Introductory Guide to CVISN

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Author:
Kim E. Richeson

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Acknowledgements

The materials included in this guide are gathered from many sources. Many of these are published documents, and these are cited as references. But many of the ideas are also drawn from informal conversations, working notes, presentations and e-mails that have occurred during the course of the Commercial Vehicle Information Systems and Networks (CVISN) program. The author is grateful to the Federal Motor Carrier Safety Administration (FMCSA) and US Department of Transportation (DOT) Intelligent Transportation Systems (ITS) Joint Program Office (JPO) personnel who sponsored various aspects of the program. This includes Steve Crane, Mike Curtis, Tom Hillegass, Jeff Loftus, Doug McKelvey, Mike Onder, Jeff Secrist and Mike Schagrin. He wishes to acknowledge the contributions of the Prototype States (Maryland and Virginia) and Pilot States (California, Connecticut, Colorado, Kentucky, Michigan, Minnesota, Oregon, Washington) in evolving many of the concepts described herein. Several private companies have made key contributions to CVISN technologies, including Cambridge Systematics Incorporated (CSI), Intelligent Decision Technologies (IDT), Lockheed Martin Information Management Systems (LMIMS), RS Information Systems (RSIS) and Science Applications International Corporation (SAIC). The author also wishes to acknowledge the contributions of the individual JHU/APL team members who carried out the work of the program including Valerie Barnes, Ron Char, Brenda Clyde, John Fewer, Karen Goldee, Bev Greenwald, Barbara Grimes, John Hardy, Tim Herder, Tom Hormby, Eric King, Alan Mick, Ed Moses, Theresa Nester, Paul North, Jim Polaha, Beth Roberts, Karen Smith, Janet Spedden, DJ Waddell, Ray Yuan and others too numerous to mention.

NOTE

The Motor Carrier Safety Improvement Act was signed into law on December 9, 1999. This act established a new FMCSA within the US DOT, effective January 1, 2000. Prior to that, the motor carrier and highway safety program was administered under the Federal Highway Administration (FHWA).

The mission of the FMCSA is to improve truck and commercial passenger carrier safety on our nation's highways through information technology, targeted enforcement, research and technology, outreach, and partnerships. The FMCSA manages the ITS/Commercial Vehicle Operations (CVO) Program, a voluntary effort involving public and private partnerships that uses information systems, innovative technologies, and business practice reengineering to improve safety, simplify government administrative systems, and provide savings to states and motor carriers. The FMCSA works closely with the FHWA's ITS JPO to ensure the integration and interoperability of ITS/CVO systems with the national ITS program.

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This guide is intended to answer basic questions about the Commercial Vehicle Information Systems and Networks (CVISN) Program. It is primarily intended for state administrators of motor carrier programs related to safety, credentials, fuel tax, and size and weight regulation. This guide is intended to help these state administrators establish a program to deploy new CVISN capabilities in their state. Table 1-1 details the content of this Introductory Guide to CVISN.

Table 1-1 Content of Introductory Guide to CVISN

Chapter	Content
1 – Introduction	Defines the purpose and scope of this document.
2 – What is CVISN? **3 – What is CVISN Level 1?**	Provide basic definitions and other background on CVISN.
4 – What Benefits are Expected from CVISN?	Describes the reasons why states and motor carriers should consider implementing CVISN Level 1 capabilities.
5 – What is the Plan for National Deployment of CVISN?	Defines the strategy the Federal Motor Carrier Safety Administration (FMCSA) is using to deploy CVISN capabilities.
6 – What Deployment Process Should States Follow? **7 – How Do States Assure Conformance with the National Intelligent Transportation Systems (ITS) Architecture?** **8 – What Resources are Available to Help States?**	Provide information that a state can use to establish a plan for deploying CVISN capabilities.
9 – What Should My State Do Next?	Helps a state identify where it is in the deployment process and recommends next step(s).
10 – References	Points to other resources that may be helpful in deploying CVISN.
A – Acronyms	A list of acronyms.

This is one in a series of guides. Section 8 describes the other guides. Please refer to Section 8 if you want to go directly to a specific topic at a lower level of detail than provided herein. The other guides are available from the CVISN web site (http://www.jhuapl.edu/cvo/). See Figure 1-1 for a list of the CVISN Guides.

This guide is intended to serve several purposes. It is to provide a first introduction to CVISN that can be read cover-to-cover by a person new to the subject. It is intended to provide context for the rest of the guides. Finally, it is intended as a useful reference for someone who may be familiar with some aspects of CVISN but does not have a clear picture of how all the parts fit together.

This document uses acronyms and terminology that may be new to you. A list of acronyms is provided in Appendix A. Please refer to the *CVISN Glossary* [JHU/APL, POR-96-6997, V1.0 1998] for definitions of terms.

This guide assumes that you are already somewhat familiar with Commercial Vehicle Operations (CVO) governmental functions such as safety regulation, the International Registration Plan (IRP), the International Fuel Tax Agreement (IFTA), and weight enforcement. However, there will be many readers who will not be, such as specialists in just one aspect of CVO or information system developers. The technical application guides provide some additional background on this material and also provide further references. The *Rand McNally Motor Carrier's Road Atlas*, updated annually, provides a good introduction to the state and federal regulations applicable to motor carriers. Someone in your state (and hopefully on your CVISN team) will be an expert in each of these areas and can help you to understand aspects new to you and provide good background material. Various state agency associations and trade associations are also good sources of information.

