

NATIONAL ITS/CVO PROGRAM

NOTE TO READER:

THIS IS A LARGE DOCUMENT

Due to its large size, this document has been segmented into multiple files. All files separate from this main document file are accessible from links ([blue type](#)) in the [table of contents](#) or the body of the document.

NATIONAL ITS/CVO PROGRAM

prepared for
Federal Highway Administration

prepared by:
Cambridge Systematics, Inc.

February 1997

Technical Report Documentation Page

1. Report No.		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle National ITS/CVO Program				5. Report Date	
				6. Performing Organization Code	
7. Author(s) Lance R. Grenzeback, Carol G. Colman, John G. Kaliski, and Molly K. Marker-t				8. Performing Organization Report No. 6039.01	
9. Performing Organization Name and Address Cambridge Systematics, Inc. 150 Cambridge Park Drive Suite 4000 Cambridge, MA 02140				10. Work Unit No. (TRAIS) 3B4a	
				11. Contract or Grant No. DTFH61-92-C-00021	
				13. Type of Report and Period Covered Final Report 1996	
12. Sponsoring Agency Name and Address Federal Highway Administration Turner-Fairbank Highway Research Center 6300 Georgetown Pike, HSR-10 McLean, VA 2221052296				14. Sponsoring Agency Code	
15. Supplementary Notes Contracting Officer's Technical Representative - Michael Freitas, HSR-10					
16. Abstract This report was developed as part of the study, "Systems Planning for Automated Commercial Vehicle Licensing and Permitting Systems." The objective of this study was to define the requirements and develop a plan for a national program to apply Intelligent Transportation Systems (ITS) to commercial vehicle operations (CVO). The objectives of the report are to define goals and guiding principles for the national ITS/CVO program: define the relationships among ITS/CVO projects; describe approaches for organizing, managing, and funding the ITS/CVO program; and build a consensus among public and private sector CVO stakeholders in support of the national ITS/CVO program. The report provides detailed descriptions of more than 50 current and planned ITS/CVO projects, organized into five broad areas: safety assurance, credentials administration, electronic screening, carrier operations, and technical infrastructure through the Commercial Vehicle Information Systems and Networks (CVISN) initiative. The report also discusses the organization and management approach to the ITS/CVO program, including the mainstreaming initiative to foster ITS/CVO deployment at the national, regional, and state levels; and the FHWA's role in managing and coordinating the ITS/CVO program. The report presents a "roadmap" to the ITS/CVO program that suggests the timing of the major projects and initiatives. Finally, the report provides a general funding approach for the ITS/CVO program, including an assessment of program expenditures and funding sources, and the identification of strategies for the devolution of funding responsibilities from the Federal government to the state and the private sector.					
17. Key Words Intelligent transportation systems, commercial vehicle operations, commercial vehicle information systems and networks, mainstreaming, business plan, safety assurance, credentials administration, electronic screening, carrier operations			18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161.		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 345	22. Price

National ITS/CVO Program

prepared for

Federal Highway Administration

prepared by

Cambridge Systematics, Inc.
150 Cambridge Park Drive, Suite 4000
Cambridge, Massachusetts 02 142

February 1997

Table of Contents

Executive Summary

<i>Introduction.</i>	<i>1.0</i>
<i>Program Goals and Strategies.</i>	<i>2.0</i>
<i>Projects Overview.</i>	<i>3.0</i>
<i>Organization and Management.</i>	<i>4.0</i>
<i>Schedule.....</i>	<i>5.0</i>
<i>Funding Strategy.....</i>	<i>6.0</i>
 <i>Appendix A Project Descriptions</i>	
 <i>Appendix B References</i>	
 <i>Appendix C List of Abbreviations</i>	

National ITS/CVO Program

This report presents the Federal Highway Administration's national program for the application of ITS to CVO.

This report presents the Federal Highway Administration's (FHWA) national program for the application of Intelligent Transportation Systems (ITS) to commercial vehicle operations (CVO). The objectives of this report are to:

- Define goals and guiding principles for the national ITS/CVO program;
- Define the relationships among ITS/CVO projects;
- Describe approaches for organizing, managing, and funding the ITS/CVO program; and
- Build a consensus among public and private CVO stakeholders in support of the national ITS/CVO program.

Commercial vehicle operations comprise approximately three dozen areas of interaction involving public agencies and motor carriers. These transactions include vehicle registration, fuel tax collections, driver and vehicle inspections, and hazardous materials routing. They are critical for highway safety, carrier productivity, and tax collection.

ITS involve the application of advanced and emerging technologies in such fields as information processing, communications, control, and electronics to surface transportation needs. ITS technologies are being applied to CVO to streamline administrative procedures and improve the safety and productivity of the trucking and bus industries.

CVO Issues and ITS Opportunities

CVO Issues	ITS Opportunities
Enforcement activities cannot completely assure highway safety or regulatory compliance	<ul style="list-style-type: none">• Target resources on high-risk carriers, vehicles, and drivers• Strengthen mobile enforcement capabilities• Improve efficiency at weigh stations and border crossings
Complex and redundant regulatory procedures raise the cost of doing business for agencies and carriers	<ul style="list-style-type: none">• Simplify interactions between carriers and public agencies• Modernize internal operations of agencies• Streamline interstate data and funds exchange
Global economic changes pressure motor carriers to reduce costs, improve delivery time, and enhance customer service	<ul style="list-style-type: none">• Improve the safety and reliability of freight transportation• Reduce congestion costs• Reduce regulatory compliance costs

Issues and Opportunities

ITS/CVO services offer new solutions for transportation problems. ITS/CVO screening and safety assurance programs make state enforcement activities more efficient and effective.

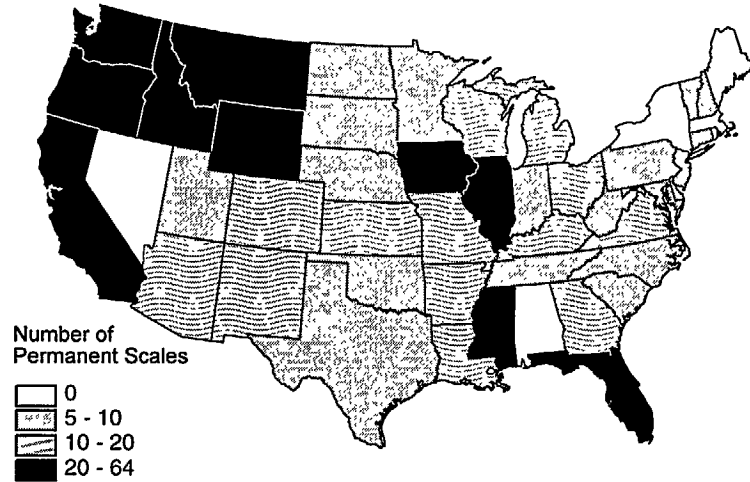
ITS/CVO programs offer new solutions for critical problems facing the trucking and bus industries, as well as the state and Federal agencies that regulate them:

- **Issue** - Current enforcement activities cannot completely assure either the safety of the nation's highways or the compliance of motor carriers with weight and credentials regulations.
 - Safety assurance activities are not targeted consistently on those carriers, drivers, and vehicles who pose the greatest risk to motorists because roadside officials often lack timely access to information on a carrier's safety performance record.
 - Noncompliant carriers can evade the weigh stations and other fixed sites where the majority of inspections occur.
 - Congestion and delays at weigh stations and border crossings penalize compliant carriers unnecessarily because current procedures require that all vehicles stop for inspection.

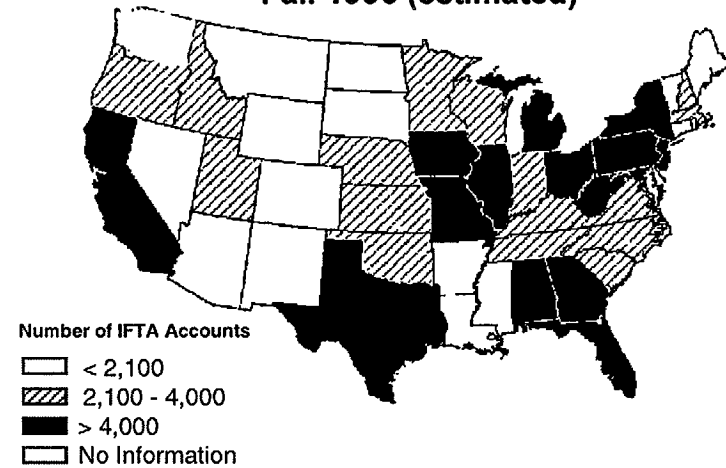
- **Opportunity** - ITS/CVO services can improve the efficiency and effectiveness of enforcement and safety assurance procedures.
 - Information systems can provide timely access to carrier safety data, as well as decision-making tools to enable enforcement personnel to target their resources on the high-risk carriers.
 - Portable inspection systems and vehicle identification technologies can make mobile enforcement more productive.
 - Automated vehicle screening technologies can enable safe and legal carriers to travel across multiple states with no more than a single stop.

Regional Variation in CVO Activities

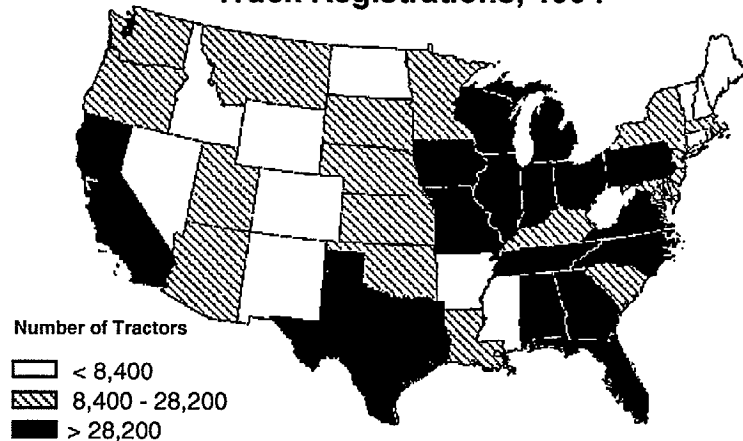
Permanent Weigh Stations by State, January 1993



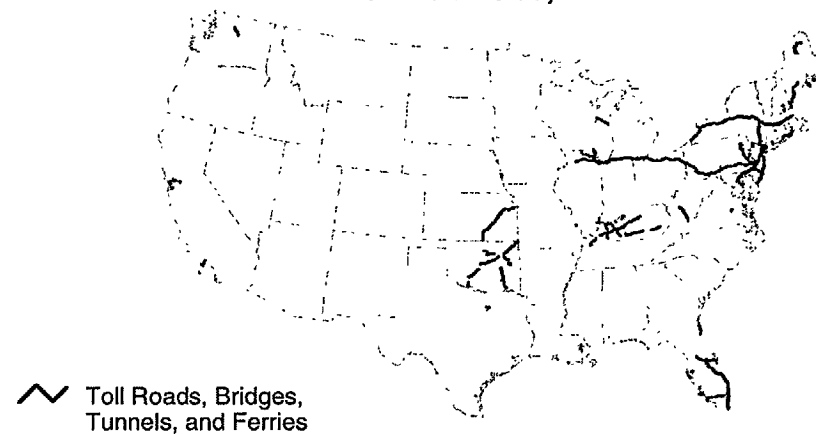
Interstate Fuel Tax Accounts, Fall 1996 (estimated)



Truck Registrations, 1994



Toll Facilities, 1994



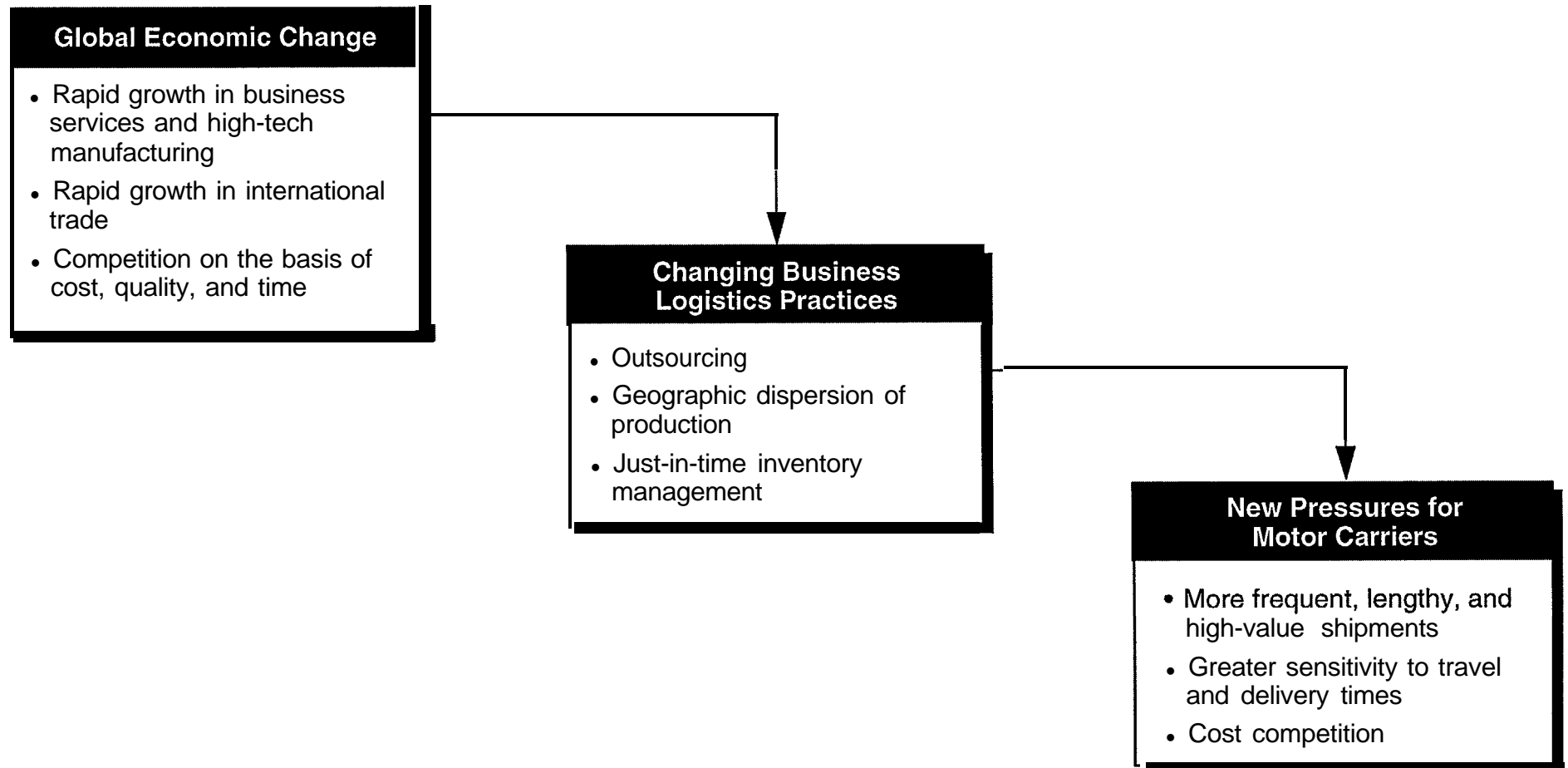
Issues and Opportunities (continued)

ITS/CVO services can reduce the cost and administrative effort associated with motor carrier regulation.

- **Issue** - Complex and often redundant procedures increase the cost of doing business for both states and carriers. This problem is significant because motor carrier regulation is big business, generating \$20 billion in annual revenues for the states and the Federal government.
 - Each state has a unique regulatory system in which responsibility for motor carrier regulation typically is divided among five or six agencies. Carriers must comply with the regulation of each state in which they operate.
 - Regulatory agencies have lagged behind other industries in modernizing their operations.
 - Interstate data and funds exchange often are cumbersome and inefficient.

- **Opportunity** - ITS/CVO services can reduce the cost and administrative effort associated with motor carrier regulation.
 - Base-state agreements and “one-stop shopping” systems can simplify motor carriers’ compliance efforts.
 - Increased use of computers and information systems can streamline the internal operations of regulatory agencies.
 - The development of multistate clearinghouses and information networks can enhance interstate data and funds exchange.

Global Economic and Logistics Trends



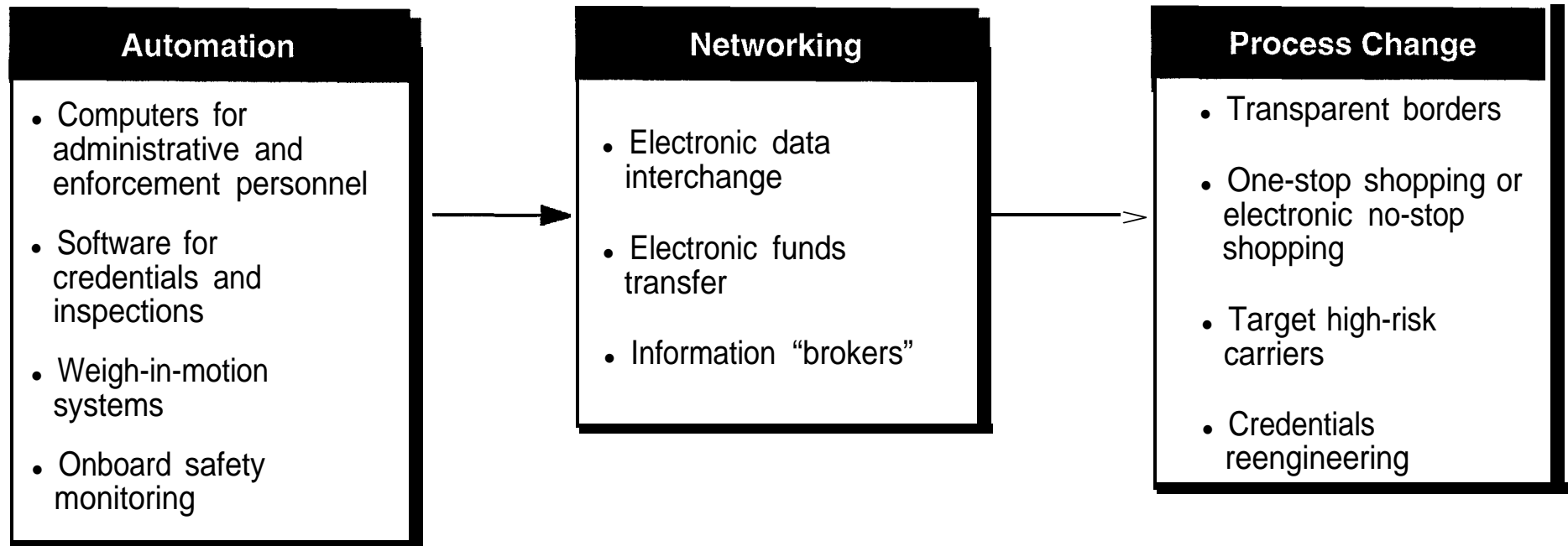
Issues and Opportunities (continued)

ITS/CVO services can improve the productivity of motor carrier operations, contributing to greater economic competitiveness.

- **Issue** – Today’s global economy demands changes in the ways that transportation is consumed and delivered. Transportation providers, including those in the trucking and bus industries, are facing pressures to reduce costs and pay more attention to delivery time and customer service. The states have an interest in the health of the motor carrier industry because trucking is the nation’s dominant form of goods movement.

