.M. peak period. Carbon monoxide emissions were reduced by 3.8 percent during the A.M. peak period and 3.6 percent during the P.M. peak period. Nitrogen oxide emissions were reduced by 4.7 percent during the A.M. peak period and 4.5 percent during the P.M. peak period.

State Participation in MSTOPs

Multi-state Transportation Operations Programs (MSTOPs) include a broad range of organizations that coordinate the operations of transportation services across multiple state jurisdictions. Three types of MSTOPs were identified: (1) MSTOPs that serve a single metropolitan area that involves more than one state, (2) MSTOPs formed when several states pool resources to address operations along an interstate corridor, and (3) MSTOPs that pool funds to address the advancements of a specific technology. Figure 2 and Table 2 (next page) summarize the participation of states in MSTOPs.

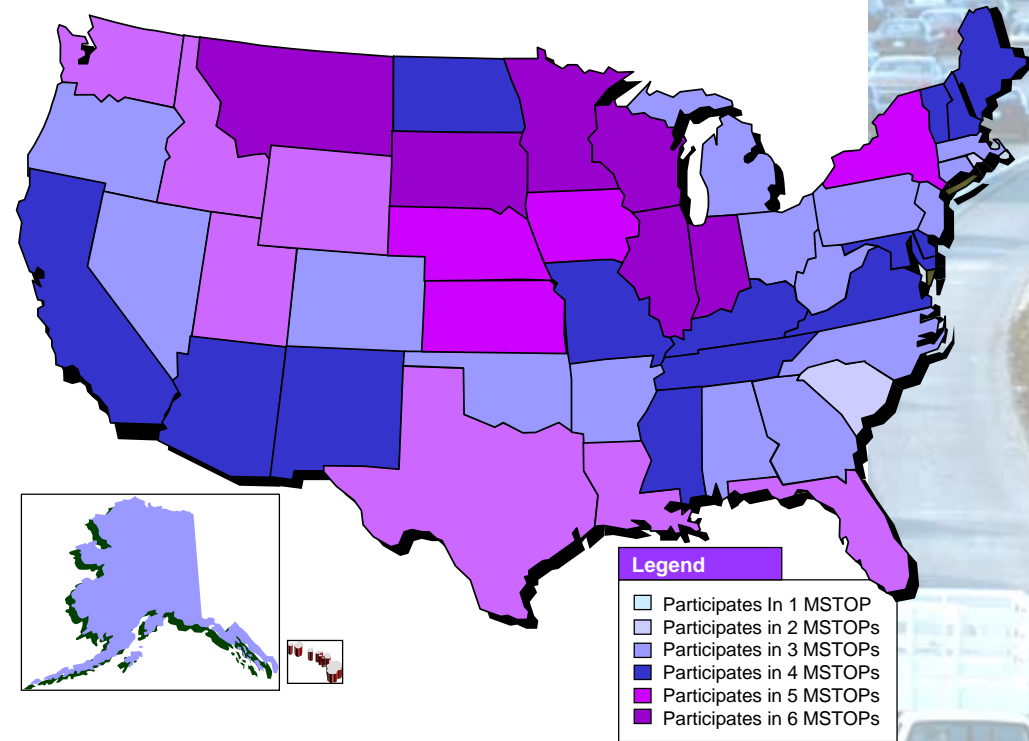


Figure 2 and Table 2 - State Participation in MSTOPs

Multi-State Transportation Operations Program	Participating States
ARTIMIS	Kentucky & Ohio
Aurora	Alaska, Illinois, Indiana, Iowa, Minnesota, New York, Pennsylvania, Tennessee, Virginia & Wisconsin
I-5 CASCADIA Freight ITS Corridor Coalition	California, Oregon & Washington
CANAMEX Corridor Coalition	Arizona, Idaho, Montana, Nevada & Utah
Detroit/Windsor 511 Partnership	Michigan & Windsor Ontario
Gary-Chicago-Milwaukee Corridor Coalition	Illinois, Indiana & Wisconsin
Greater Yellowstone Advanced Traveler Information System	Idaho, Montana, Utah & Wyoming
High Plains Corridor Coalition	Colorado, Kansas, Missouri, Nebraska, Utah, & Wyoming
I-10 Freight Corridor Study	Alabama, Arizona, California, Florida, Louisiana, Mississippi, New Mexico & Texas
I-69 Corridor	Arkansas, Indiana, Kentucky, Louisiana, Michigan, Mississippi, Tennessee & Texas
I-95 Corridor Coalition	Connecticut, Delaware, District of Columbia, Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont & Virginia
Enterprise Condition Acquisition and Reporting System (CARS)	Alaska, Florida, Iowa, Kentucky, Minnesota, New Hampshire, New Mexico, Vermont & Washington
Norpass CVO or PrePass CVO	Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, South Dakota, Tennessee, Utah, Virginia, Washington, West Virginia, Wisconsin & Wyoming
North American Superhighway Corridor Coalition	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, North Dakota, Oklahoma, South Dakota & Texas
Northwest Passage Corridor Coalition	Idaho, Minnesota, Montana, North Dakota, South Dakota, Washington, Wisconsin & Wyoming
Trio -511 Partnership	Maine, New Hampshire & Vermont