Some of you may be very familiar with CVO, but not familiar at all with information systems technology. The ITS/CVO training courses and the associated reference material are specifically set up to address this need. Please refer to Chapter 8 for more details on these courses.

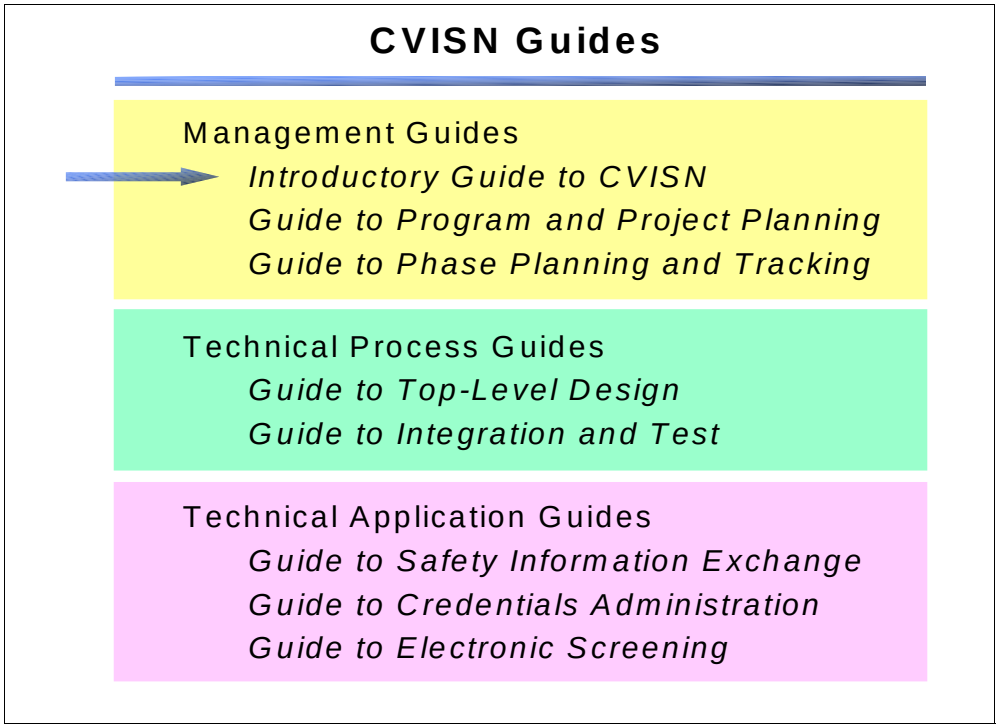


Figure 1-1 CVISN Guides

This chapter provides a summary of what CVISN (pronounced "see – vision") is. But sometimes the forest gets lost in the trees. Figure 2-1 attempts to show a picture of the forest before you set off on a path that looks more closely at some of the trees.

2.1 What is the Definition of CVISN?

The term CVISN (Commercial Vehicle Information Systems and Networks) refers to the collection of information systems and communications networks that support commercial vehicle operations (CVO). These include information systems owned and operated by governments, motor carriers, and other stakeholders. The Federal Motor Carrier Safety Administration (FMCSA) CVISN program is not trying to create a new information system, but rather to create a way for existing and newly designed systems to exchange information through the use of standards and available communications infrastructure. The CVISN program provides a framework or "architecture" that will enable government agencies, the motor carrier industry, and other parties engaged in CVO safety assurance and regulation to exchange information and conduct business transactions electronically. The goal of the CVISN program is to improve the safety and efficiency of commercial vehicle operations.

> ***CVISN***
> *The collection of information systems and communications networks that support commercial vehicle operations.*

The CVISN Architecture is the CVO part of the National Intelligent Transportation Systems (ITS) Architecture. It includes standards for communications technologies such as electronic data interchange (EDI) and dedicated short range communication (DSRC). These standards are being developed to promote interoperability and efficiency. The Transportation Equity Act for the 21st Century (TEA-21) requires that ITS projects funded from the Highway Trust Fund must be consistent with the National ITS Architecture and applicable standards.

2.2 What is the Difference Between ITS/CVO and CVISN?

Over the past few years as terminology has evolved, there has been considerable confusion about terminology. Unfortunately, the situation remains confusing because terms are commonly used in ways that are not always precise and logically consistent. The following definitions are those that have been generally accepted among stakeholders. Figure 2-2 shows the relationships of these terms.