- **Opportunity** – ITS/CVO services can improve the productivity of motor carrier operations, contributing to greater economic competitiveness.
 - Motor carriers are investing in new technology to reduce the cost and improve the reliability of long-distance freight transportation; assure the safety of drivers, vehicles, and cargo; and streamline internal business management practices.
 - Traffic management systems can reduce congestion delays for motor carriers, decreasing the cost of delivering goods.
 - Efforts to streamline regulatory processes and procedures can reduce compliance costs for motor carriers.

Representative ITS/CVO Activities



ITS/CVO Activities

ITS/CVO involves automating existing procedures, networking information systems, and changing the way that states and carriers do business.

ITS/CVO products and services involve three types of activities:

- **Automating existing procedures and operations.** Agencies and carriers are purchasing computer hardware and software, communications systems, electronics, sensors, and other instruments to automate their existing recordkeeping, inspection, and communication procedures.
- **Networking information systems.** The deployment of electronic data interchange (EDI) and electronic funds transfer (EFT) capabilities enables agencies and carriers to share information and transfer money. The development of linked databases and networks of information systems will enhance the systems now operated independently by agencies and carriers.
- **Changing the way that states and carriers do business.** Over time, the automation and networking will encourage changes in traditional processes and roles to reflect the changing needs of tomorrow's intermodal transportation system. A commonly cited goal is "transparent borders," which refers to enabling safe and legal carriers to travel through multiple states, or across international borders, with no more than a single stop. Another common goal is "one-stop shopping," which refers to enabling carriers to obtain permits for multiple states through a single source, either physically through a single office or electronically through the use of information systems and software.

ITS and CVO

ITS Technologies

- Information processing
- Communications
- Control
- Electronics

ITS/CVO Services

- Safety assurance
- Credentials administration
- Electronic screening
- Carrier operations

Commercial Vehicle Operations

- Enforcement and safety
- Administration
- Fleet and vehicle management
- Highway traffic management

Objectives and Benefits

The objectives of the ITS/CVO program are to improve credentials administration and highway safety, while reducing congestion costs for motor carriers and ensuring regulatory compliance and equitable treatment.

The objectives of the ITS/CVO program are to:

- Improve highway safety;
- Streamline credentials and tax administration;
- Reduce congestion costs for motor carriers; and
- Ensure regulatory compliance and equitable treatment.

ITS/CVO services offer a range of benefits to the states, the Federal government, the private sector, and the general public. ITS/CVO will:

- Reduce administrative costs for regulatory agencies and motor carriers;
- Reduce the frequency and severity of commercial vehicle accidents;
- Reduce congestion and improve efficiency at weigh stations and international border crossings; and
- Improve economic competitiveness by reducing the cost of motor carrier transportation and regulation.

National ITS/CVO Program Framework

Program Areas			
Safety Assurance	Credentials Administration	Electronic Screening	Carrier Operations
<ul style="list-style-type: none">• Access to driver, vehicle, and carrier safety information• Automated inspections and reviews• Onboard monitoring	<ul style="list-style-type: none">• Electronic credentialing• Electronic one-stop shopping• Interagency data exchange• Interstate data exchange	<ul style="list-style-type: none">• Automated weight and credentials screening (fixed site)• International electronic border clearance	<ul style="list-style-type: none">• Fleet and vehicle management• Traveler information systems• Hazardous materials incident response
CVISN (Technical Infrastructure)			
Mainstreaming (Organizational Infrastructure)			

ITS/CVO Program Areas

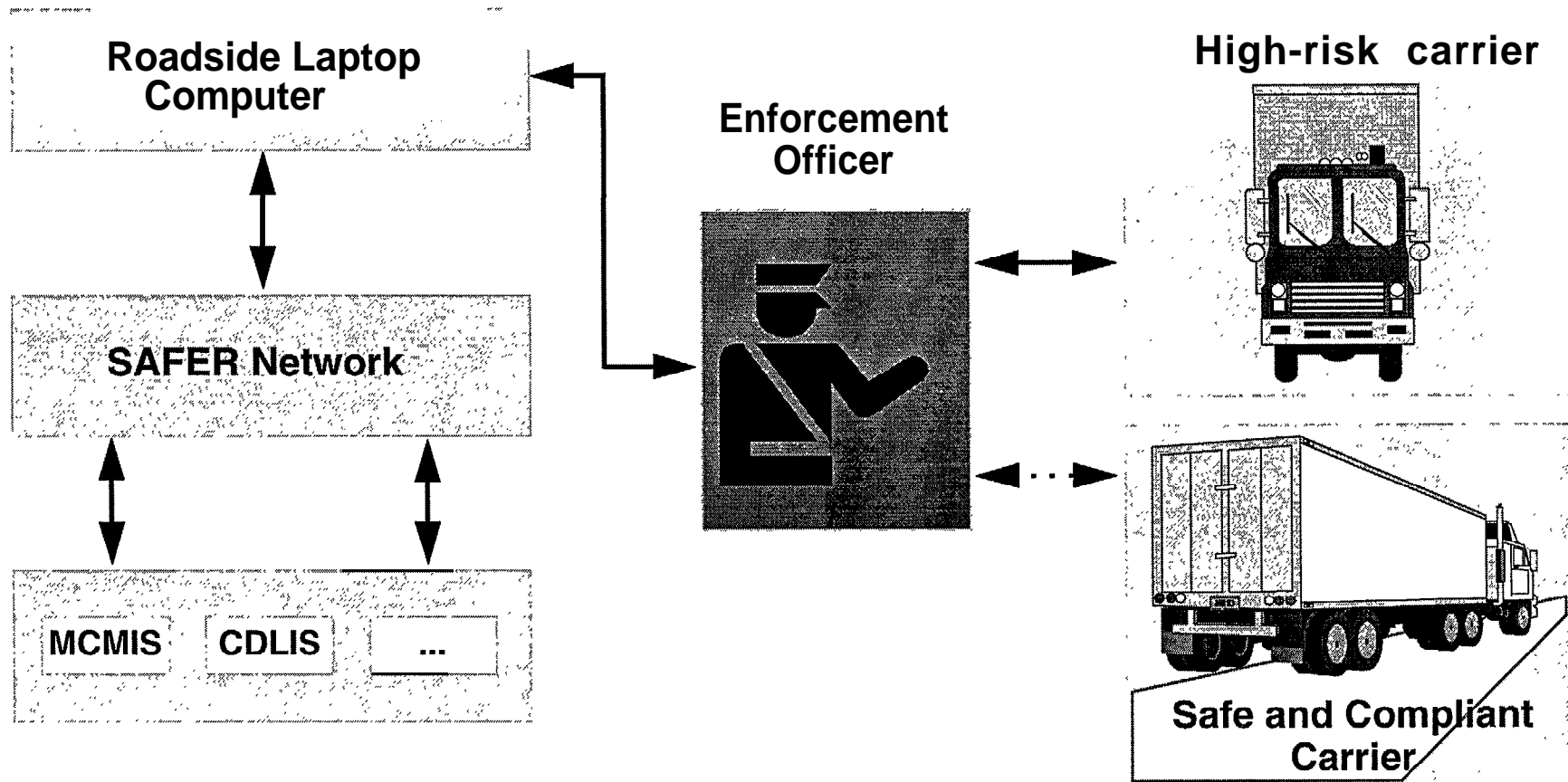
The ITS/CVO program includes projects in four broad categories: safety assurance, credentials administration, electronic screening, and carrier operations. Cross-cutting initiatives will provide the technical and organizational infrastructure to connect these efforts.

The national ITS/CVO program comprises dozens of initiatives covering multiple functions. These initiatives represent the efforts of individual states, consortia of states, the Federal government, individual motor carriers, and industry associations. The ITS/CVO program is developing capabilities in four broad areas:

- **Safety Assurance** - Programs and services designed to assure the safety of commercial drivers, vehicles, and cargo. These include automated roadside safety inspections and carrier reviews, safety information systems, and onboard safety monitoring.
- **Credentials Administration** - Programs and services designed to improve the deskside procedures and systems for managing motor carrier regulation. These include electronic application, purchasing, and issuance of credentials, as well as automated tax reporting and filing.
- **Electronic Screening** - Programs and services designed to facilitate the verification of size, weight, and credential information. These include the automated screening of commercial vehicles at fixed weigh stations and international border crossings.
- **Carrier Operations** - Programs and services designed to reduce congestion and manage the flow of commercial vehicle traffic. These include travel advisory services and hazardous materials incident response services. The private sector is taking leadership in the deployment of fleet and vehicle management technologies and systems that improve motor carrier productivity.

The Commercial Vehicle Information Systems and Networks (CVISN) initiative will provide a technical infrastructure to link these projects and information systems, including common standards for electronic communication among participating agencies and carriers. The mainstreaming initiative will provide the organizational infrastructure to support ITS/CVO deployment, including state and regional ITS/CVO forums and business plans.

Safety Assurance Operational Concept



Safety Assurance

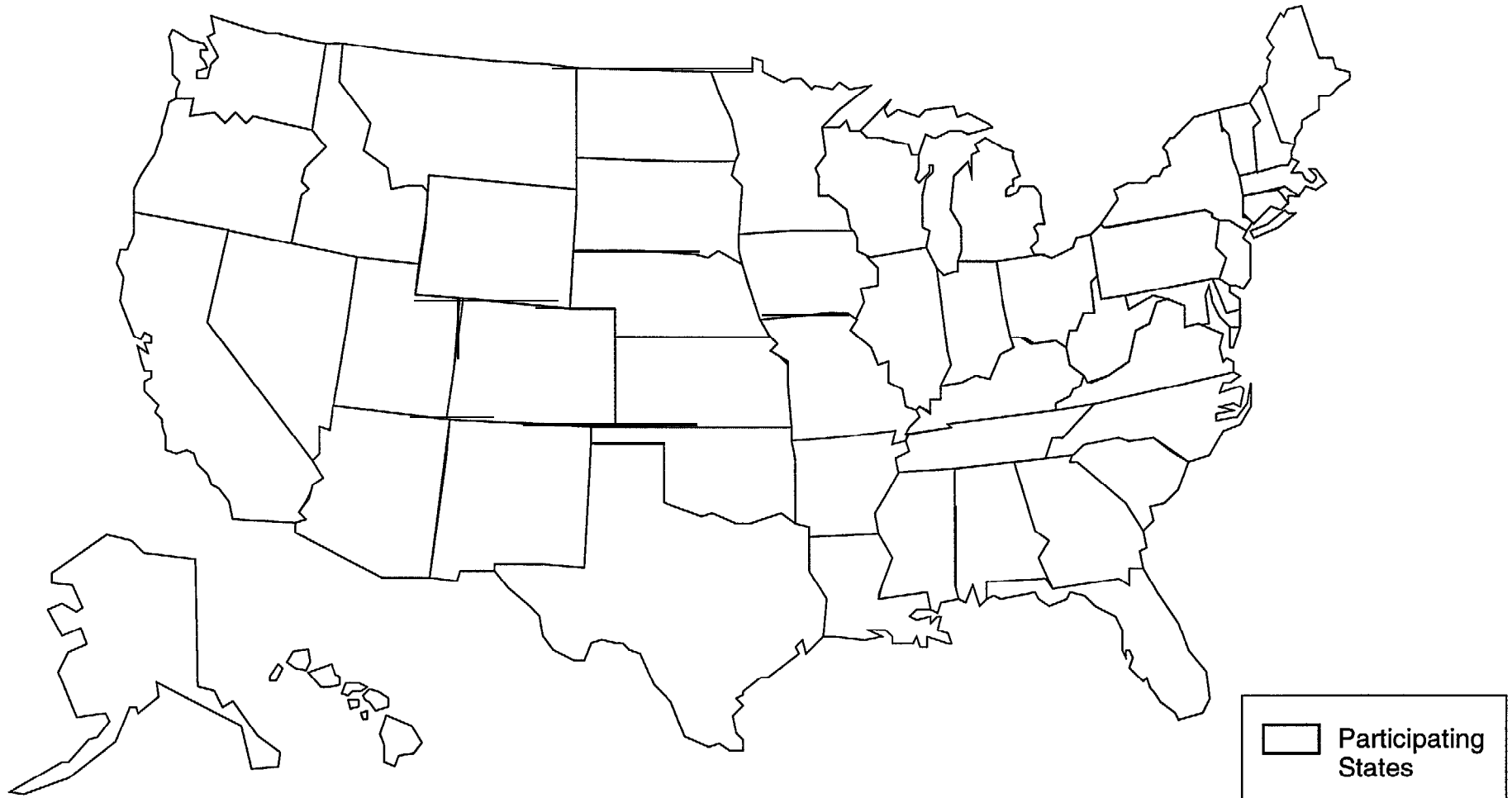
ITS/CVO safety assurance projects seek to improve highway safety by focusing enforcement resources on high-risk carriers, drivers, and vehicles.

The objective of the ITS/CVO safety program is to improve highway safety. The primary benefit will be a reduction in the frequency and severity of commercial vehicle accidents. In addition, the safety program will reduce compliance costs for safe and legal carriers, and will enable state enforcement agencies to improve the efficiency of their operations.

The ITS/CVO safety program will enable safety inspectors to target their resources on the carriers, drivers, and vehicles that are at the highest risk. This capability will be achieved through a series of research projects, operational tests, and deployment activities as follows:

- **Automation** – Deploy laptop computers at inspection sites to enable roadside personnel to access data and enter inspection results. Develop software to screen carriers for inspection. Develop diagnostic technologies to test the brakes and other vehicle components. Develop onboard technologies to monitor the safety status of the vehicle, driver, and cargoes.
- **Networking** – Develop linkages among existing and planned safety information systems to share data among agencies and states. Link inspection processes to onboard diagnostics and computers.
- **Process Change** – Enable safety inspectors to target resources on high-risk carriers, drivers, and vehicles. Coordinate safety enforcement among states. Encourage carriers to develop safety management programs.

100/200 MCSAP Site Project



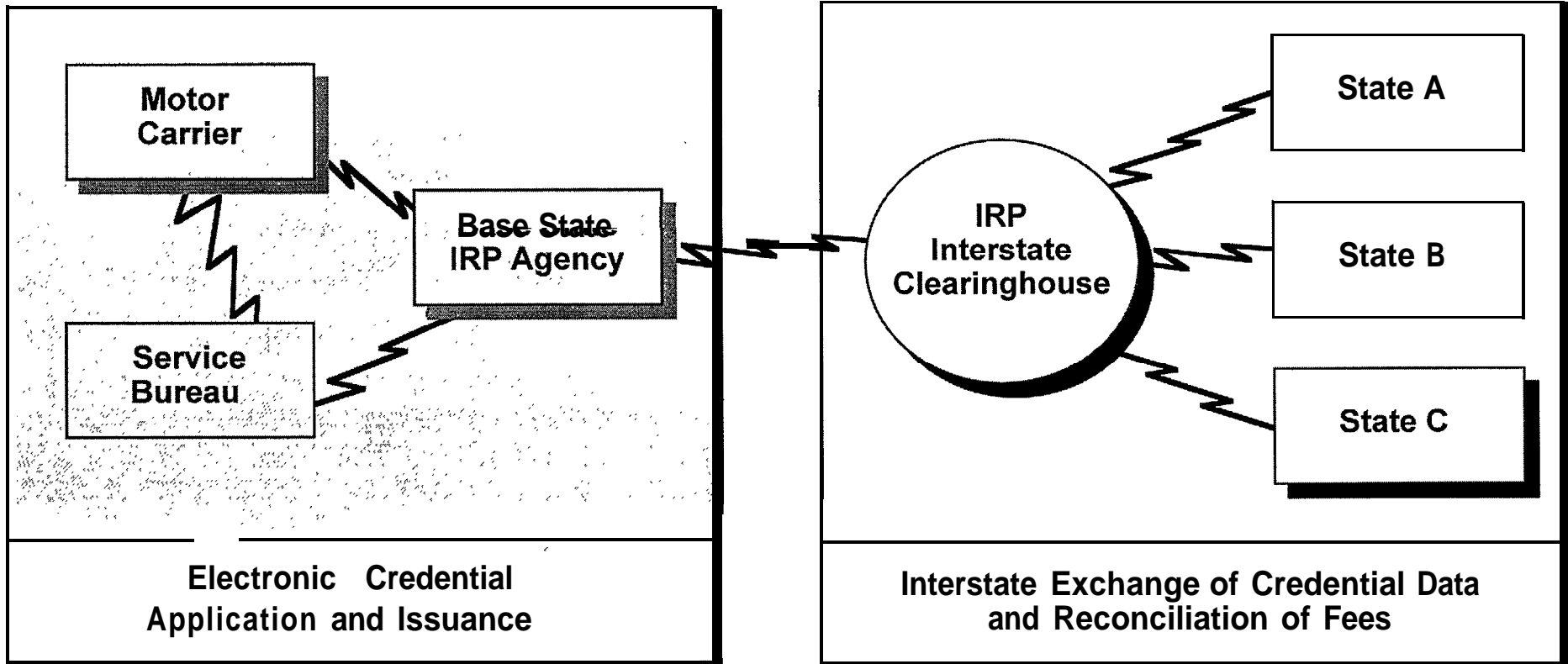
Safety Assurance (continued)

The ITS/CVO safety program will shift the emphasis of safety assurance from paper to performance, and from random to rational.

The major safety assurance projects include the following:

- Through the **100/200 Motor Carrier Safety Assistance Program (MCSAP) Site** initiative, the FHWA and the states will provide electronic access to carrier safety and driver license data from roadside inspection sites. The U.S. Congress mandated that the electronic access be available at 200 MCSAP sites by mid-1997, a target that already is close to fulfillment. As part of this initiative, the **Safety and Fitness Electronic Records (SAFER)** system will provide access from fixed and mobile inspection sites to the data residing within Federal and state motor carrier safety information systems.
- **The Safety Status Measurement System (SafeStat)** will measure safety fitness by assessing a carrier in four broad areas: accidents, driver, vehicle, and safety management. **The Commercial Vehicle Information System (CVIS)** will use results from the SafeStat to determine which carriers should have their registration suspended or revoked due to unsatisfactory safety performance.
- Operational tests in Idaho, Minnesota, and Wisconsin are developing methods to verify **compliance with out-of-service orders** issued following driver and vehicle safety inspections. Verification can occur at the site where the vehicle or driver was placed out-of-service; at a subsequent inspection site; or by the responsible carriers through self-certification.
- The FHWA and National Highway Traffic Safety Administration are sponsoring a series of projects to develop **brake testing** devices and **emissions testing** devices that reduce the time and effort required for roadside safety inspections. Other research projects are developing **onboard systems** to monitor the performance of the driver, the brakes, and other vehicle components, and to provide appropriate countermeasures.

Electronic Registration Operational Concept



Credentials Administration

ITS/CVO administration projects seek to streamline motor carrier and tax regulatory procedures, reducing costs for both agencies and motor carriers.