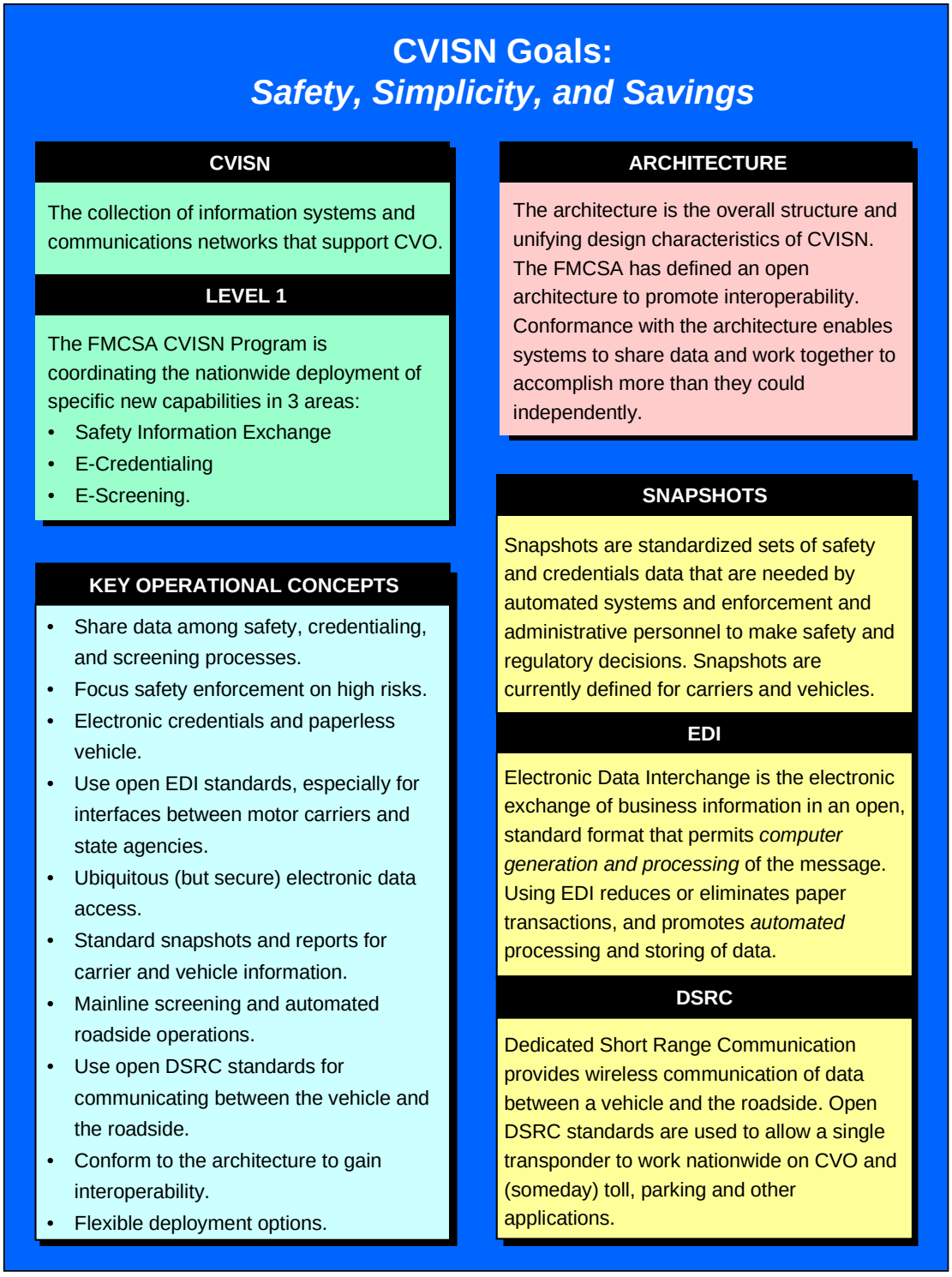


Figure 2-1 CVISN Overview

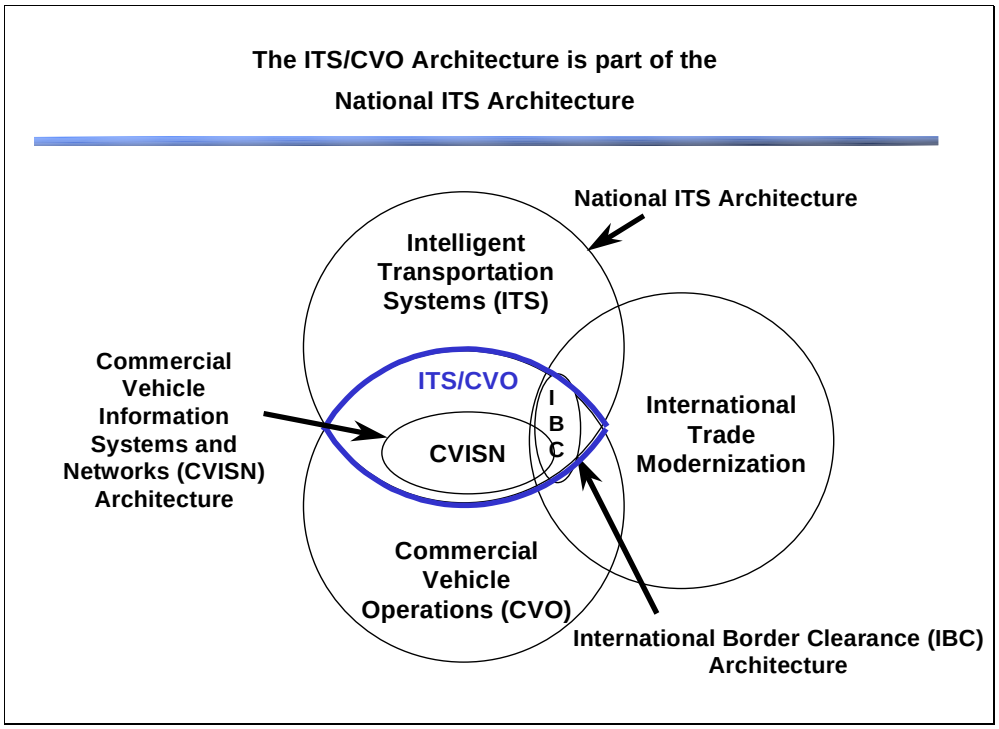


Figure 2-2 CVISN Terminology

ITS – Electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

CVO – The motor carrier operations and motor vehicle regulatory activities associated with the commercial movement of goods, including hazardous materials, and passengers. With respect to the public sector, includes the issuance of operating credentials, the administration of motor vehicle and fuel taxes, and roadside safety and border crossing inspection and regulatory compliance operations.

ITS/CVO – The ITS elements that support commercial vehicle operations. These include information systems, networks, sensor systems such as weigh-in-motion (WIM), technologies such as brake testing equipment, border crossing systems, and the components of the intelligent commercial vehicle. The ITS National Program Plan defines these Commercial Vehicle Operations User Services: Commercial Vehicle Electronic Clearance, Automated Roadside Safety Inspection, Onboard Safety Monitoring, Commercial Vehicle Administrative Processes, Hazardous Materials Incident Response, and Freight Mobility.

CVISN –The collection of information systems and communications networks that support commercial vehicle operations. CVISN includes information systems owned and operated by governments, carriers, and other stakeholders. It excludes the sensor and control elements of ITS/CVO.

IBC (International Border Clearance) – The clearance of commercial carriers and vehicles at U.S. borders with Canada and Mexico using transponders, the information exchange infrastructure, and roadside sensors.

2.3 What are the ITS/CVO Program and the CVISN Program?

The FMCSA is sponsoring and coordinating a set of activities to develop and deploy ITS/CVO technologies. These activities are generally referred to as the **ITS/CVO Program**. *The purpose of the ITS/CVO Program is to foster the development and implementation of technology designed to assist trucks and buses in moving safely and freely throughout North America.* The CVISN Program is one element of the ITS/CVO Program. Chapter 5 provides more background on the elements of the ITS/CVO and CVISN Programs.

2.4 What is the CVISN Program Trying to Accomplish?

The current, primary objective of the CVISN Program is to develop and deploy information systems that will support new capabilities in three areas:

- Safety Information Exchange
- Credentials Administration
- Electronic Screening.