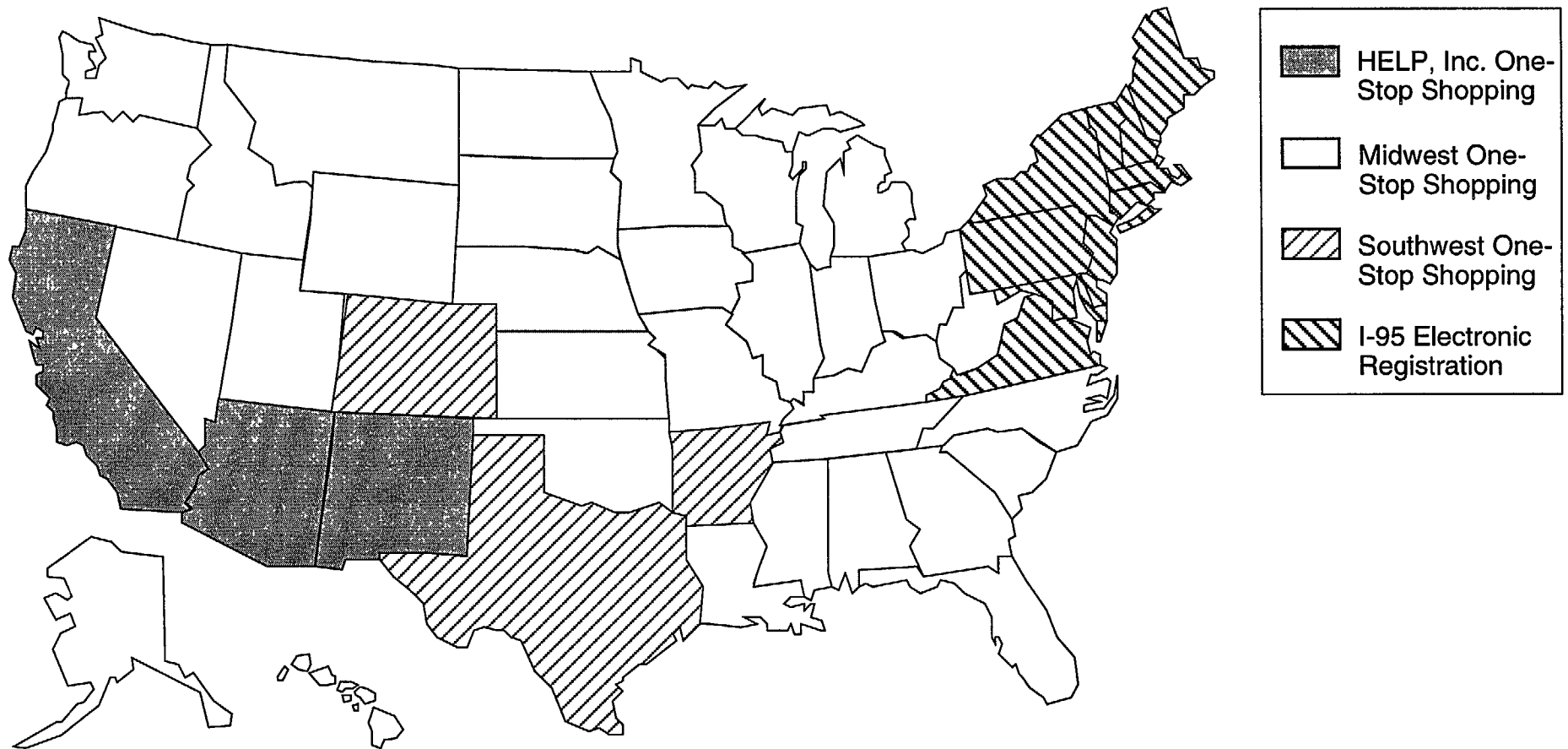
The objective of the ITS/CVO credentials administration program is to streamline credentials and tax procedures. The expected benefits include reduced operating costs and administrative effort for both agencies and carriers, as well as improved regulatory compliance by carriers.

The ITS/CVO credentials administration program will enable government agencies and motor carriers to conduct business transactions electronically. This capability will be achieved through a series of research projects, operational tests, and deployment activities, as follows:

- **Automation** - Develop software and information systems for electronic registration, mileage reporting, and tax and fee collections.
- **Networking** - Develop electronic data interchange and electronic funds transfer capabilities for the movement of data and money between agencies and carriers. Develop “clearinghouses” to manage data and funds exchange among states.
- **Process Change** - Develop “one-stop shopping” capabilities for carriers to obtain permits for multiple states through a single source. Develop base-state agreements for the administration of credentials other than registration and motor fuel tax accounts. Begin the reengineering of regulations and procedures.

These projects address three areas: transactions between motor carriers and agencies, transactions among agencies within the same state, and transactions among states.

Credentials Administration Projects



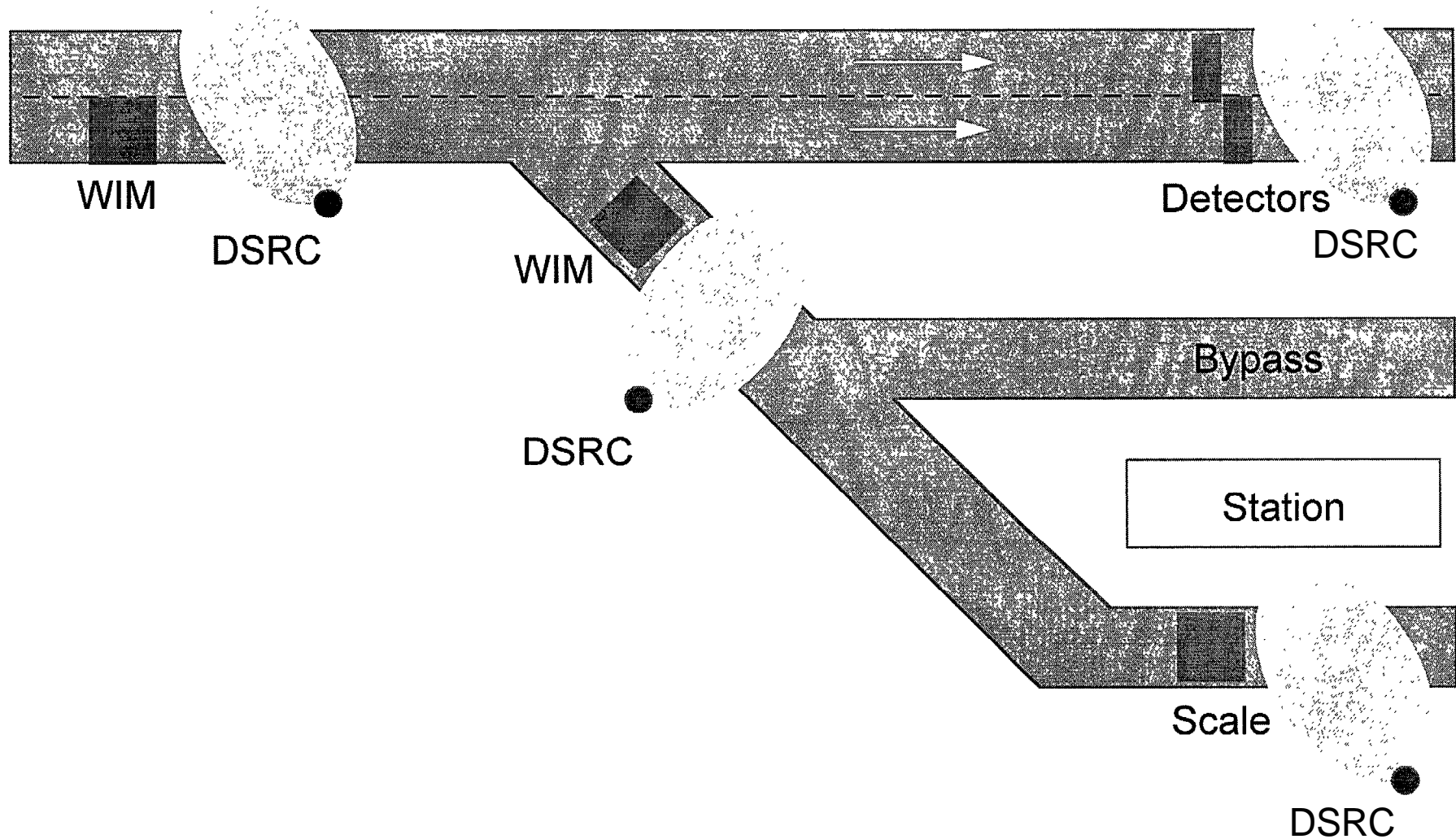
Credentials Administration (continued)

ITS/CVO credentials administration projects are shifting transactions from paper to electronic media, creating the opportunity for states to change the ways they regulate carriers.

The major credentials administration projects include the following:

- Operational tests of **electronic “one-stop shopping” systems** are underway in three regions: the Midwest; the Southwest; and the Far West, under the direction of HELP, Inc. The results of these tests will provide guidance to the states for the development of carrier automated transaction software.
- **Multistate clearinghouses** are under development to manage the exchange of data and fees for the International Registration Plan (IRP) and the International Fuel Tax Agreement (IFTA).
- The I-95 Corridor Coalition, a consortium of public and private transportation agencies representing 12 Northeast states, is developing a regional **electronic registration** system. The system will enable motor carriers to register electronically with state motor vehicle agencies, either directly or through third-party service providers.
- **The Automated Mileage and Stateline Crossing Operational Test (AMASCOT)**, completed in late 1995, demonstrated and evaluated the technology to automate the collection and filing of motor carrier mileage and fuel reports.
- **Regional oversize/overweight permitting programs** have been developed by 11 states in the Southeast, six states in the West, and five states in New England. A broad program covering all 12 Northeast states is under development.
- Under the auspices of the **Alliance for Uniform Hazmat Transportation Procedures**, four states are participating in a pilot test of a proposed base-state program for hazardous materials registration and permitting.

Automated Screening Operational Concept



Electronic Screening

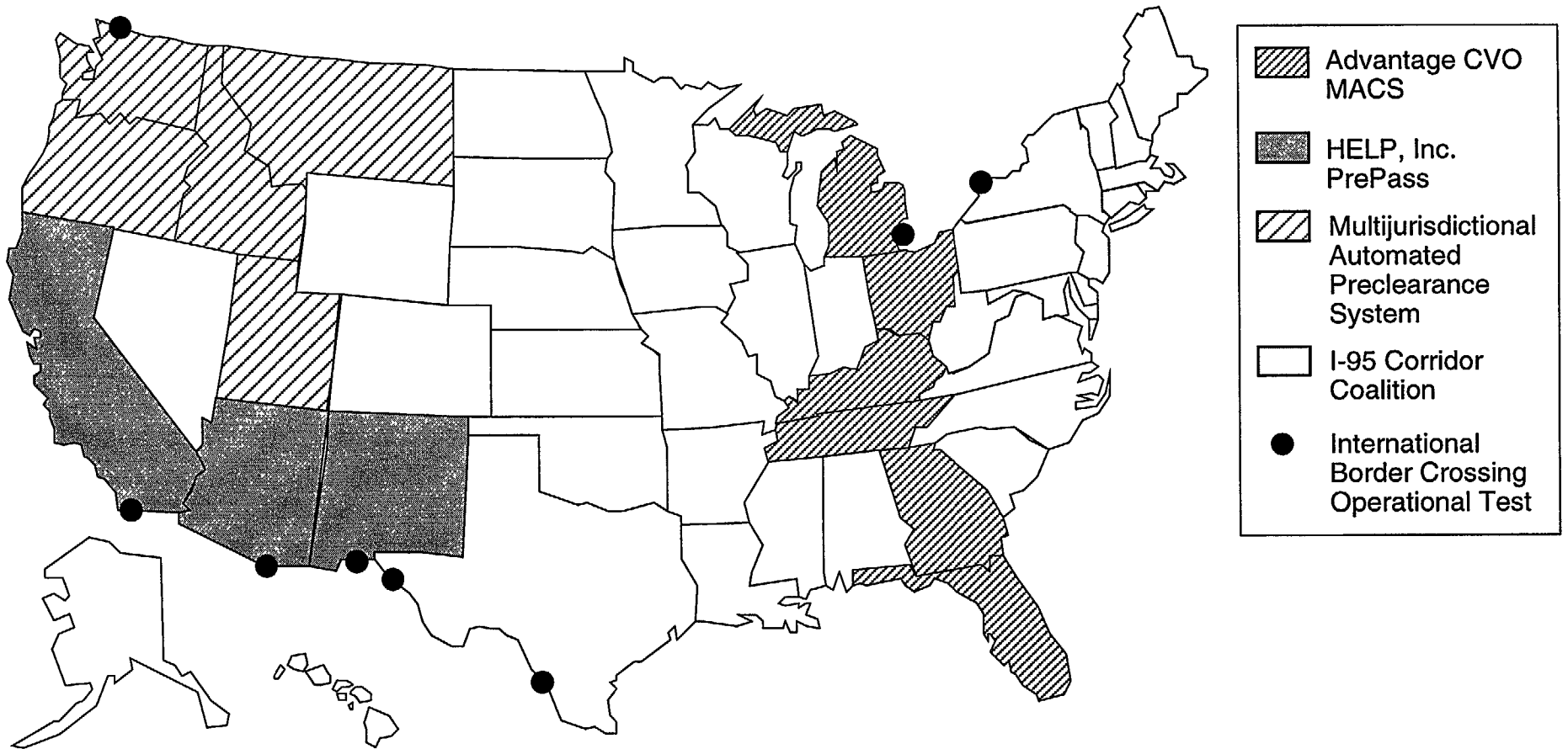
ITS/CVO electronic screening projects seek to reduce the delays experienced by safe and legal carriers at weigh stations, international border crossings, and other inspection sites.

The objective of electronic screening projects is to improve the verification of size, weight, and credentials information by roadside enforcement operations. The primary benefit of these projects will be reduced delays for compliant motor carriers, which will improve freight mobility and reduce delivery costs. In addition, the decrease in the use of weigh stations will reduce the number of accidents resulting from traffic queues outside stations or from vehicles exiting and re-entering the mainline highway.

The ITS/CVO electronic screening program will enable commercial vehicles to be screened electronically at weigh stations, border crossings, and other inspection sites. This capability will be achieved through a series of research projects, operational tests, and deployment activities, as follows:

- **Automation** - Develop the technologies for automated vehicle weighing and identification, which can screen vehicles at mainline speeds. Develop advanced portable scales.
- **Networking** - Develop information systems linking roadside readers and weigh station computers with state and regional credential databases.
- **Process Change** - Create “transparent borders,” allowing travel by safe and legal carriers through multiple states - or across international borders - with no more than a single stop. Use mobile units to catch drivers attempting to evade fixed sites and to increase enforcement capabilities in urban areas.

Electronic Screening Projects



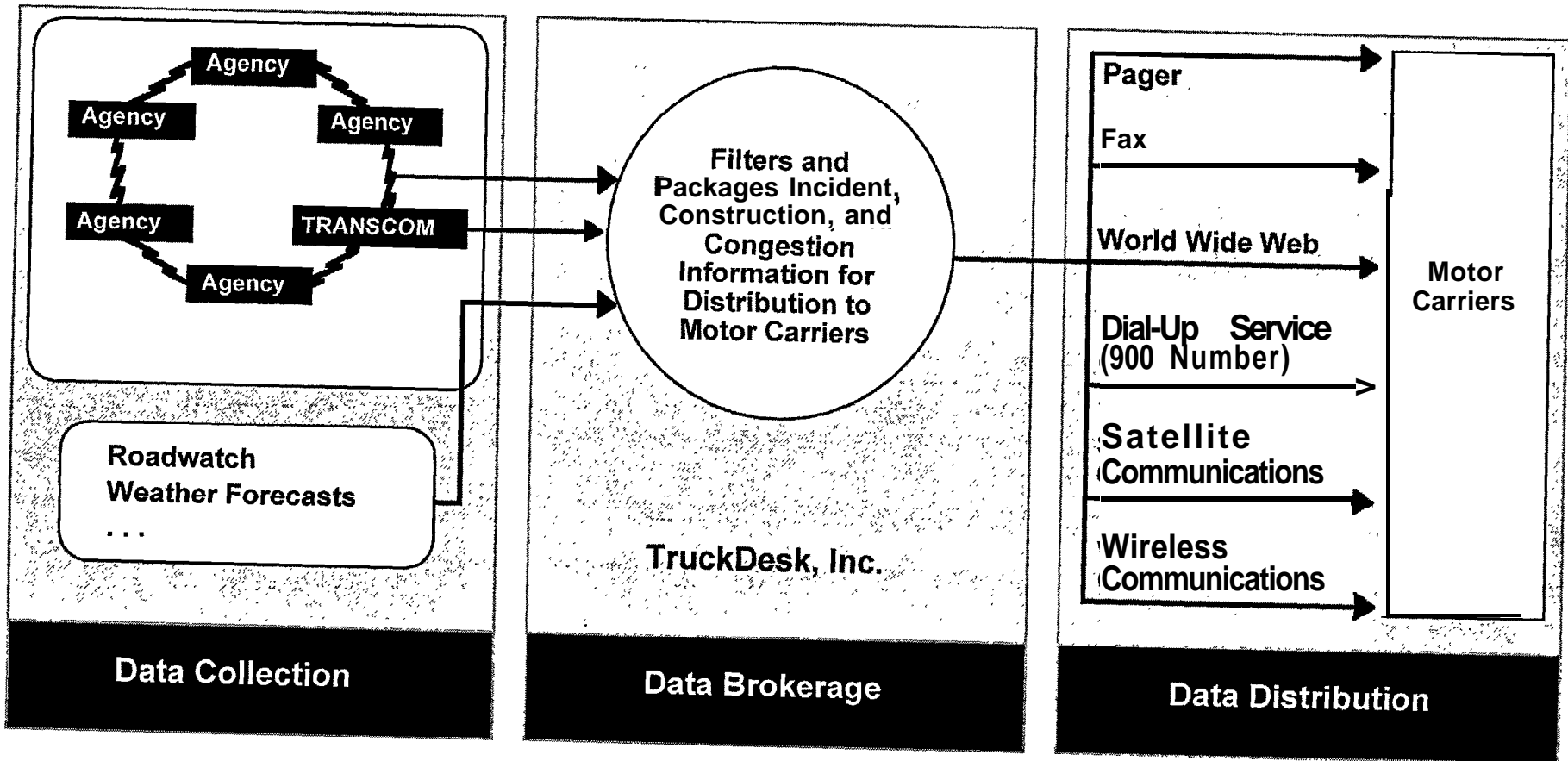
Electronic Screening (continued)

ITS/CVO screening projects are enhancing enforcement procedures at weigh stations, ports-of-entry, international border crossings, and other sites. The long-term vision is to enable trucks and buses to move as freely as passenger cars.

The major clearance projects include the following:

- HELP, Inc., a public/private corporation, provides a menu of pay-per-use services to carriers and states. The HELP **PrePass** service allows trucks to be weighed at highway speeds and have their credentials verified without stopping. HELP PrePass is operating at 19 weigh stations in California, Arizona, and New Mexico.
- **The Advantage CVO Partnership** is developing a Mainline Automated Clearance System (MACS) along the Interstate 75 corridor from Ontario to Florida. Six states and Ontario are participating an operational test of the system.
- Building on Oregon's experience with the **Green Light** operational test, four Northwest states are developing the **Multijurisdictional Automated Preclearance System** (MAPS). The MAPS system will be interoperable with HELP and MACS technology.
- The capability for **international electronic border clearance** is being developed through operational tests at major crossings in New York, Michigan, Washington, Texas, New Mexico, Arizona, and California. These systems will allow selected vehicles to cross the border without stopping or with expedited inspections. The systems will address customs, immigration, administrative, and safety requirements.

TruckDesk Operational Concept



Carrier Operations

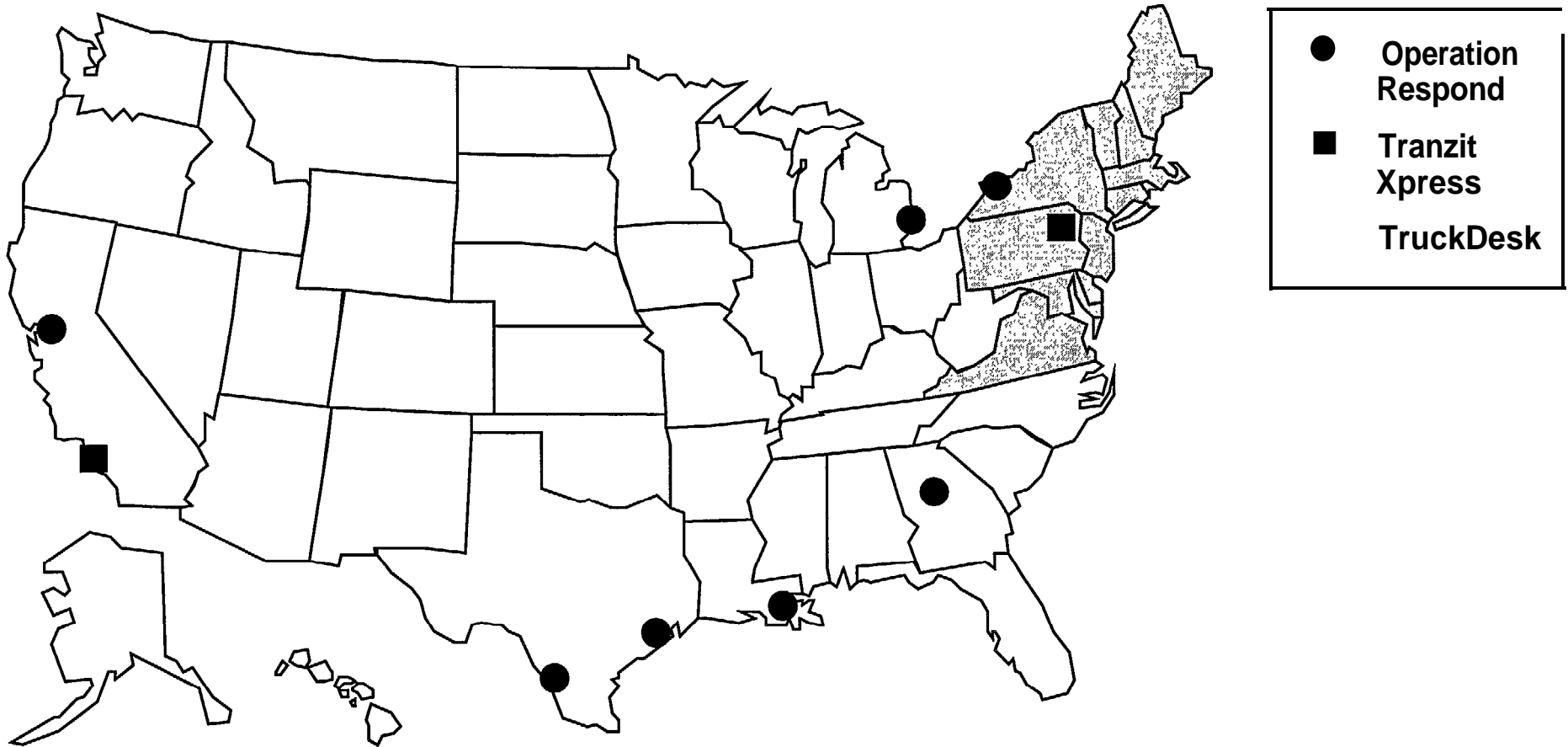
ITS/CVO carrier operations projects seek to reduce the time lost by motor carriers to congestion.

The ITS/CVO carrier operations program is building upon existing activity in two areas: private sector deployment of fleet management systems, and public sector deployment of traffic management systems. Because most traffic management systems are oriented primarily toward passenger cars, they cannot address the unique routing and dispatching restrictions and service demands faced by motor carriers.

The ITS/CVO carrier operations program will increase the flow of information about carrier operations and roadway conditions among carriers, state agencies, and emergency responders.

- **Automation** - Encourage the use of fleet and vehicle management systems to support vehicle routing and dispatching, shipment tracking, and driver/dispatcher communications.
- **Networking** - Develop an information exchange network with regional “brokers” to collate, filter, and repackage traffic information tailored to motor carrier needs. Provide emergency responders with information on the cargoes of vehicles involved in hazardous materials spills.
- **Process Change** - Provide real-time information to support dynamic routing and dispatching procedures.

Carrier Operations Projects



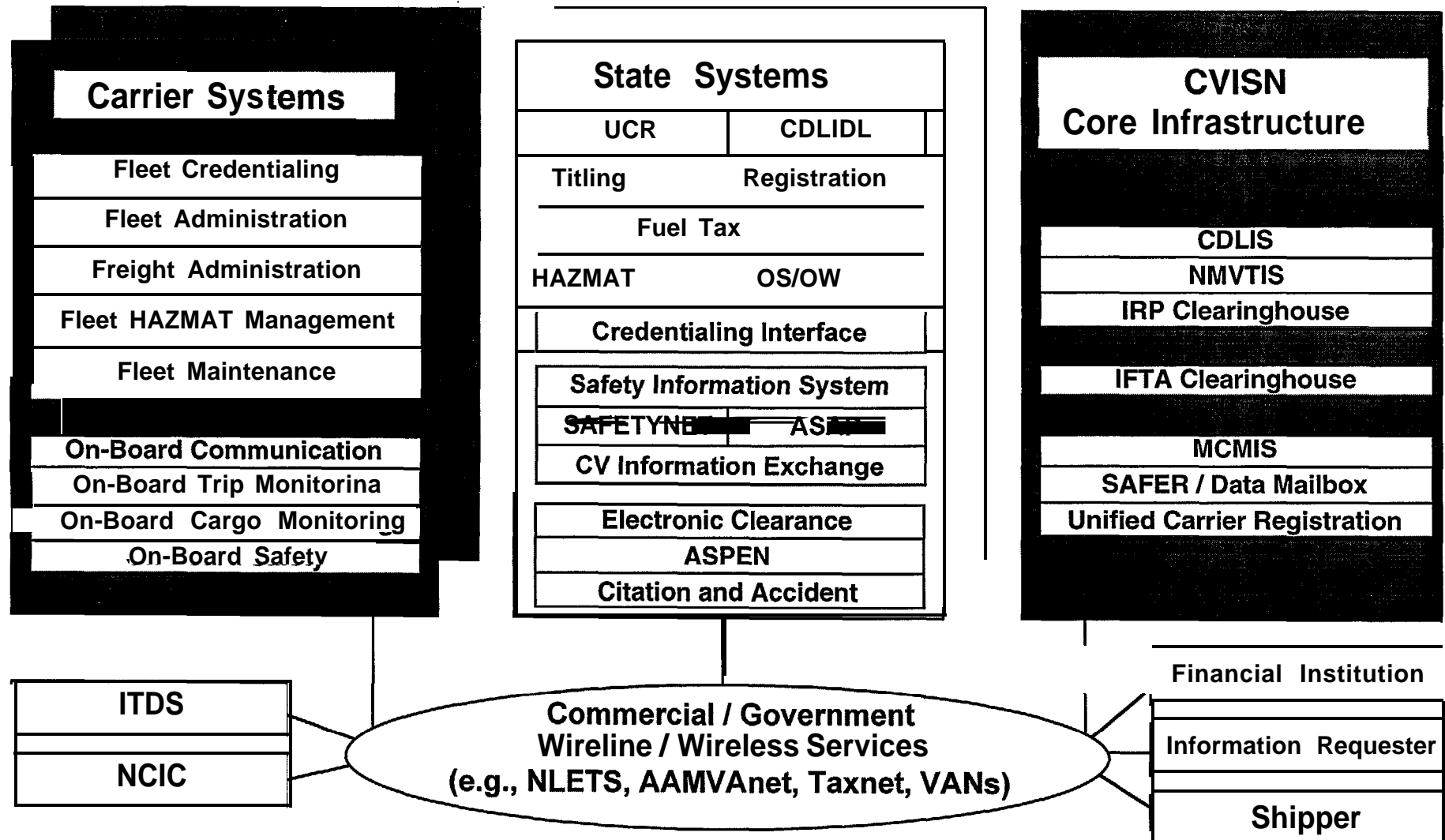
Carrier Operations (continued)

The ITS/CVO carrier operations program will improve freight mobility by linking motor carrier operations to real-time traffic information.

The major carrier operations projects include the following:

- The I-95 Corridor Coalition will establish a public/private organization known as **TruckDesk** to collate, package, and disseminate information on highway travel conditions to motor carrier dispatchers and drivers. The objective is to enhance motor carrier safety and operating efficiency through better routing and dispatching based on accurate and timely information on highway construction, incidents, congestion, and weather.
- **Operation Respond** is developing a format for information exchange and computer linkages between railroads, intermodal motor carriers, and first responders to speed the flow of information and the notification about hazardous materials incidents. Operational tests are underway in California, Georgia, Louisiana, Michigan, New York, and Texas.
- The National Institute for Environmental Renewal is developing a pilot program for a **Hazardous Materials Fleet Management and Monitoring System**. The program will establish and operate information systems to identify the contents of hazardous materials transported by motor carriers. An operational test is underway along Interstate 81 in Pennsylvania, to be followed by additional work in Los Angeles.
- The FHWA is sponsoring research to determine the appropriate role of the Federal government and the ITS program in fleet and vehicle management. Preliminary results of the **Commercial Vehicle Fleet Management and Information Systems** project suggest that the Federal role should be minimal. The project currently is exploring the application of ITS technologies to intermodal freight transportation.

CVISN System Design



CVISN Initiative

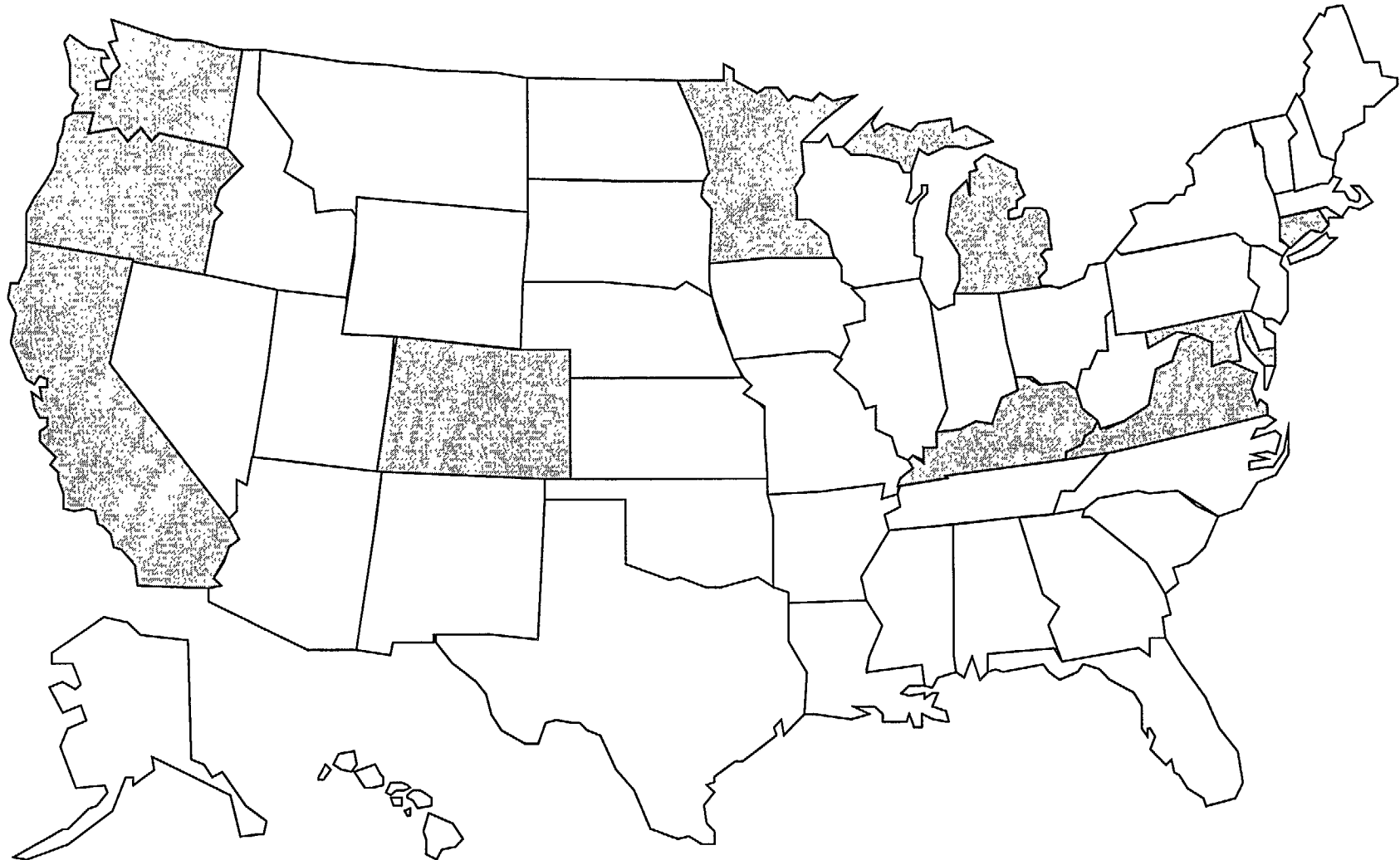
The CVISN project is developing a blueprint for a national CVO architecture, which will provide the framework necessary for cooperation and growth.

The ITS/CVO program is investing in the development of the technical infrastructure that will support the widespread deployment of ITS/CVO services. The Commercial Vehicle Information Systems and Networks (CVISN) initiative is developing a blueprint for a national CVO architecture and a framework for future cooperation and growth. Through the CVISN, the ITS/CVO program is developing the following:

- Standards, protocols, and unique identifiers to facilitate the electronic data interchange and vehicle-to-roadside communication capabilities that enable most ITS/ CVO services.
- Interstate clearinghouses for vehicle registration, fuel tax administration, hazardous materials permits, and other credentials.
- The SAFER system to provide a much-needed link between existing and planned motor carrier safety information systems.

The CVISN will create a way for existing and new systems to exchange information electronically through the use of standards and commercially available communications systems. The CVISN will provide a fully integrated collection of commercial vehicle information systems operated by the states, the FHWA, carriers, and other stakeholders. Its central vision is that by the year 2005, the vast majority of CVO business transactions will be handled electronically.

CVISN Prototype and Pilot States



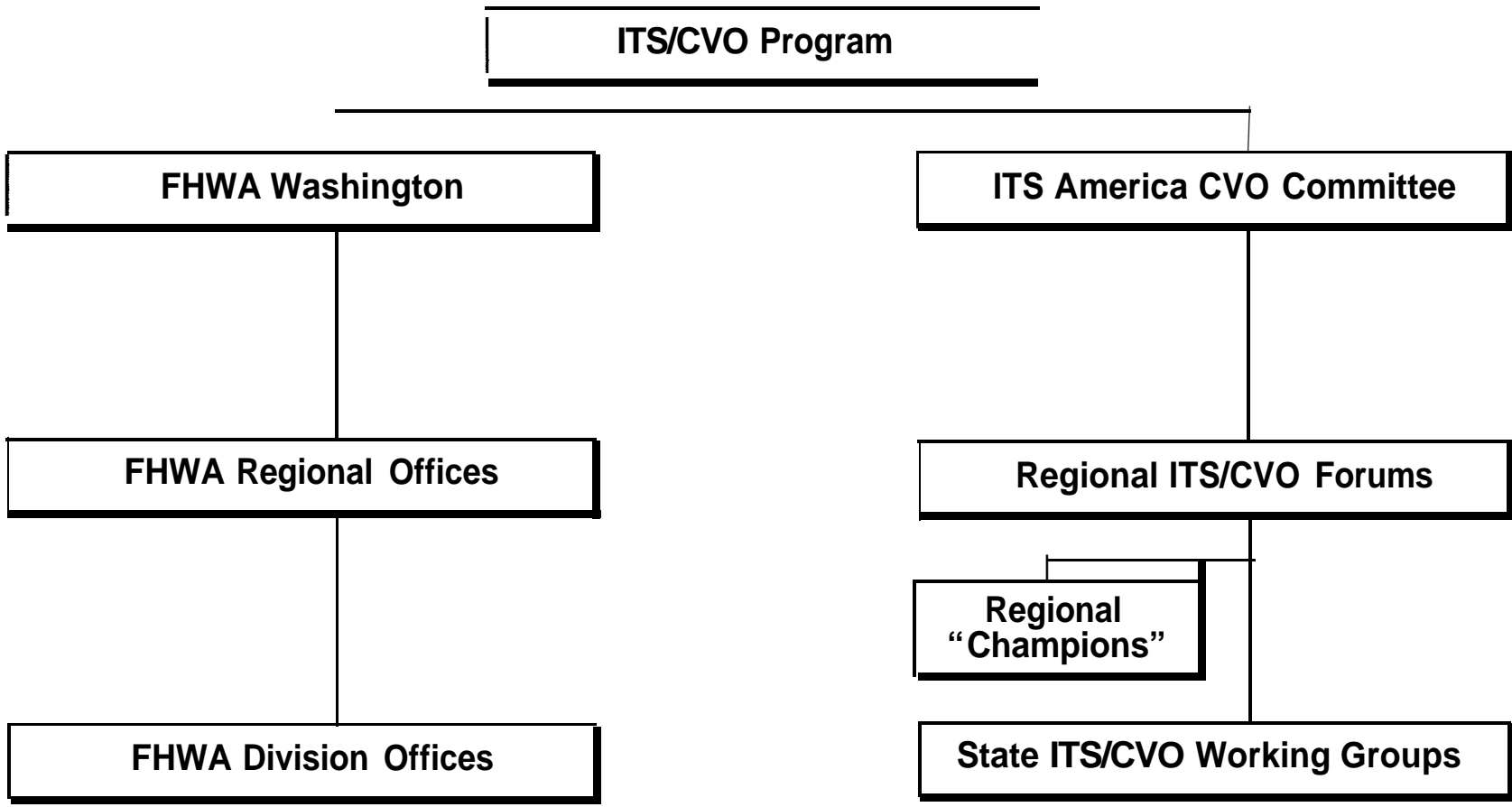
CVISN Initiative (continued)

The CVISN pilot program will be a critical step in the nationwide deployment of ITS/CVO capabilities.

The objective of the CVISN Model Deployment initiative is to move the CVISN architecture from the concept stage into operation. It is intended to be a cooperative effort of the FHWA, states, government and industry associations, and motor carriers. The scope of the pilot will include the following activities:

- Development of the CVISN core infrastructure, which refers to a collection of planned or operational multistate information systems, including the Commercial Driver's License Information System (CDLIS); SAFER; and multistate clearinghouses for vehicle registration, fuel tax administration, and other credentials. Through the pilot, these systems will be brought into compliance with the CVISN architecture and standards.
- Participation of eight pilot states (in addition to the two prototype states, Maryland and Virginia) that are committed to enhancing internal information systems and implementing applicable ITS/CVO services in a manner consistent with the CVISN architecture.
- Involvement of representative carriers from each pilot state in planning, implementation, and operation.
- Development of formal standards for electronic data interchange and dedicated short-range communication.
- Demonstration of the synergistic effects of providing integrated ITS/CVO services.
- Preparation for full nationwide deployment of the CVISN.

Organization and Management Approach



Mainstreaming Initiative

The FHWA's mainstreaming initiative will organize and manage ITS/CVO deployment. The ITS/CVO program will develop policies, plans, projects, and forums at the state, regional, and national levels.