The CVISN Program is using an approach based on an **open architecture and standards** so that these capabilities may be deployed in a manner that is interoperable from state-to-state from a motor carrier's perspective. The architecture will also enable the addition of further capabilities in the future. An overview of the vision for each of the current capability areas follows. Please refer to the guides for these capability areas for more detailed information.

CVISN is officially defined as a very broad concept covering all ITS/CVO information systems and networks. In common usage, many people now use "CVISN" as a shorthand way to refer to only the parts of CVISN being developed as part of the current CVISN Program.

2.5 What Will the CVISN Program do for Safety Information Exchange?

For a number of years, the FHWA (now FMCSA) funded states through the Motor Carrier Safety Assessment Program (MCSAP) to perform safety inspections of selected commercial vehicles at the roadside and to perform audits of the safety processes of selected motor carriers at their terminals. FMCSA maintains a central Motor Carrier Management Information System (MCMIS) to support these tasks. In the past, MCMIS inputs were entered from paper forms and outputs were available as printed reports. The CVISN Safety Information Exchange capability area is intended to provide improved electronic exchange of MCMIS and other safety information among roadside and deskside, state and federal systems.

A key aspect of the new capability is the automated collection of the results of the vehicle and driver inspections via a system called ASPEN (see Figure 2-3). This laptop or pen-based unit is used by law enforcement officers at the roadside to enter the results of driver and vehicle inspections as they perform the inspection. This improves the entry accuracy and enables them to submit the reports immediately over a network, dial-up, or wireless cellular digital packet data link.

In a typical state configuration, the **inspection reports** are relayed from ASPEN via a Commercial Vehicle Information Exchange Window (CVIEW) system at the state level to the Safety and Fitness Electronic Records System (SAFER) at the national level. SAFER relays them to MCMIS and makes them available back to the CVIEW's and roadside systems in other states. These relays are conducted in near real-time so that other states can usually have the results of inspection reports (including out-of-service orders) in less than an hour. The CVIEW in the originating state also provides the inspection reports to SAFETYNET where a quality control edit can be performed by a safety analyst later

when time is available. (Note that each state configuration may be different. Also, the exact configurations of SAFER, SAFETYNET and MCMIS are all evolving. Please see the CVISN Guide to Safety Information Exchange for more details on alternative configurations. A typical configuration is used herein to describe basic concepts.)