The organization and management of the ITS/CVO program are critical to the overall progress in deployment. The FHWA's mainstreaming initiative will organize and manage ITS/CVO deployment. The objectives of the mainstreaming program are to:

- Incorporate ITS/CVO more fully into state and metropolitan transportation planning;
- Coordinate ITS/CVO activities among agencies and among states; and
- Explain the ITS/CVO program to key decision makers in the public and private sectors.

The ITS/CVO program will develop policies, plans, projects, and forums at three levels:

- The state level, because the states have the first-line responsibility for motor carrier safety regulations;
- The regional level, because many truck trips occur in more than one state; and
- The national level, because of the need to ensure uniformity of state services for carriers operating in more than one region.

The efforts of state, regional, and national policy forums and deployment groups will be paralleled by the management activities of the three levels of FHWA offices: the division offices; the regional offices; and the headquarters, particularly through the Office of Motor Carriers, the Joint Program Office for Intelligent Transportation Systems, and the Research and Development division.

CVO Stakeholder Groups

	Highway Maintenance & Operations	Law Enforcement	Revenue Collection	Motor Carriers	ITS/CVO Policy Forums	ITS/CVO Deployment Groups
National	<ul style="list-style-type: none"> . FHWA . AASHTO 	<ul style="list-style-type: none"> . CVSA 	<ul style="list-style-type: none"> . FTA . AAMVA - IFTA - IRP 	<ul style="list-style-type: none"> . ATA . NPTC - OOIDA 	<ul style="list-style-type: none"> . ITS-A CVO Committee . Base State Working Group 	<ul style="list-style-type: none"> . Permit Services . IFTA, Inc. . IRP, Inc. . AAMVAnet, Inc.
Regional	<ul style="list-style-type: none"> . FHWA Regional Offices . WASHTO, SASHTO, etc. 				<ul style="list-style-type: none"> . ITS/CVO Regional Consortia 	<ul style="list-style-type: none"> . HELP, Inc. . Advantage CVO Partnership . I-95 Corridor Coalition
State	<ul style="list-style-type: none"> . DOTs . FHWA Division Offices 	<ul style="list-style-type: none"> . Police . Patrols 	<ul style="list-style-type: none"> . DORs . DMVs . PUCS 	<ul style="list-style-type: none"> - MTAs . Carriers 	<ul style="list-style-type: none"> . State ITS/CVO Working Groups 	

Shaded boxes indicate forums that will be strengthened through the ITS/CVO mainstreaming program.

Mainstreaming Initiative (continued)

The ITS/CVO program includes several key stakeholder groups.

The major CVO stakeholder groups include the following:

- **State regulatory agencies** control the day-to-day delivery of most CVO services, and will be the major public sector beneficiaries of **ITS/CVO** programs. The states will invest in ITS equipment and technologies, as well as in the CVO information infrastructure. The states will operate and maintain most **ITS/CVO** systems. They will share data and change their internal processes as appropriate to make the most effective use of new technologies.
- **State and local planning agencies**, including metropolitan planning organizations (MPOs) and the planning divisions of state DOTs, are responsible for establishing short- and long-term transportation plans and for setting funding priorities. The support of these agencies for **ITS/CVO** deployment will be critical to ensure continued long-term funding.
- **Motor carriers** will be the major private sector beneficiaries of **ITS/CVO** programs. Carriers will invest in technologies that meet their unique operating needs. Carriers will be encouraged to participate in operational tests and planning exercises.
- **Commercial drivers** will be encouraged to participate in public and private sector **ITS/CVO** deployment, with a focus on evaluating new technologies.
- **Shippers, receivers, and insurers** are interested in ensuring the safe, timely, and efficient delivery of freight and passengers.
- **Service providers and manufacturers** will develop **ITS/CVO** technologies and equipment for the public and private sectors. The technical approach behind the **ITS/CVO** program relies heavily on private industry to provide computer, software, and communication technology and services.
- **Industry and trade associations** will play important roles in planning exercises and operational tests. They can educate and organize their membership to participate effectively in **ITS/CVO** deployment, and also can provide feedback to the public sector on the concerns and interests of the CVO community.

Framework for ITS/CVO Business Plans

	ITS/CVO PROGRAM					
	Goals and Objectives (Why?)	Projects (What? Where?)	Technical Approach (How?)	Organization and Management (Who?)	Schedules and Milestones (When?)	Funding (How Much?)
Safety Assurance						
Credentials Administration						
Electronic Screening						
Carrier Operations						

Mainstreaming Initiative (continued)

The state ITS/CVO program will establish public/private forums with broad membership, and develop state ITS/CVO business plans.

Thirty-three states are participating in the ITS/CVO mainstreaming initiative. The state ITS/CVO mainstreaming program will emphasize planning for and deployment of specific ITS/CVO technologies and services, with a particular emphasis on the deployment of the CVISN infrastructure. The development of a national ITS/CVO program will not change the fundamental allocation of responsibility between the states and the Federal government, but will improve coordination and communication both within and among states. In most states, the primary need is for the integration and coordination of the work of existing agencies to ensure smooth planning.

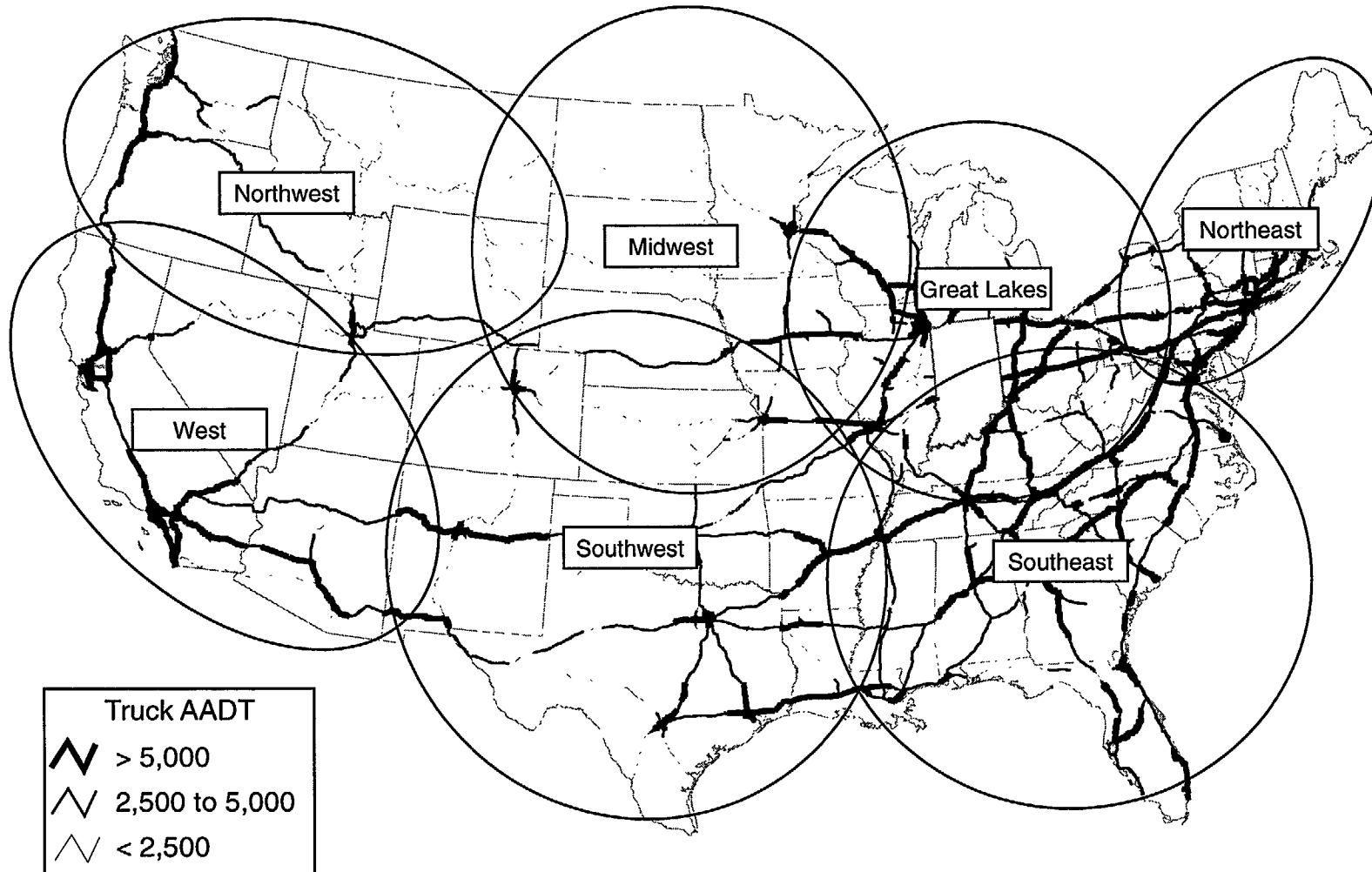
Each participating state will form a working group comprising representatives of the full range of agencies involved in CVO regulation and enforcement, as well as the motor carrier industry. The working groups will carry out the following responsibilities:

- Provide policy leadership and planning support for ITS/CVO activities in the state;
- Develop business plans with specific projects, milestones, and funding sources;
- Increase the level of understanding about agency roles in CVO, and identify where agency responsibilities or objectives conflict or overlap; and
- Designate a lead agency to develop and implement specific ITS/CVO services.

The objectives of the state business plans are to formalize the CVO planning process, promote the development of public/private partnerships, and provide justification for ITS/CVO funding in state budgets. The business plans also will guide the integration of ITS/CVO technologies with existing state regulatory programs.

Regional Trucksheds

Average Annual Daily Truck Traffic on Interstate Highways



Source: FHWA Highway Performance Monitoring System.

Mainstreaming Initiative (continued)

At the regional level, the ITS/CVO program will be organized around seven trucksheds.

Regional ITS/CVO programs will provide linkages and coordination among the state programs. These regional programs will reflect the reality that most truck movements are regional and local rather than national; that most state-to-state interaction occurs within loosely defined regions or “trucksheds”; and that the needs and interests of state agencies and motor carriers differ more across states than within them.

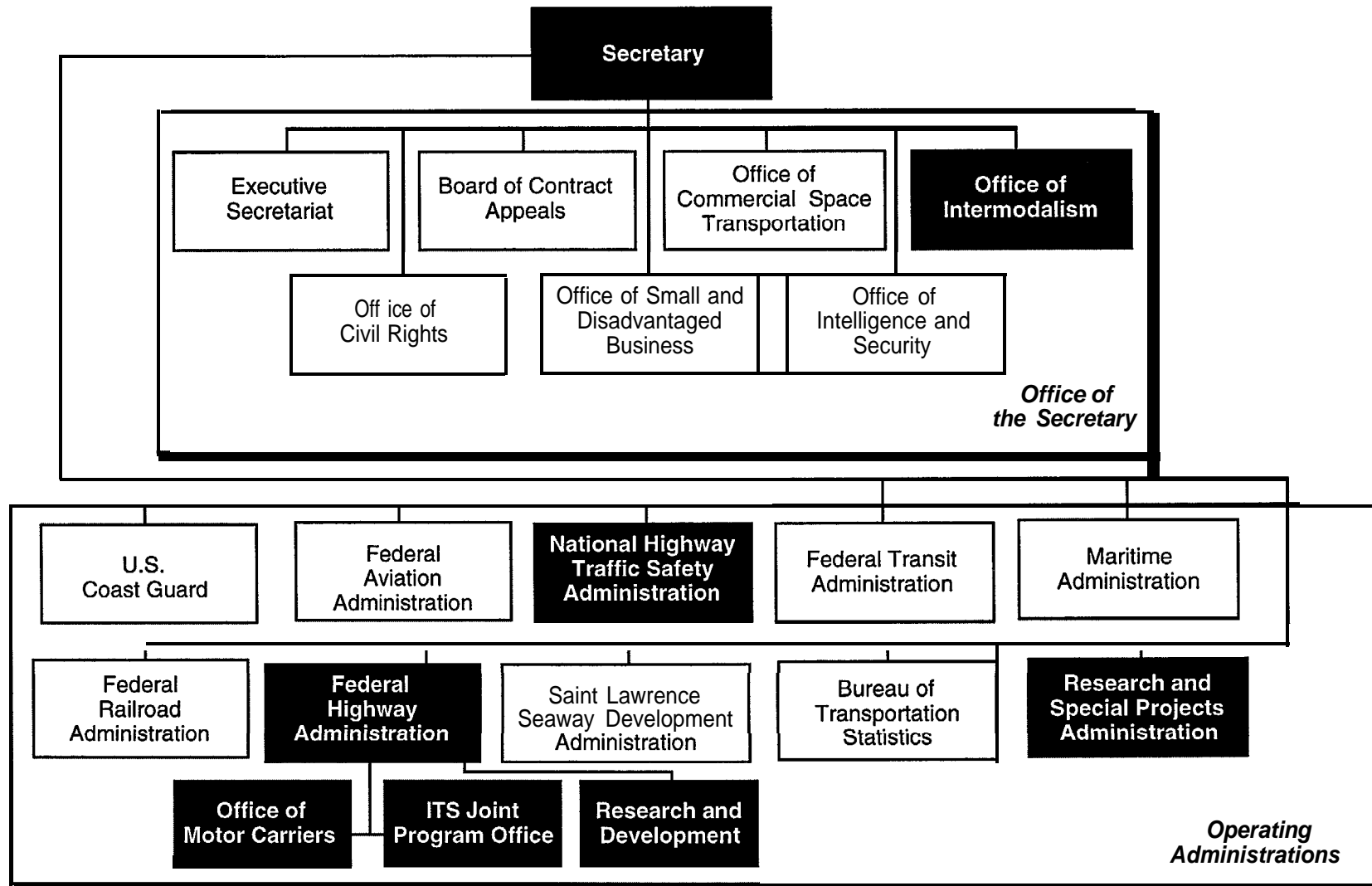
The mainstreaming initiative is supporting seven regional ITS/CVO consortia. Each regional consortium will establish an ongoing regional ITS/CVO mainstreaming forum comprising representatives of both public agencies and motor carriers. Although the state government provides a framework for coordinating CVO activities at the local level, and the Federal government and trade associations provide a framework at the national level, little integration occurs at the regional level. Thus, these forums will fill a critical gap in the current CVO organizational structure.

Each regional consortium will carry out the following activities:

- Provide policy leadership and planning support for ITS/CVO activities in the region.
- Build awareness of, and support for, ITS/CVO activities among state agencies and motor carriers in the region.
- Produce and regularly update an ITS/CVO business plan for the region. The regional plan will reflect coordination with its constituent state plans, and will show how the regional program will be integrated with the national ITS/CVO program.
- Provide technical and evaluation support to state working groups, agencies, and motor carriers in the region.

To expedite its work, each regional forum will hire the equivalent of a full-time “champion” or program coordinator. The champion will facilitate the work of the forum and explain ITS/CVO services to administrators, legislators, motor carriers, and the general public.

U.S. Department of Transportation Organizational Chart



Note: The darkened boxes represent agencies with formal responsibilities related to the national ITS/CVO program.

Management Approach

The Federal ITS/CVO program will be managed by the U.S. Department of Transportation/Federal Highway Administration, primarily through the Office of Motor Carriers.

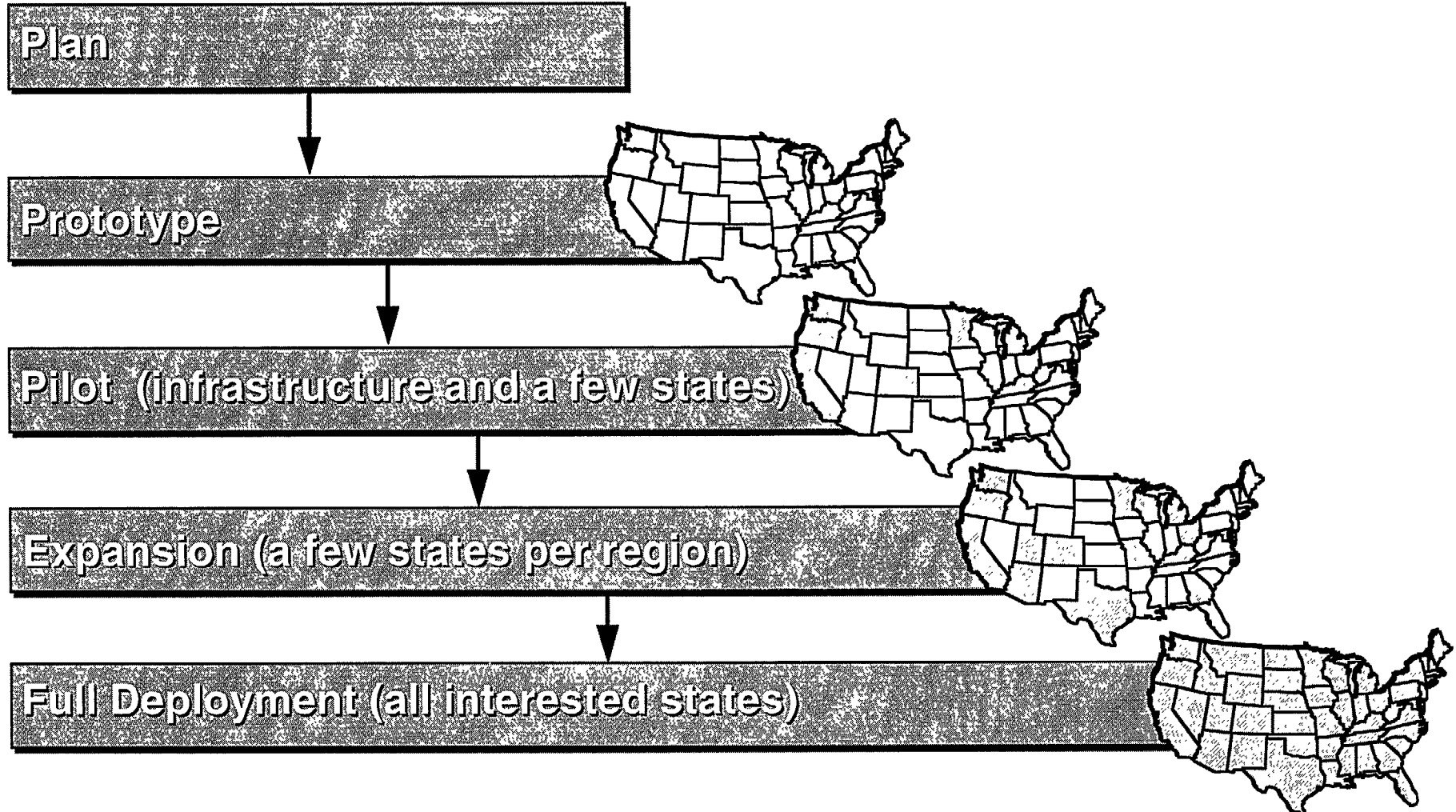
The Federal ITS/CVO program will be managed by the U.S. Department of Transportation, primarily through the Federal Highway Administration (FHWA). Responsibilities will be allocated among the following FHWA units:

- **The Office of Motor Carriers (OMC)** has statutory and regulatory authority over the safety performance of all commercial motor carriers engaged in interstate or foreign commerce. The OMC includes an ITS/CVO division.
- The **Research and Development Division** is responsible for systems development and technical research, including the CVISN architecture development.
- **The Joint Program Office for Intelligent Transportation Systems (JPO)**, coordinates the ITS activities of all U.S. DOT modal administrations. The JPO's objectives are to provide strategic leadership for ITS research, development, testing and deployment; coordinate the various elements of the ITS program; and ensure the cost-effective use of resources.

The OMC will manage the Federal ITS/CVO program in cooperation with its regional and division offices.

- The FHWA includes nine regional offices. Each office includes a regional OMC director, as well as a technical programs manager with responsibility for overseeing regional ITS/CVO activities.
- The FHWA operates a division office in each state. Each division office includes a state director, as well as technical staff with ITS expertise.
- The OMC also will coordinate with the regional and division Federal-aid offices, which are responsible for the contracting and monitoring of projects involving Federal highway funds.

Phased Deployment Strategy



Schedule and Milestones

ITS/CVO services will be developed and deployed in phases. The initial emphasis will be on the CVISN architecture and safety information systems.

The ITS/CVO program uses a phased deployment strategy. In the near-term, the emphasis will be on the deployment of the CVISN architecture and safety information systems; over time, the emphasis will shift to credentials administration and congestion management. The major milestones will serve as goals for the participating agencies and carriers, as well as a tool for the FHWA to monitor progress.

Within this overall phased strategy, the schedules and milestones for individual projects will vary. The typical ITS/CVO service will be developed and deployed in five stages, corresponding to the strategy used for the CVISN:

- **Plan** - Develop the organizational and technical frameworks to support the development and deployment of the service.
- **Prototype** - Conduct a small-scale test to demonstrate the operational concept and validate the system requirements.
- **Pilot** - Conduct a larger-scale test at a limited number of sites to evaluate the costs and benefits of the service before proceeding to widespread deployment.
- **Expansion** - Expand from the pilot sites to incorporate additional states or carriers in a smooth, coordinated manner.
- **Full Deployment** - Achieve the targets for implementation of the service, which in most cases will involve national deployment.

Major Milestones

Events	Year											
	1996			1997			1998			1999		
Select CVISN pilot states			■									
Award mainstreaming funding			■									
Conduct CVISN prototype test	■	■	■	■	■	■	■	■	■			
Publish baseline CVISN architecture				■	■	■						
Deploy computers and inspection software at 200 MCSAP sites	■	■	■	■	■	■						
Conduct ITS/CVO operational tests (e.g., Advantage I-75 MACS, international border crossing, out-of-service verification, one-stop shopping)	■	■	■	■	■	■	■	■	■	■	■	■
Conduct CVISN pilot test				■	■	■	■	■	■	■	■	■
Develop state and regional ITS/CVO business plans				■	■	■	■	■	■			

Schedule and Milestones (continued)

The CVISN pilot test and the completion of major operational tests will be the most significant milestones for the ITS/CVO program over the next three years.

The major milestones for the ITS/CVO program over the next three years are as follows:

Winter 1996/97

- Publish baseline CVISN architecture

Summer 1997

- Complete deployment of computers and inspection software at 200 MCSAP sites

Through Fall 1997

- Complete current round of ITS/CVO operational tests (E.g., Advantage I-75 MACS, international border crossing, out-of-service verification, one-stop shopping)

Spring 1998

- Complete state and regional ITS/CVO business plans

Fall 1998

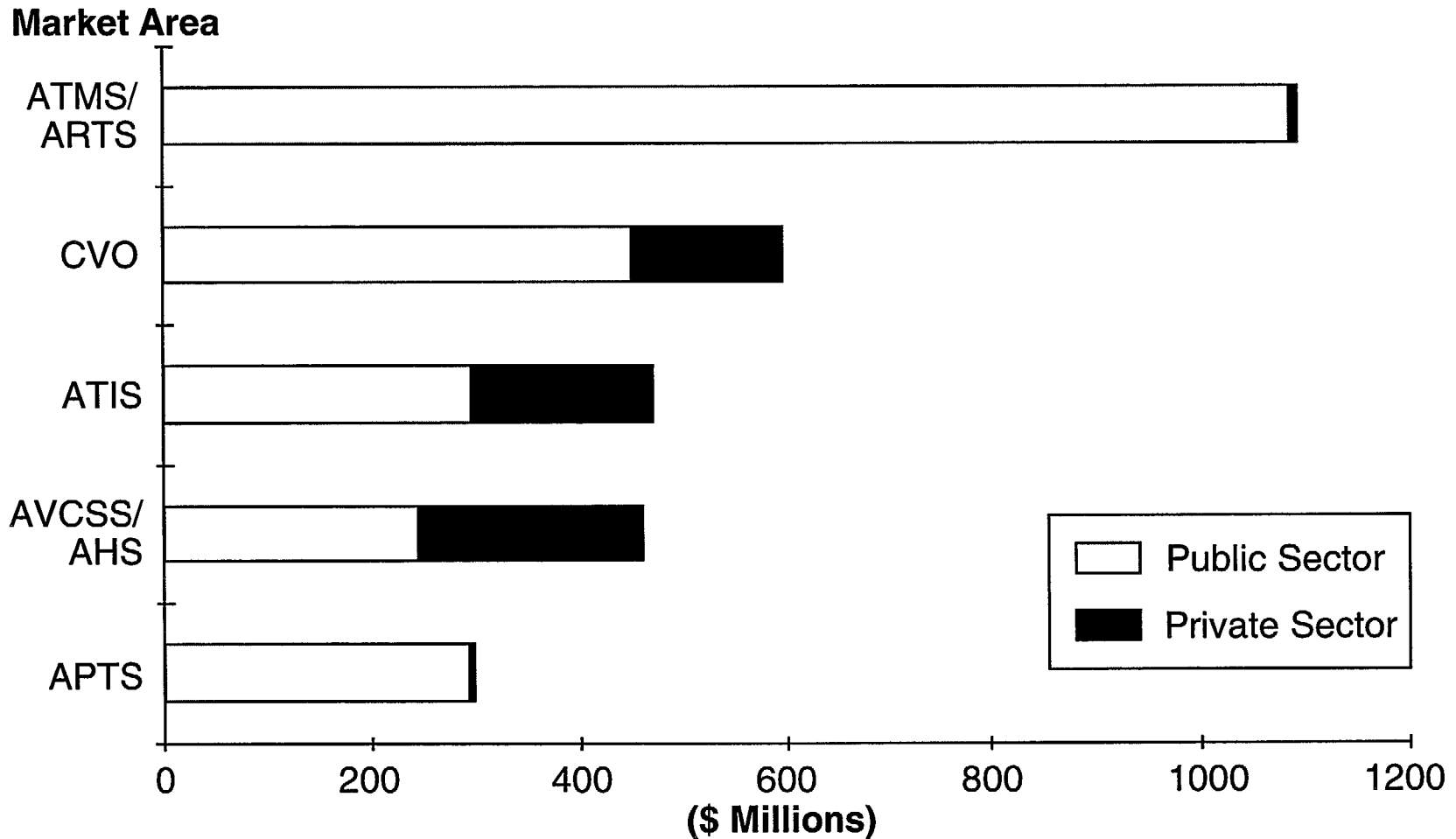
- Complete CVISN prototype demonstration

Summer 1999

- Complete CVISN pilot test

Other operational tests may begin or be completed over this period.

ITS Expenditures, 1992 to 1995



Source: U.S. DOT, Joint Program Office for ITS.

Funding Approach

ITS/CVO spending is projected to total \$21 billion over the next 15 years, with the private sector providing the majority of the investment.

The U.S. DOT's Joint Program Office for ITS has estimated that investment in ITS products and services totaled \$2.9 billion from 1992 to 1995. The largest amount, over \$1 billion, was spent on Advanced Traffic Management Systems (ATMS) and Advanced Rural Transportation Systems (ARTS), CVO represented 20 percent of the total ITS investment over the period, or \$600 million.¹

Federal and state governments accounted for about three-quarters of the ITS/CVO spending during the four-year period, or \$451 million. The remaining \$147 million in ITS/CVO spending was provided by the private sector. The private sector's role in ITS/CVO deployment to date has been substantially larger than in other ITS market areas such as ATMS.

ITS America has estimated that ITS expenditures between 1997 and 2011 will total \$200 billion in 1992 dollars, which would make ITS deployment one of the largest transportation programs in history. In comparison, the construction of the Interstate Highway Systems cost \$130 billion over a 35-year period. It is estimated that CVO would account for \$21 billion, or approximately 10 percent of this total.²

¹ Funding levels were derived from *The Intelligent Vehicle-Highway Systems Program in the United States*, produced by the U.S. DOT's Joint Program Office for Intelligent Transportation Systems in 1995. This document provided the most recent funding data for the Federal program for fiscal years 1992 through 1995.

² Data were derived from the *Draft Strategic Plan for IVHS in the United States*, produced by IVHS America (now ITS America) in February 1992.

ITS/CVO Funding Sources

	Research Development	Capital Costs	Operations and Maintenance
Federal ITS Program MCSAP OMC General Operating Expenditures Federal-Aid Highway Funds (NHS, STP, etc)	● ● ●	● ● ● ●	●
State	●	●	●
Toll Authorities	●	●	●
Private Sector	●	●	●

Funding Approach (continued)

The ITS/CVO program can draw upon a variety of public and private sector funding sources.

The major sources of ITS/CVO funding are as follows:

- The **Federal government** is a catalyst for ITS/CVO deployment. The Federal government is the primary source of funding for research, development, and capital costs. Each year, the Federal governments spends upwards of \$30 million on the ITS/CVO program. The major Federal funding sources include:
 - The overall ITS budget;
 - Congressional earmarks for specific projects;
 - The general operating expenditures of the FHWA Office for Motor Carriers;
 - The Motor Carrier Safety Assistance Program (MCSAP); and
 - The Federal-aid highway programs financed by the Highway Trust Fund.
- **State and local governments** are the primary sources of operations and maintenance funding. However, relatively few state governments -- and even fewer local governments -- have developed dedicated funding sources for ITS/CVO projects.
- **Toll authorities** that operate bridges, tunnels, and turnpikes can provide funding for the planning and deployment of ITS/CVO programs for their facilities.
- **The private sector** is an important partner in ITS/CVO investment. Private investment includes the development and new products and services by manufacturers and other vendors, as well as the installation of equipment by motor carriers.

Devolution Strategies

- **Provide step-down Federal grants**
- **Focus Federal money on deployment of core infrastructure**
- **Build public and private sector constituencies for ITS/CVO**
- **Form public/private partnerships**

Funding Approach (continued)

The ITS/CVO program will not rely exclusively on Federal money, but will use Federal investment as a catalyst. Over the long-term, funding responsibilities will shift to the states and to the private sector.

The devolution of funding responsibility from the Federal governments to the states and the private sector will require the following actions:

- **Provide step-down grants.** Where possible, Federal ITS/CVO funding will be provided to the states in the form of “step-down” grants, in which the Federal share of the total project costs decreases each year. In this manner, the Federal government can provide an incentive for a state to begin deployment of ITS/CVO services. Once the benefits of the service are evident, the state should be willing to bear more of the costs.
- **Commit to deployment of the core CVO infrastructure.** Public sector efforts initially will focus on the nationwide deployment of the CVISN and its key clearinghouses and information systems by 2005. Progress in this area will encourage private sector investment and development of other applications.
 - **Build a constituency among public and private sector decision-makers.** The ITS/CVO program will seek ways to build support among key decision-makers so that it can compete more effectively for Federal-aid highway funds, state and local general operating budgets, and private sector investment capital. The state and regional ITS/CVO forums will continue to encourage participation from motor carriers and other private businesses. Outreach and education will be a critical element of this effort.
 - **Develop public/private partnerships.** The ITS/CVO program will explore areas in which the private sector can bring expertise as well as additional investment capital. Private sector leadership is particularly appropriate in areas where most of the benefit accrues to private businesses, as well as in areas where the risk is high. The program will develop models for public/private partnerships, and address regulatory and statutory barriers to contracting with the private sector.

Introduction

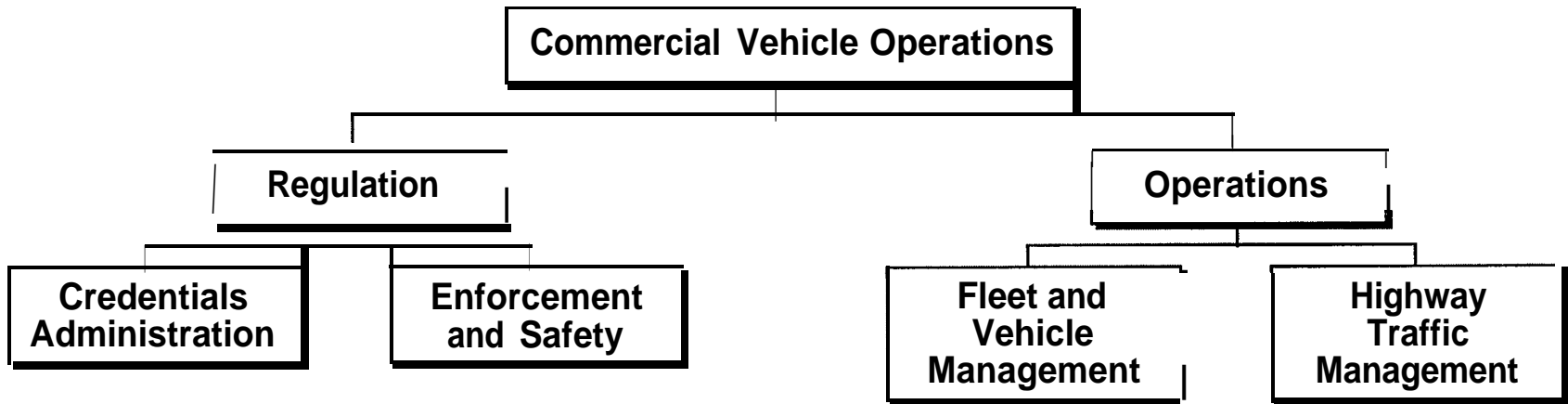
This report presents the FHWA's national program for the application of ITS to CVO.

This report presents the Federal Highway Administration's national program for the application of Intelligent Transportation Systems (ITS) to commercial vehicle operations (CVO).

The objectives of this report are to:

- Define goals and guiding principles for the national ITS/CVO program;
- Define the relationships among ITS/CVO projects;
- Describe approaches for organizing, managing, and funding the ITS/CVO program; and
- Build a consensus among public and private CVO stakeholders in support of the national ITS/CVO program.

Commercial Vehicle Operations



- Account Processing
- Credentials Issuance
- Reporting
- Tax Collection
- Auditing

- Driver and Vehicle Safety Assurance
- Size and Weight Inspection
- Credentials Verification

- Routing and Dispatching
- Communications
- Onboard Safety Monitoring
- Record Keeping
- Maintenance

- Travel Advisory Services
- Incident Management
- Routing Restrictions

Commercial Vehicle Operations

Commercial vehicle operations comprise three dozen areas of interaction involving public agencies and motor carriers. CVO activities cover four broad functions: credentials administration; enforcement and safety; fleet and vehicle management; and highway traffic management.

Commercial vehicle operations comprise three dozen areas of interaction involving public agencies and motor carriers. These transactions are critical for highway safety, carrier productivity, and tax collection. For both agencies and carriers, the time and paperwork involved in these activities are substantial, as is the potential for streamlining current procedures.

CVO activities cover four broad functions, as follows:

- **Regulation/Credentials Administration** – Deskside procedures and systems for managing motor carrier regulations. These systems include the processes for accepting and reviewing applications, issuing credentials, auditing, and reporting.
- **Regulation/Enforcement and Safety** – Roadside procedures designed to verify credentials, check vehicle size and weight, and assure the safety of drivers and vehicles.
- **Operations/Fleet and Vehicle Management** – Activities such as routing and dispatching, communications between the driver and dispatcher, onboard safety monitoring, record keeping, and regulatory compliance.
- **Operations/Highway Traffic Management** – Activities such as travel advisory services, incident management programs, hazardous materials routing, and other factors that influence the movement of commercial vehicles.

Many of these activities, such as fuel tax collections and special permitting for overweight vehicles, represent interactions between public agencies and individual carriers. Other transactions, such as the exchange of apportioned registration fees among states, are exclusive to the public sector. Still other activities, such as the routing and dispatching of vehicles within a fleet, remain entirely within the domain of the private sector. What all of these activities have in common, however, is that they influence the safety and productivity of trucking – the dominant form of goods movement in the United States – as well as the efficiency of the public agencies that administer and enforce motor carrier regulations.

Freight Revenues by Mode, 1994

1994

Air (4%)

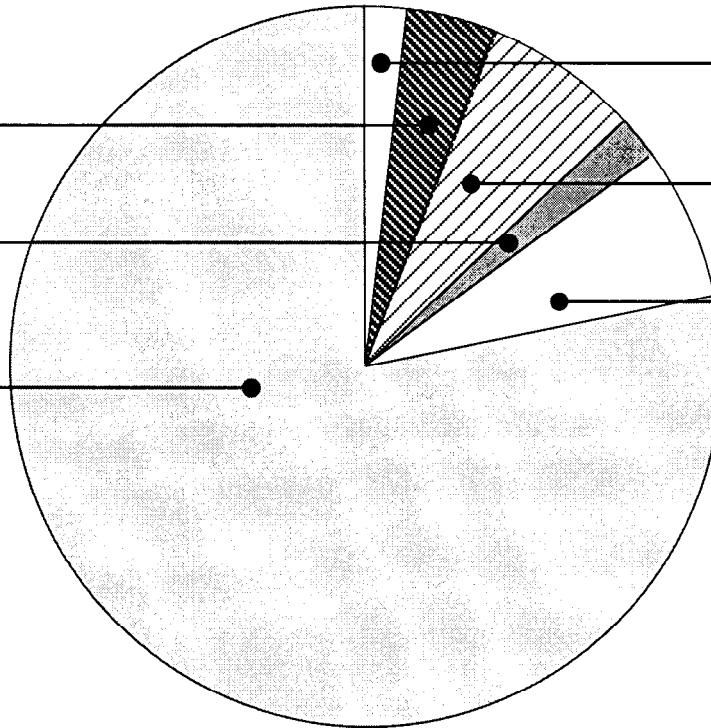
Water (2%)

Truck (78%)

Other (2%)

Pipeline (7%)

Rail (7%)



Note: "Truck" includes all intercity and local freight revenues. "Other" includes freight forwarders and miscellaneous shipper costs.

Source: Freight Stakeholders National Coalition.

Impact of Motor Carrier Operations

The motor carrier industry is large, complex, and vitally important to the health of the U.S. economy.

Safe and efficient commercial vehicle operations are critical to the competitiveness of the national economy, because trucking is the nation's dominant form of goods movement. At some point, virtually all goods delivered in the United States travel by truck. Any increase in efficiency that motor carriers may achieve through the use of advanced technologies will have important ramifications for the entire economy.

- About 48 million trucks were registered in the United States in 1992.¹ This total includes 3.3 million medium and heavy trucks. Heavy trucks – those with gross vehicle weight rating (GVWR) of more than 26,000 pounds – are the primary market for CVO programs.
- The trucking industry earned \$345 billion in gross freight revenues in 1993, more than 78 percent of the national total? Trucks transported 5.1 billion tons of freight.
- The volume and value of freight transported by trucks will continue to increase over the next decade. Trucking industry revenues are projected to increase a total of 21 percent from 1994 to 2004. This growth is expected to result in a 32 percent increase in ton-miles traveled by trucks, and a 14 percent increase in the number of trucks on the road.³ The challenge for the nation's transportation system and the ITS/CVO program is to accommodate this growth while meeting safety, economic, and environmental goals.