The SAFER system is now making much of the MCMIS safety data available online to safety analysts and law enforcement personnel. SAFER receives an extract of subsets of MCMIS data, referred to as motor carrier and vehicle "**snapshots**." Snapshots are standardized sets of safety and credentials data that are needed by automated systems, enforcement personnel, and administrative personnel to make safety and regulatory decisions. For example, the carrier snapshot contains the name and United Sates Department of Transportation (USDOT) identifier of the carrier, several statistical safety indicators, tax payment, and other regulatory data items. SAFER distributes snapshots in several ways, including a web site (http://www.safersys.org/) that is available to the general public. It distributes the snapshots to CVIEW that in turn distributes them to roadside sites and administrative users within the state.

Snapshots are standardized sets of safety and credentials data that are needed by automated systems, enforcement personnel, and administrative personnel to make safety and regulatory decisions. Snapshots are currently defined for carriers and vehicles.

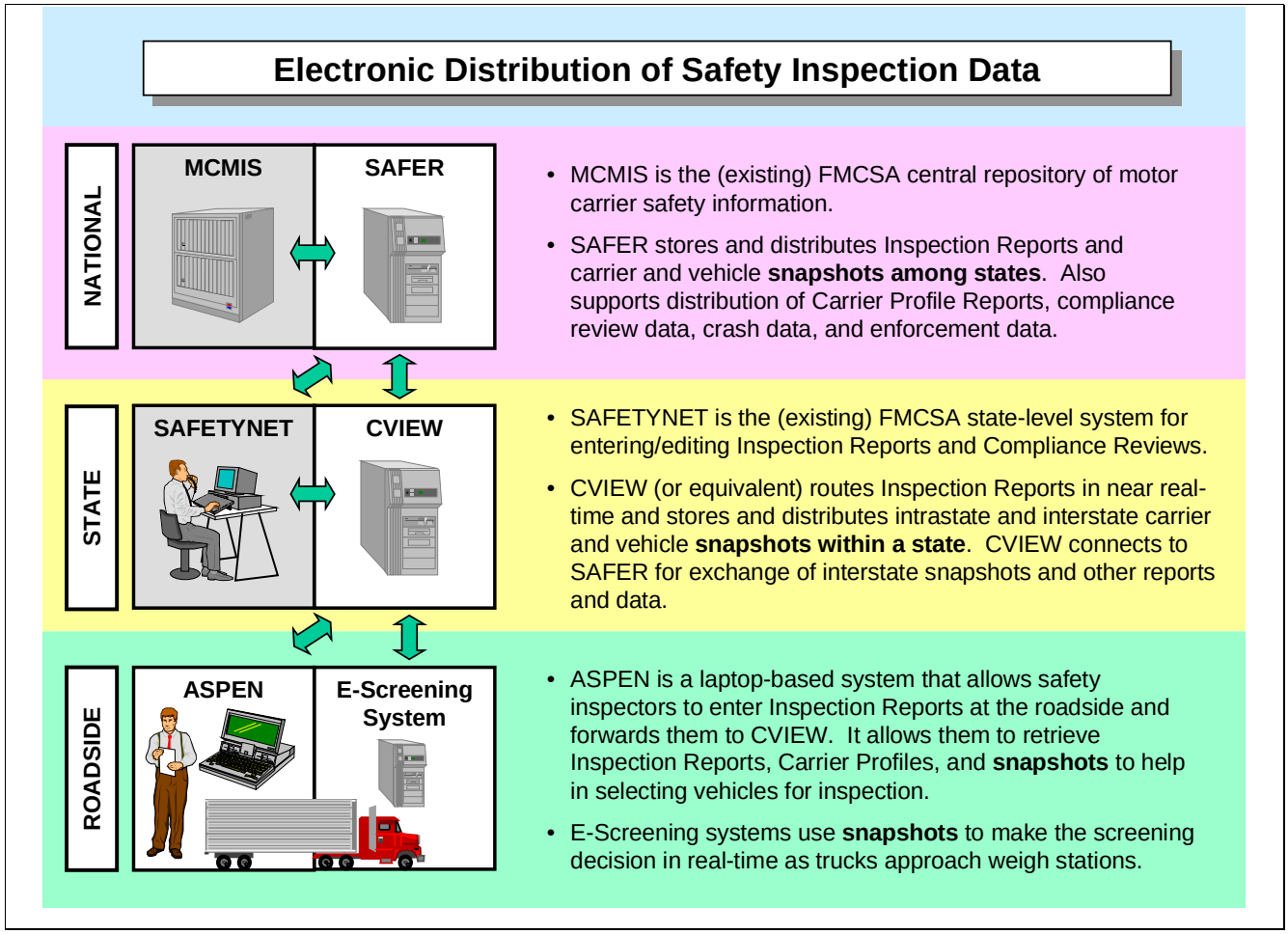


Figure 2-3 Electronic Distribution of Safety Inspection Data

A key feature of the snapshot data is that changes are automatically distributed to users. Source systems recognize when a significant change has occurred and forward these data proactively to SAFER. SAFER uses the change notice to update snapshot data and forwards the data to users (e.g., state CVIEW systems) who have subscribed to the update service. A state may subscribe to the carrier snapshots for all carriers registered to operate in its state (an average of approximately 10,000 interstate carriers per state).

In the past, SAFETYNET was the primary point of entry for inspection reports. With CVISN Level 1, this function has been taken over by ASPEN. SAFETYNET continues to be used for editing inspection reports, entering compliance review data and running safety reports. Currently, SAFETYNET interfaces directly with MCMIS. In the future, it will interface indirectly through SAFER.