1 U.S. Department of Commerce, Bureau of the Census, *Truck Inventory and Use Survey*, 1992.

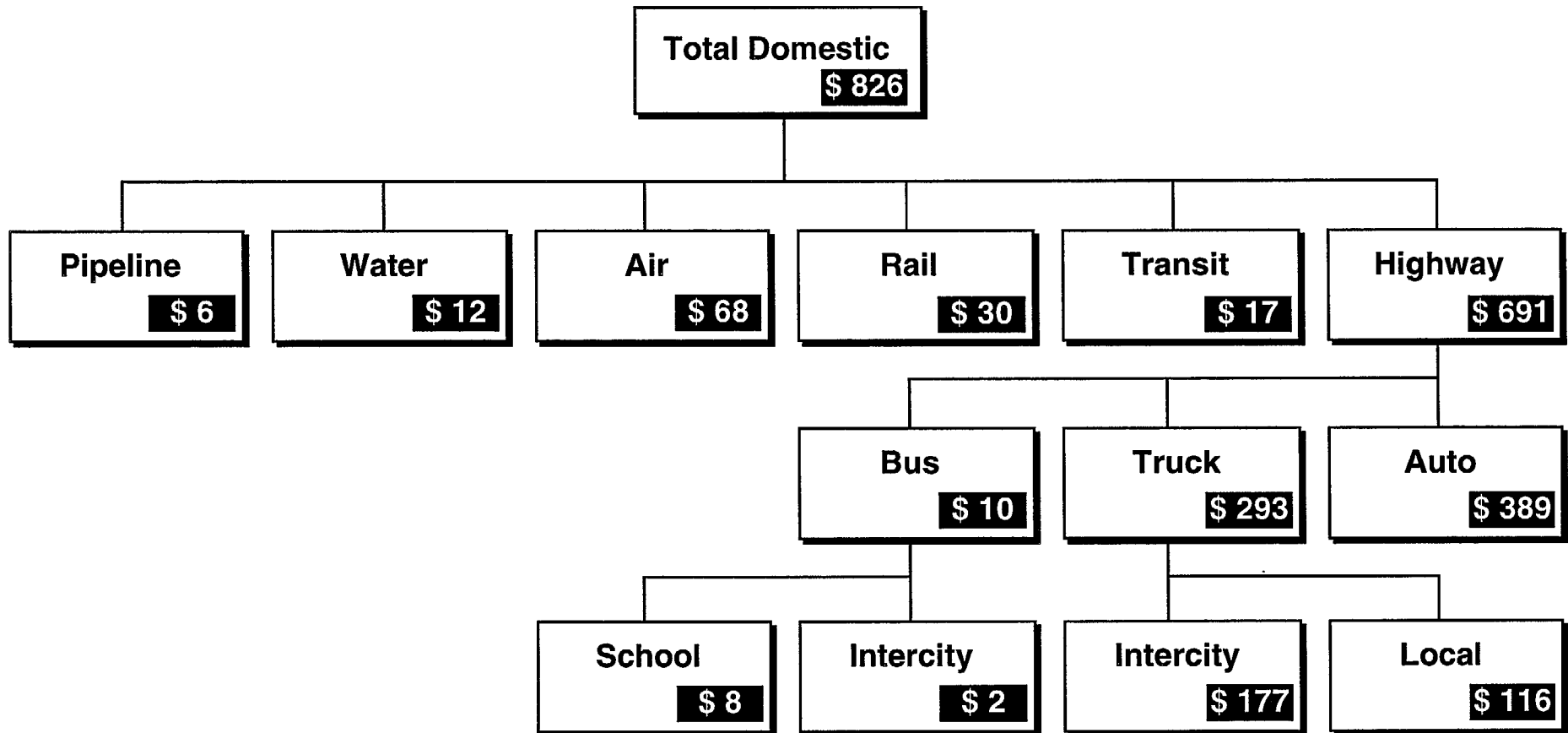
2 Eno Foundation for Transportation, *Transportation in America*, December 1993.

3 DRI/McGraw-Hill, U.S. *Freight Transportation Forecasts* to 2004, prepared for the ATA Foundation (Lexington, Massachusetts), April 1996.

4 U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics* (Washington, D.C., 1995), p. 32.

Transportation Revenues, 1992

(Billions of Dollars)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics.

Impact of Motor Carrier Operations (continued)

The intercity and school bus industries are secondary markets for ITS/CVO programs.

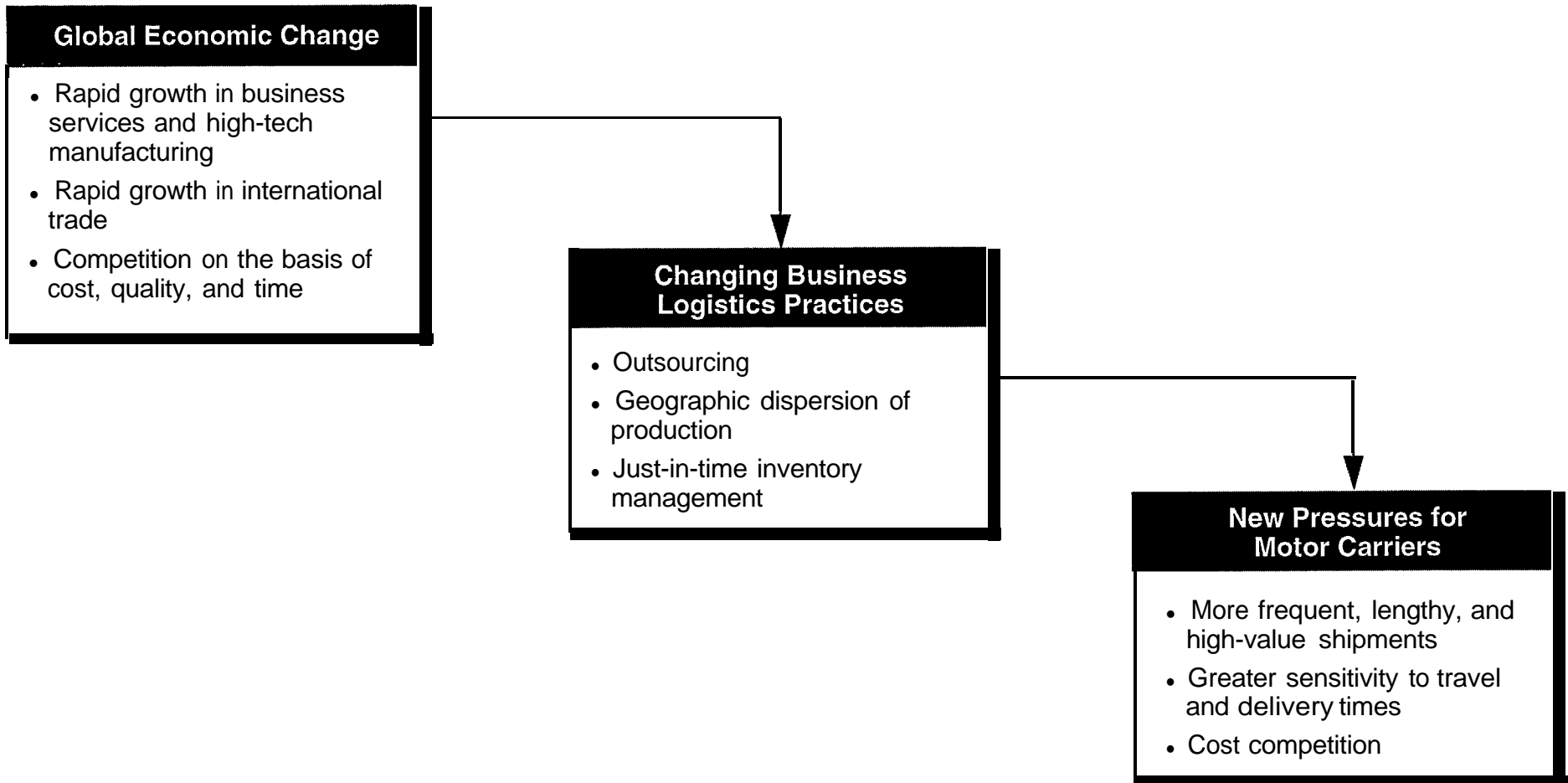
The intercity and school bus industries are secondary markets for ITS/CVO programs.

- The intercity bus industry includes about 4,000 passenger carriers operating 25,000 buses and transporting more than 339 million passengers per year.
- The school bus industry accounts for an additional 365,000 vehicles and 120,000 employees.⁵

These industry segments are relatively small in size. Buses account for less than 5 percent of all intercity passenger trips, and just \$10 billion of the nation's \$826 billion in transportation revenues. However, it is crucial to ensure the safety of the millions of passengers who travel on buses each year. In addition, the bus industries can take steps to improve productivity. The intercity bus industry showed little improvement in productivity in the 1980s, lagging the gains experienced by the rest of the transportation sector.

⁵ Data from the U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics* (Washington, D.C., 1995).

Global Economic and Logistics Trends



Issues and Opportunities in Motor Carrier Operations

The global economy is demanding new transportation solutions from businesses and from the motor carriers that serve them.

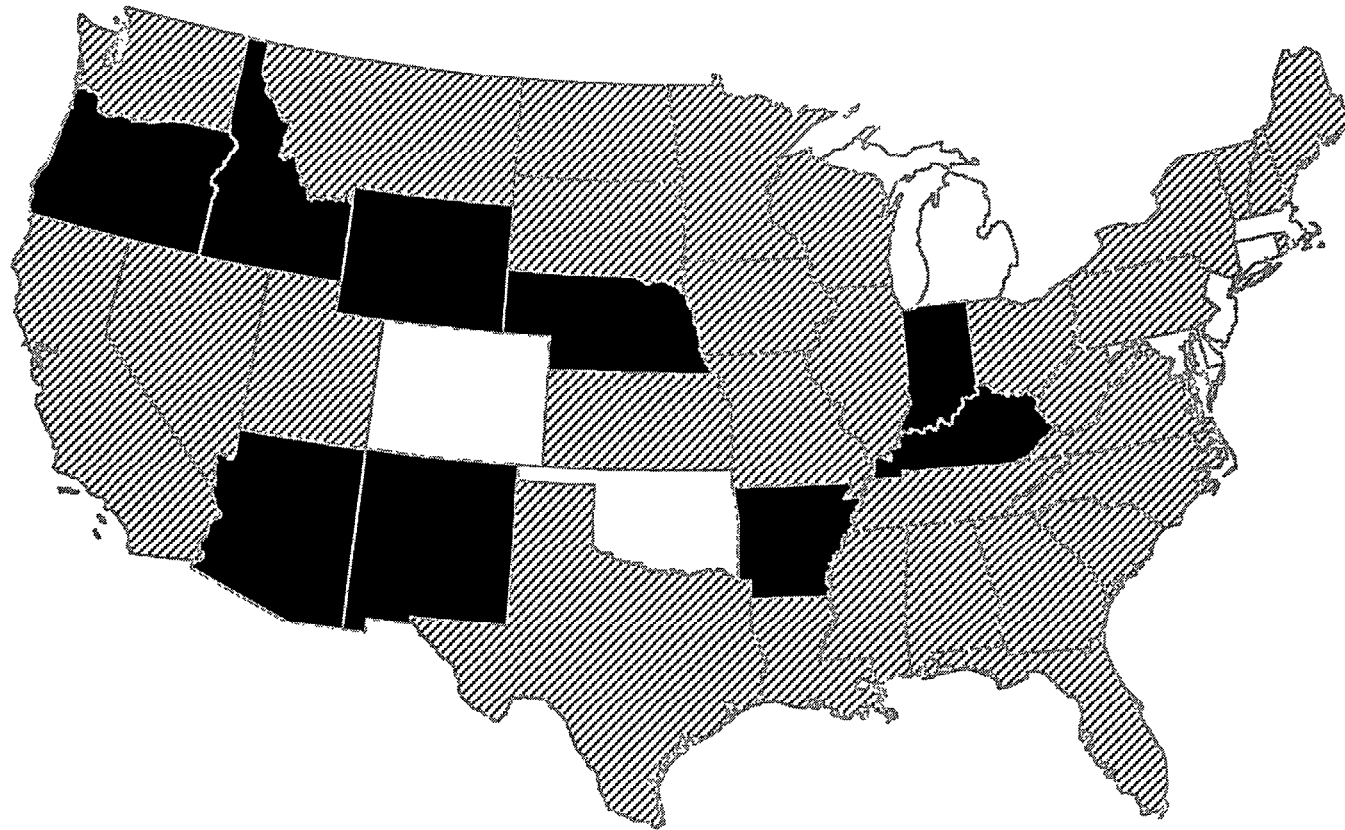
ITS/CVO is part of a broad revolution in business logistics practices that is driven by the changing global economy. As the 21st century draws near, markets are expanding from local and regional to national and international. The growth of high-tech production and professional services is outstripping the growth of basic manufacturing. Most importantly, countless businesses are realizing that their most important resource is finite: time.

These forces are reshaping the ways that businesses consume transportation. Businesses are outsourcing manufacturing and assembly work and developing longer supply chains and distribution networks. At the same time, businesses are adopting just-in-time manufacturing and distribution systems as a strategy for reducing inventory carrying costs.

Consequently, transportation providers - including those in the trucking and bus industries - are being asked to make more frequent and more lengthy trips; to pay more attention to quality and customer service; and to find ways to reduce costs. In response, the motor carrier industry is investing in new technology to:

- Reduce the cost and improve the reliability of long-distance freight transportation;
- Assure the safety of drivers, vehicles, and cargo; and
- Streamline internal business management practices.

Motor Carrier – Related Revenues



Percent of State/Federal Highway Revenues Collected from Trucks

- [] <= 25 Percent
- [/] 25 to 35 Percent
- [] > 35 Percent

Impact of Motor Carrier Regulations

More than a decade after the economic deregulation of the trucking industry began, motor carrier regulation remains complex and broad-based. The focus of motor carrier regulation today is on highway safety and revenue collection.

The public agencies that regulate the trucking and bus industries are experiencing similar pressures to modernize their own operations. More than a decade after the economic deregulation of the trucking industry began, motor carrier regulation remains complex and broad-based. Commercial vehicle regulation covers more than a dozen areas related to motor carrier business practices, vehicles, drivers, cargo, and trips. The focus of motor carrier regulation today is on highway safety and revenue collection.

Commercial vehicle regulation is big business, generating \$20 billion per year in state and Federal revenues (excluding tolls). In some states, motor carriers account for more than 40 percent of all highway-related revenues. Each year, state agencies:

- Register nearly 6 million commercial tractors, trailers, or buses;
- License over 7 million commercial drivers;
- Weigh over 162 million commercial vehicles; and
- Collect tolls from 177 million commercial vehicle trips.

Impact of Motor Carrier Regulations

Regulatory Area	Improves Highway Safety	Generates State Revenue	Requires Large Transaction Volume
Driver Safety Inspections	✓✓✓✓		◆◆
Carrier Safety Reviews	✓✓✓		◆
Toll Collection		\$\$\$	◆◆◆◆
Fuel Use Taxation		\$\$\$	◆◆◆
Commercial Driver's License	✓✓✓	\$	◆◆◆
Vehicle Registration		\$\$	◆◆◆
Vehicle Safety Inspections	✓✓✓		◆◆
Size/Weight Permits	✓	\$	◆◆
Hazardous Materials Registration/Permitting	✓	\$	◆◆
Size/Weight Inspections	✓		◆◆◆◆
Operating Authority/Insurance Registration		\$	◆◆
Weight-Distance Taxation		\$	◆◆

Note: Number of icons represents the relative impact of each regulatory area.

Issues and Opportunities in Motor Carrier Regulation

CVO regulatory processes are evolving. ITS technologies and services offer opportunities for change.

Today, many regulatory programs are changing. The base-state agreements for vehicle registration (the International Registration Plan [IRP]) and fuel use tax administration (the International Fuel Tax Agreement [IFTA]) have expanded to nationwide membership. The early 1996 sunset of the Interstate Commerce Commission, the creation of the Single-State Registration System, and the deregulation of intrastate trucking are forcing many states to reconsider their carrier registration systems. Regional approaches to oversize/overweight permitting have emerged, and a multistate arrangement for hazardous materials permitting is under development. These concurrent changes offer an opportunity to apply advanced technologies to streamline procedures and rethink existing processes.

Several common issues face current CVO regulatory procedures:

- **Multiple agencies are involved in CVO regulation.** In a typical state, six different agencies are involved in motor carrier regulation. Each state's system has developed to reflect its unique geography and economy. For motor carriers, the cost and aggravation associated with complying with this "balkanized" system is enormous. Within states, the cost of regulating the motor carrier industry is high because most CVO regulatory programs operate in isolation. This lack of coordination produces duplicative efforts. It also undercuts the effectiveness of regulatory programs. For example, the agency that administers vehicle registration programs rarely has access to information on a carrier's safety record, insurance status, or fuel tax account that would enable the agency to get unsafe, underinsured, or noncompliant vehicles off the road. Similarly, enforcement officials in most states lack on-line, timely access to safety and credentials data. Without this information, it is difficult for roadside inspectors to maximize highway safety and compliance with credential requirements.

Issues in Motor Carrier Regulation

Regulatory Area	Issues				
	Regulatory Procedures Are Changing	Procedures Vary Across States or Regions	Operates in Isolation from Other CVO Programs	Interstate Data/Funds Exchange Are Complex	Enforcement Is Difficult
Driver Safety Inspections		●	●	●	●
Carrier Safety Reviews		●	●	●	●
Toll Collection	●	●	●		
Fuel Use Taxation	●	●	●	●	●
Commercial Driver's License					●
Vehicle Registration	●	●	●	●	●
Vehicle Safety Inspections	●	●	●	●	●
Size and Weight Permits	●	●	●	●	
Hazardous Materials Registration and Permits	●	●	●	●	●
Size and Weight Inspections		●	●		●
Operating Authority and Insurance Registration	●	●	●		●
Weight-Distance Taxation		●			●

Issues and Opportunities in Motor Carrier Regulation (continued)

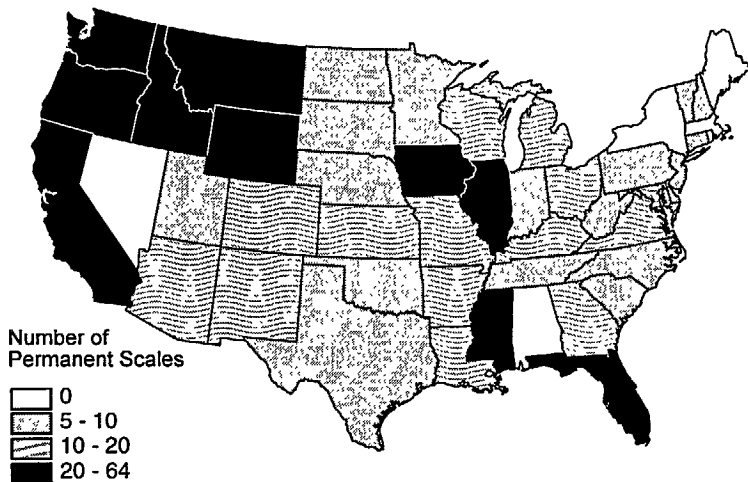
The administration and enforcement of motor carrier regulations is complex both within and among states. Moreover, interstate data and funds exchange are needlessly cumbersome and inefficient.