2.6 What Will the CVISN Program do for Credentials Administration?

The central concept for this capability area is to allow motor carriers to apply for, pay for, and receive credentials electronically. Anyone who has had to title or register a personal vehicle can appreciate the magnitude of a commercial carrier's task that includes credentialing many hundreds of vehicles. Most states today have extensive information systems used to process all the credentialing aspects of commercial motor vehicle operations. Motor carriers typically submit applications on a variety of paper forms relating to registering to operate as a motor carrier, demonstrating they have the required liability insurance, registering and titling vehicles, paying fuel taxes, applying for special oversize/overweight (OS/OW) permits, applying for special hazardous materials hauling licenses and permits, paying federal heavy vehicle use tax, and complying with other state-specific regulations. The state processes the applications with a combination of manual and automated systems. Often some sort of invoicing and payment is involved, which may or may not use electronic payment mechanisms.

A goal of CVISN is to provide end-to-end automation of these credentialing processes. By end-to-end we mean the electronic application, processing, fee collection, issuance, and distribution of CVO credentials, tax filing and auditing, and support of multistate information exchange and processing agreements. The carrier would use some type of credentialing system software on their computer to prepare applications electronically. One possible alternative is a standalone, desktop software package referred to as a CAT (Carrier Automated Transaction) system. The CAT would provide prompting and error checking to help improve the accuracy of the applications. (Some state agencies report that as many as 40 percent of the applications submitted manually have some type of error on them, including illegible entries, missing items, wrong identifiers, etc.) After completing the application, the carrier transmits the form electronically to the state.

The exact information systems design used by each state will vary. A typical design is shown in Figure 2-4. In this example, the state has a Credentialing Interface (CI) system that receives the applications. The CI does some initial error checking and transaction archiving, and then routes the transaction to the appropriate state agency system to process the particular submission. For example, vehicle registration requests or renewals might go to the department of motor vehicles while fuel tax payments might go to the comptroller's office. The actual processing of the form would be done in a system operated by a particular agency. This system would typically be a "legacy" (previously existing) system that had been modified to include a new interface for accepting electronic transactions from the CI instead of accepting manual entries of information from state agency clerks, who processed the paper applications in the past. Part of the processing might include crosschecks to other systems, such as verifying that a carrier who was requesting to register a vehicle was current on tax payments or checking that the vehicle was properly titled and not stolen. The details of the processing are different for each transaction.

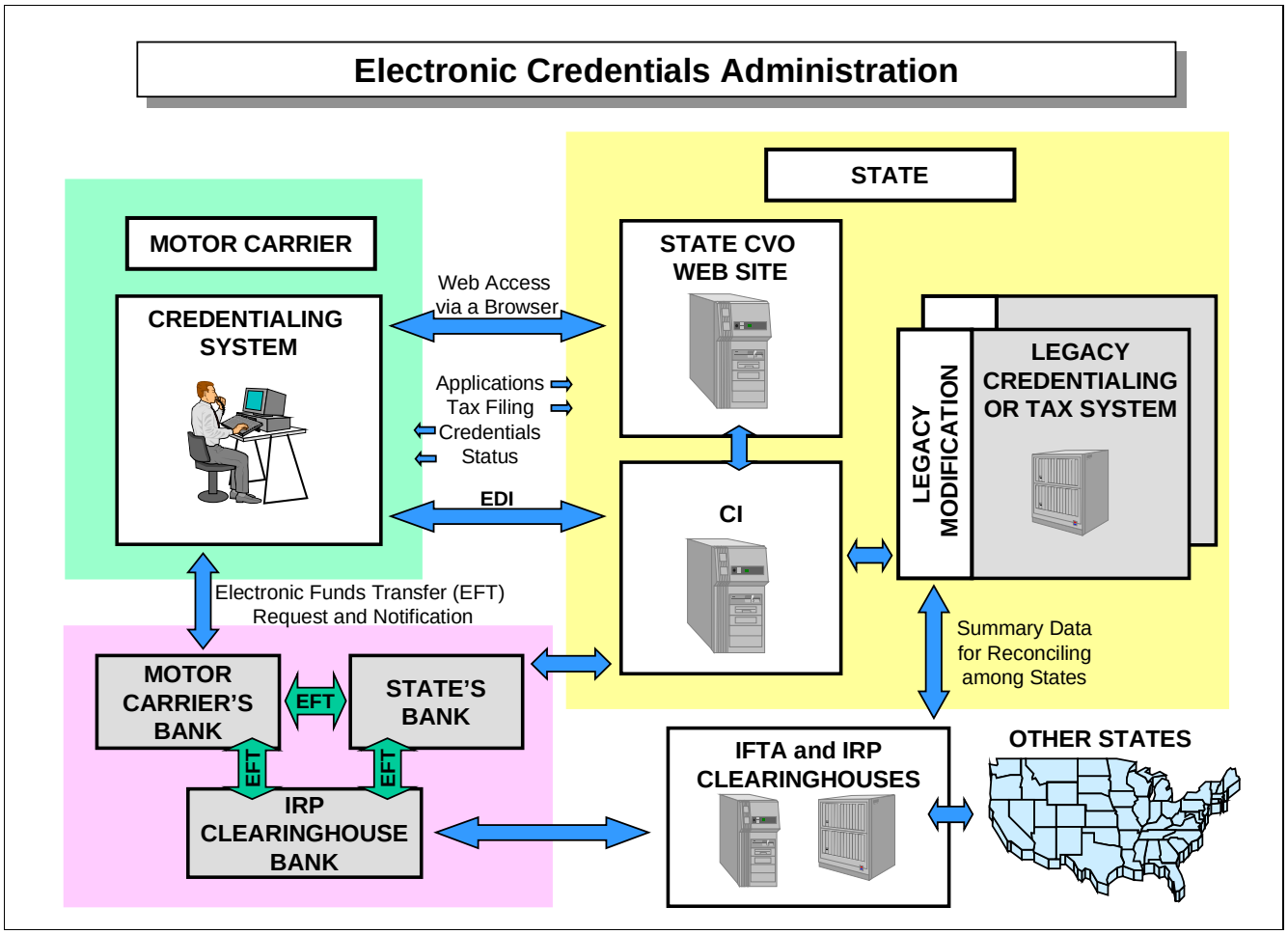


Figure 2-4 Electronic Credentials Administration

In general, the processing includes error checking, crosschecks with other databases, fee calculations, invoicing, payment, and issuance of some type of decal, sticker, plate, or paper document. The goal is to allow paper documents to be printed by the carrier. Decals and metal plates will need to be mailed to smaller carriers, although larger carriers will be able to maintain an inventory of these items at their sites, just as some states allow car and truck dealers to do today.

A cornerstone feature of CVISN is that each state will support an EDI interface available to motor carriers for electronic credentialing. Figure 2-5 illustrates some of the key features of EDI. It is the commonly accepted method of sending **computer-to-computer transactions** between businesses. It has been used extensively for years in the transportation field for transactions among shippers and carriers. Examples of transactions include shipping orders, bills-of-lading, shipping status notification, and invoices. The CVISN Program has developed a number of new transactions to support the exchange of credentials transactions (as well as safety transactions). EDI allows two trading partners with different hardware and software to communicate via a common language, i.e., EDI transactions. They typically do this by purchasing a commercial off-the-shelf EDI translator and developing some custom code to interface their existing application to the translator.