- **The administration and enforcement of motor carrier regulations varies among states.** The IFTA and the IRP have succeeded in establishing a national system for registration and fuel tax administration, but the administration of these programs varies among the states. For other credentials such as oversize/overweight permits or electronic toll collection accounts, procedures and requirements continue to vary widely across the states. This piecemeal approach to motor carrier regulation imposes a burden on carriers seeking to comply with regulations in multiple states, as well as for state agencies trying to communicate and exchange data or funds with other jurisdictions.
- **Motor carrier administrative and enforcement activities vary across regions.** The most striking regional difference is in enforcement strategies: states in the West and Midwest operate large numbers of fixed weigh stations, while the Northeast states rely primarily on mobile enforcement. A second important difference is in the distribution of toll roads and bridges, which are heavily concentrated in the Northeast and Midwest. Other regulatory areas with noteworthy regional differences include fuel use taxation, weight-distance taxation, size and weight permitting, and hazardous materials permitting.
- **Interstate data and funds exchange are needlessly cumbersome and inefficient.** The exchange of data among IFTA and IRP jurisdictions generally occurs on paper, with fewer than one in five states reporting the use of electronic data interchange technologies. Data exchange is complicated by a lack of commonality among databases. Funds exchange is less complex, but tends to be inefficient. Most states exchange offsetting payments, when one check from the net debtor to the net creditor would suffice.

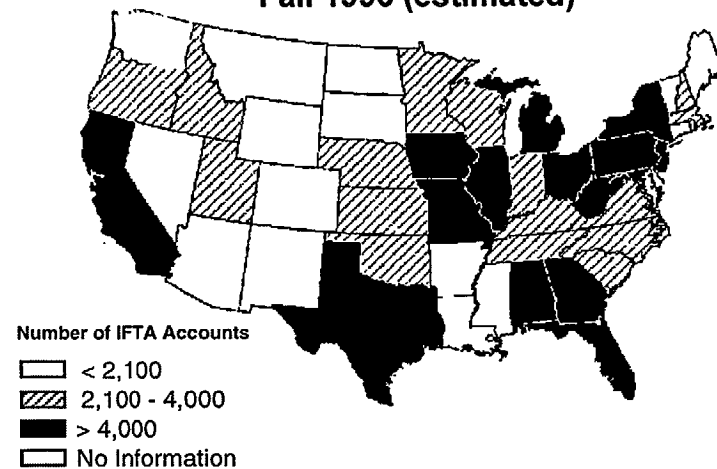
Issues and Opportunities

Regional Variation in CVO Activities

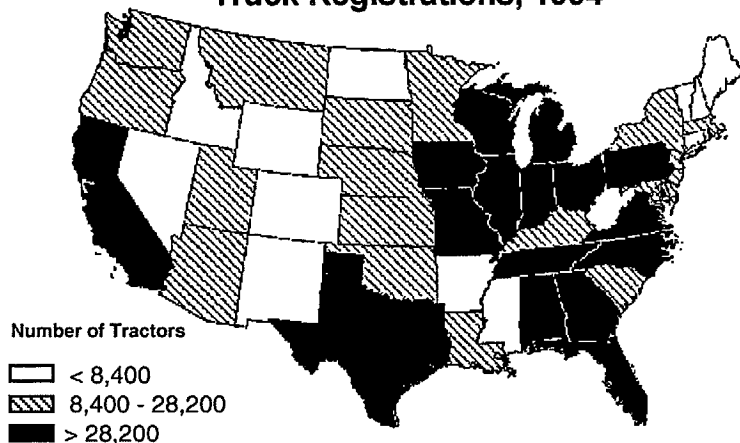
Permanent Weigh Stations by State, January 1993



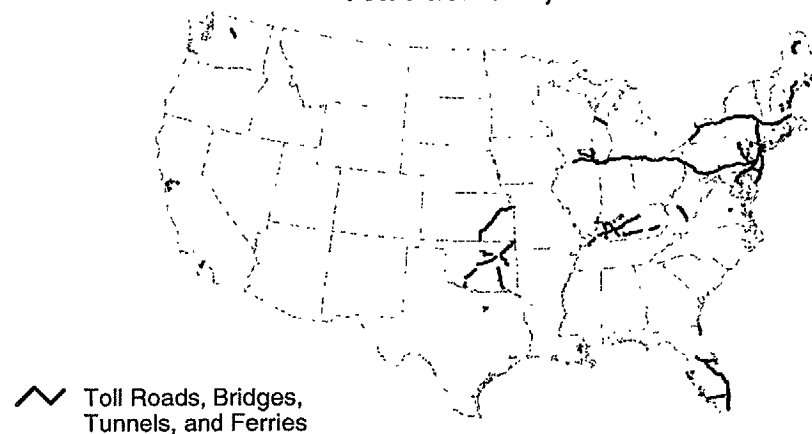
Interstate Fuel Tax Accounts, Fall 1996 (estimated)



Truck Registrations, 1994



Toll Facilities, 1994



Issues and Opportunities in Motor Carrier Regulation (continued)

Current enforcement activities -which emphasize weight enforcement at fixed sites - are not completely effective.

- **Current enforcement activities cannot be completely effective or efficient.** States are committing considerable financial and human resources to commercial vehicle enforcement, yet current activities do not completely assure safety or regulatory compliance. Three elements of enforcement strategies are of particular concern:
 - *Safety versus weight.* The current allocation of resources is heavily oriented toward size and weight enforcement. More than 162 million vehicles are weighed each year, compared to less than 2 million safety inspections. However, the potential impact on motorists of an unsafe vehicle or driver is much more severe than that of an overweight vehicle.
 - *Mobile versus fixed.* Fewer than 1 percent of the weight inspections conducted by the states each year result in a citation. This suggests that weight inspections are effective at deterring overweight trucks from traveling on Interstate highways in the vicinity of weigh stations. However, this rate also suggests that overloaded and unsafe carriers may be detouring around fixed inspection sites. The most effective enforcement strategies combine both fixed and mobile approaches.
 - *Performance versus paper.* There is concern that enforcement may not be focused sufficiently on high-risk carriers and drivers. Enforcement officials may need more guidance in identifying and selecting high-risk vehicles for inspection; access to portable systems for mobile enforcement; and systems to verify that repairs have been made to vehicles cited with out-of-service violations. Similarly, driver safety inspections generally emphasize verification of credentials, such as driver's licenses or hours-of-service logs, rather than actual driving performance. Credentials are difficult to enforce due to the lack of roadside verification capability. In most states, inspectors simply examine the appearance of the "paper" - the registration or fuel tax decal - and not the status of a carrier's account.

ITS and CVO

ITS Technologies

- Information processing
- Communications
- Control
- Electronics

ITS/CVO Services

- Safety assurance
- Credentials administration
- Electronic screening
- Carrier operations

Commercial Vehicle Operations

- Enforcement and safety
- Administration
- Fleet and vehicle management
- Highway traffic management

Purpose and Scope of the National ITS Program

ITS involve the application of advanced and emerging technologies in such fields as information processing, communications, control, and electronics to surface transportation needs. ITS technologies are being applied to CVO to streamline administrative procedures and to improve the safety and productivity of trucking.

ITS⁶ involve the application of advanced and emerging technologies in such fields as information processing, communications, control, and electronics to surface transportation needs.⁷ ITS technologies are being applied to CVO to streamline administrative procedures and to improve the safety and productivity of trucking.

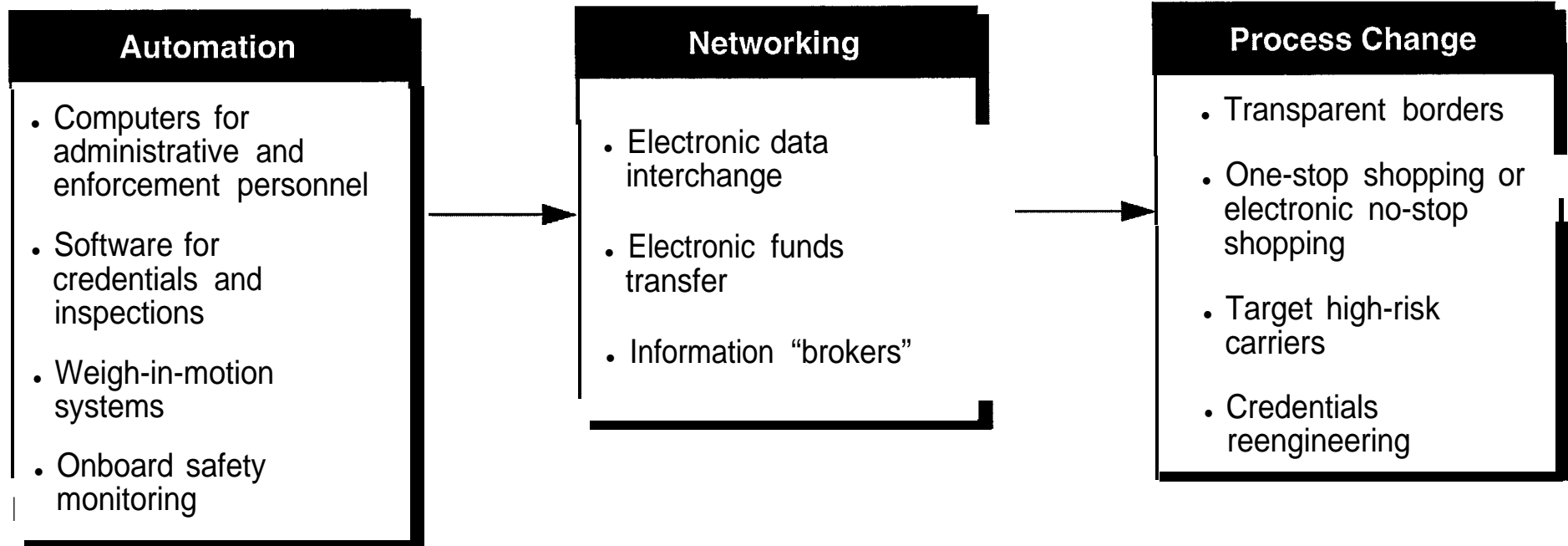
The official statement of the current ITS program is the National ITS *Program Plan*, developed in early 1995 by the U.S. Department of Transportation (U.S. DOT) and the Intelligent Transportation Society of America (ITS America). The goals of the national ITS program are as follows:

- * Improve the safety of the nation's surface transportation system;
- Increase the operational efficiency and capacity of the surface transportation system;
- Reduce energy and environmental costs associated with traffic congestion;
- Enhance present and future productivity;
- Enhance the personal mobility and the convenience and comfort of the surface transportation system; and
- Create an environment in which the development and deployment of ITS can flourish.

⁶ Formerly known as Intelligent Vehicle-Highway Systems, or IVHS.

⁷ U.S. Department of Transportation, Joint Program Office for Intelligent Transportation Systems, and Intelligent Transportation Society of America, *National ITS Program Plan*, First Edition, March 1995, p. 2.

Representative *ITS/CVO* Activities



ITS/CVO Activities

ITS/CVO involves automating existing procedures, networking information systems, and changing the way that states and carriers do business.

ITS/CVO products and services involve three types of activities:

- **Automating existing procedures and operations.** Agencies and carriers are purchasing computer hardware and software, communications systems, electronics, sensors, and other instruments to automate their existing recordkeeping, inspection, and communication procedures.
- **Networking information systems.** The deployment of electronic data interchange (EDI) and electronic funds transfer (EFT) capabilities enables agencies and carriers to share information and transfer money. The development of linked databases and networks of information systems will enhance the systems now operated independently by agencies and carriers.
- **Changing the way that states and carriers do business.** Over time, the automation and networking will encourage changes in traditional processes and roles to reflect the needs of tomorrow's intermodal transportation system. The most commonly cited goals include "transparent borders" - enabling safe and legal carriers to travel through multiple states, or across international borders, with no more than a single stop - and "one-stop shopping" - enabling carriers to obtain permits for multiple states through a single source.

ITS Market Bundles

ITS Market Bundles	ITS User Services
Advanced Traffic Management Systems (ATMS) and Advanced Rural Transportation Systems (ARTS)	<ul style="list-style-type: none">• Traffic surveillance and detection• Traffic control• Incident management• Electronic toll collection• Emergency vehicle management• Emissions testing and mitigation
Advanced Traveler Information Systems (ATIS)	<ul style="list-style-type: none">• En-route driver information• Route guidance• Traveler services information• Pre-trip travel information• Real-time ride matching and reservation• Emergency notification and personal security
Advanced Public Transportation Systems (APTS)	<ul style="list-style-type: none">• Public transportation management• En-route transit information• Personalized public transit• Public travel security
Advanced Vehicle Control and Safety Systems (AVCSS) and Automated Highway Systems (AHS)	<ul style="list-style-type: none">• Collision avoidance• Safety readiness• Pre-crash restraint deployment• Automated highway systems
Commercial Vehicle Operations (CVO)	<ul style="list-style-type: none">• Commercial vehicle electronic clearance• Automated roadside safety inspection• Commercial vehicle administrative processes• Onboard safety monitoring• Commercial fleet management• Hazardous material incident response

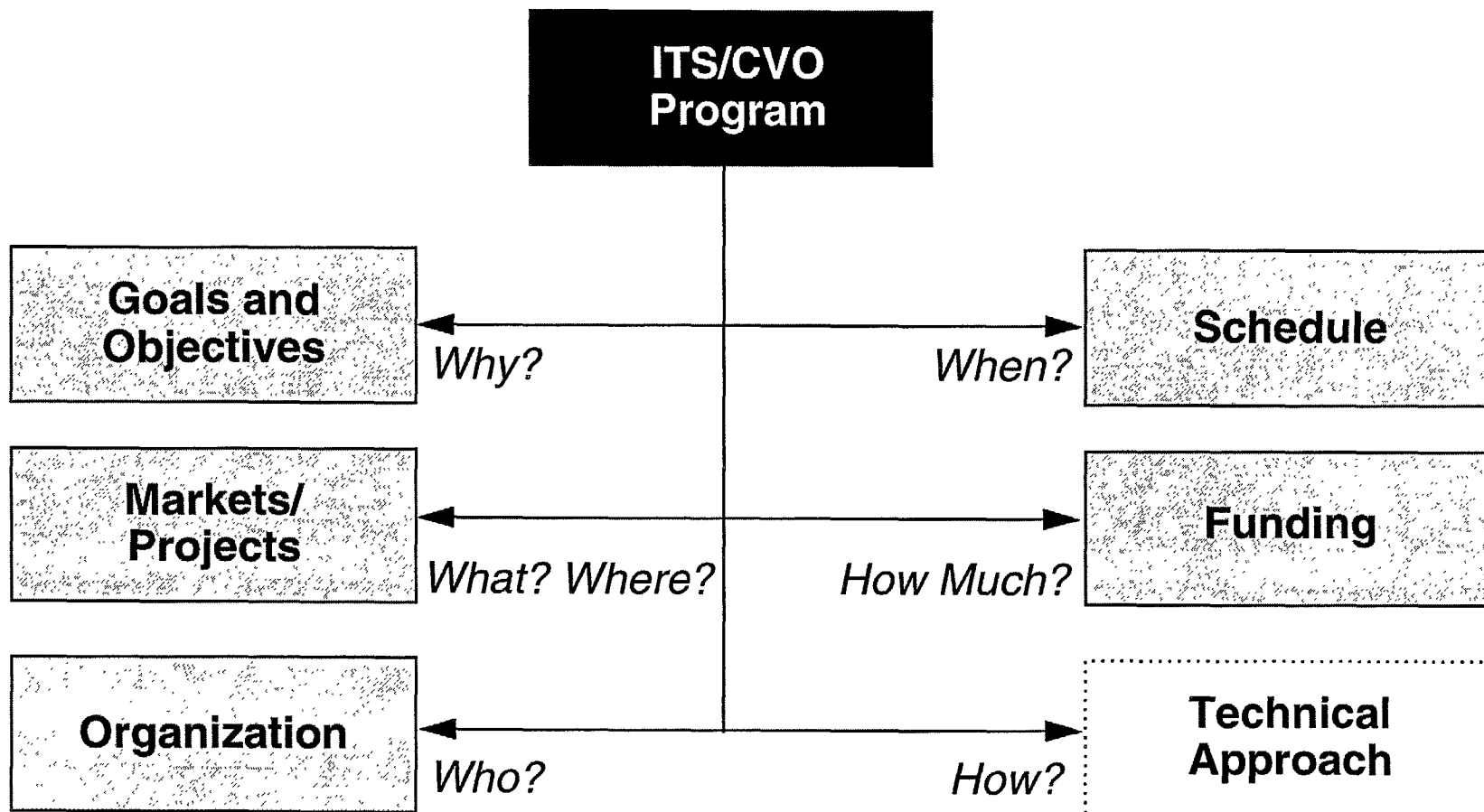
ITS Market Bundles

CVO applications represent one of several areas in the national ITS program.

The ITS/CVO program is being coordinated with the broader ITS program. The national ITS program includes seven broad functional areas, as follows:

- **Advanced Traffic Management Systems** and **Advanced Rural Transportation Systems** focus on highway traffic management and control. These activities include traffic surveillance, traffic signalization, incident management, electronic toll collection, emergency vehicle management, and emissions testing.
- **Advanced Traveler Information Systems** disseminate traffic information to the traveler. These activities include the provision of en-route driver information and route guidance, pre-trip travel information, and real-time ride matching.
- **Advanced Public Transportation Systems** help transit authorities to improve the management of their facilities, equipment, and services. These activities include the automation of management systems, the provision of en-route transit information, the development of flexibly routed transit vehicles, and the monitoring of security in stations and on vehicles.
- **Advanced Vehicle Control and Safety Systems** seek to improve highway safety through the development of in-vehicle technologies to sense potential collisions, alert drivers, and activate onboard safety systems. **Automated Highway Systems** seek to improve highway safety by providing an operating environment in which a vehicle is guided automatically rather than by a driver.
- **Commercial Vehicle Operations** use advanced computer and communications technologies to improve the safety and productivity of the motor carrier industry.

Program Framework



Organization of This Report

This report describes the broad goals and objectives for the national ITS/CVO program. The report also discusses the major current and planned ITS/CVO projects and the program's organizational, management, and funding approach.

This report is organized as follows:

- **Section 2.0 presents an overview of the national ITS/CVO program.** This includes the program's goals and objectives, as well as specific strategies for the program's markets, organization, and resources.
- **Section 3.0 summarizes the major current and planned ITS/CVO projects,** including their objectives, participants, status, and requirements. The projects are classified into four broad areas: credentials administration, commercial vehicle clearance, safety assurance, and carrier operations. In addition, the Commercial Vehicle Information Systems and Networks (CVISN) project is discussed as a technical infrastructure initiative that provides connectivity among projects. The program's technical approach is not a focus of this report. **Appendix A includes a detailed description of each project.**
- **Section 4.0 discusses the organization and management approach to the ITS/CVO program.** This includes the mainstreaming initiative to foster ITS/CVO deployment at the national, regional, and state levels. In addition, the FHWA's role in managing and coordinating the ITS/CVO program is defined.
- **Section 5.0 presents a "roadmap" to the ITS/CVO program that suggests the timing of the major projects and initiatives.**
- **Section 6.0 provides a general funding approach for the ITS/CVO program.** This includes an assessment of program expenditures and funding sources. In addition, this section discusses strategies for the devolution of funding responsibilities from the Federal government to the states and the private sector.
- **Appendix B includes a list of other relevant plans and reports.**
- **Appendix C includes a list of abbreviations.**