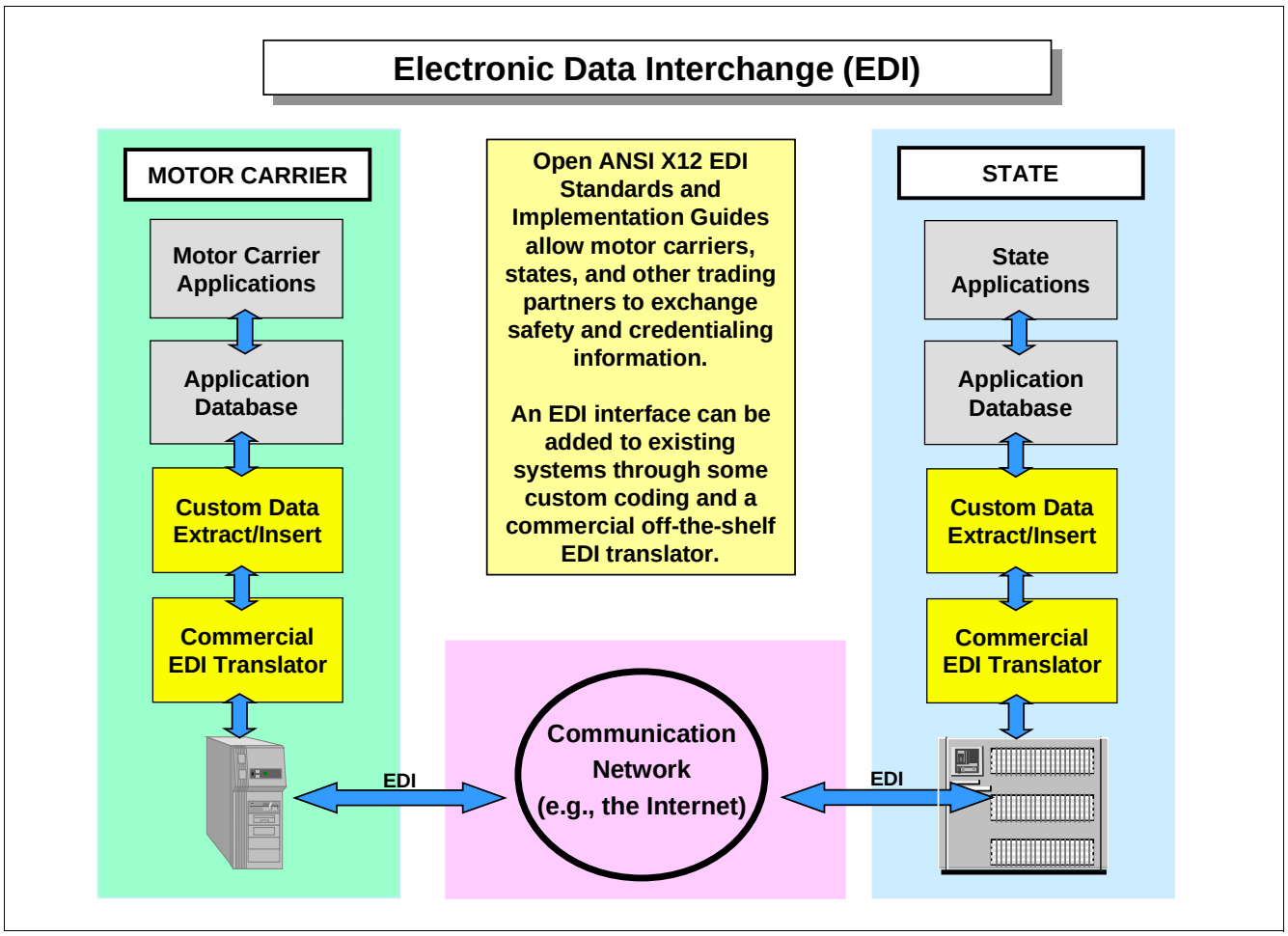


Figure 2-5 Electronic Data Interchange

Some states will provide web sites for electronic credentialing in addition to the EDI interface. These may be more attractive to smaller and midsize carriers since they will be accessible via a standard web browser. The web browser has become the commonly accepted method of providing a **person-to-remote-computer interface**. No specialized CAT software will be required. The disadvantage to this approach for larger carriers is that a person will be required to enter data manually onto the web site. Whereas, the CAT might actually be integrated into the carrier's fleet management system and it could fill out electronic forms automatically from the carrier's existing business databases. Most states are likely to offer both EDI and web-based approaches to satisfy the needs and preferences of all carriers.

EDI is the electronic exchange of business information in a standard structure that permits computer generation and processing of the message.

Another aspect of credentialing is sharing information among multiple states. States have evolved a number of "base-state agreements" over the years, including the International Registration Plan (IRP) and International Fuel Tax Agreement (IFTA). These agreements allow a carrier to designate a base state that it deals with and that state in turn provides information and fee payments to other states. For example, a carrier may operate in Maryland and 10 surrounding states. The carrier could choose to register its vehicles in Maryland as the base state. In completing the registration form (using the CAT), the carrier would specify the expected percentage of allocation of each vehicle's mileage to

each of the other 10 states. The state of Maryland would process the data, calculate the fees based on the differing rates for each state, and exchange the necessary information and fee payments with each state. This is a great simplification for carriers. Until a decade ago, they had to separately register and obtain license plates from each state for each vehicle that would operate in the state. The further improvement that CVISN brings to this situation is the development of an IRP Clearinghouse and an IFTA Clearinghouse to allow the states to exchange data and fees electronically rather than via paper reports as is done today. At this time, only the IRP Clearinghouse actually initiates the transfer of funds among states' banks. The IFTA Clearinghouse calculates the transfer amounts, but relies on the states to actually initiate the transfers.

2.7 What Will the CVISN Program do for Electronic Screening?

Most automobile drivers have gone past weigh stations on major highways. Signs direct trucks to pull into these stations to have their weight checked to ensure that they are within federal and state regulations. Overweight trucks can cause excessive road wear. Most states limit trucks to a maximum of 80,000 pounds, with corresponding maximum weights on each axle. At a typical weigh station, trucks slow down or stop at a scale that weighs each axle and total vehicle gross weight. While the vehicle is slowing and stopped on the scale, law enforcement personnel check it for the proper decals and any obvious safety problems. If they observe any problem, they will ask the driver to pull into an inspection area at the site for a more thorough examination. They also pull in a small random sample of vehicles for safety inspections, even without any obvious safety problem. The weighing process may result in a delay of from 30 seconds to (if traffic is backed up) 5 minutes or more. This can be a significant cost to some types of trucking operations. At some high-traffic stations, queues can back up onto the highway, forcing temporary closure of the station to avoid a safety hazard.

Another aspect of ITS/CVO is to automatically screen vehicles as they approach weigh stations and allow those that are safe and legal to bypass without slowing down or stopping (see Figure 2-6). This capability requires installation of WIM scales in the main highway to measure the weight of trucks while they are moving at highway speeds. The trucks would be equipped with DSRC transponders (see Figure 2-7) that can be interrogated by roadside readers just before the vehicle goes over the scale. This reader obtains identifying information from the transponder equivalent to the license plate number. A Roadside Operations Computer (ROC) in the weigh station uses this identifier to check information about the vehicle and the associated carrier using the snapshot information provided by SAFER. It checks the safety rating of the vehicle and associated carrier and also checks to see that the vehicle is registered, is current on tax obligations, and has no other recent problems. If the weight and other checks are good, the reader sends back a message to the transponder that says the truck is cleared and does not need to pull into the static scale ramp. The transponder is mounted on the dashboard and has red and green indicators. The green light signals the driver to proceed; the red light to pull into the scale. Enforcement personnel can set up the ROC to pull in a certain number of vehicles for random safety inspections, just as they do today with manual systems.

2.8 What are the CVISN Key Operational Concepts?

The term "operational concept" generally means "how a system is used in various operational scenarios." "System" is used here in a broad sense to include people and manual processes as well as automated information, sensor, and control systems. New operational concepts are adopted in order to solve a problem in the current operations or to take advantage of new knowledge or technology that enables improvements in current operations.

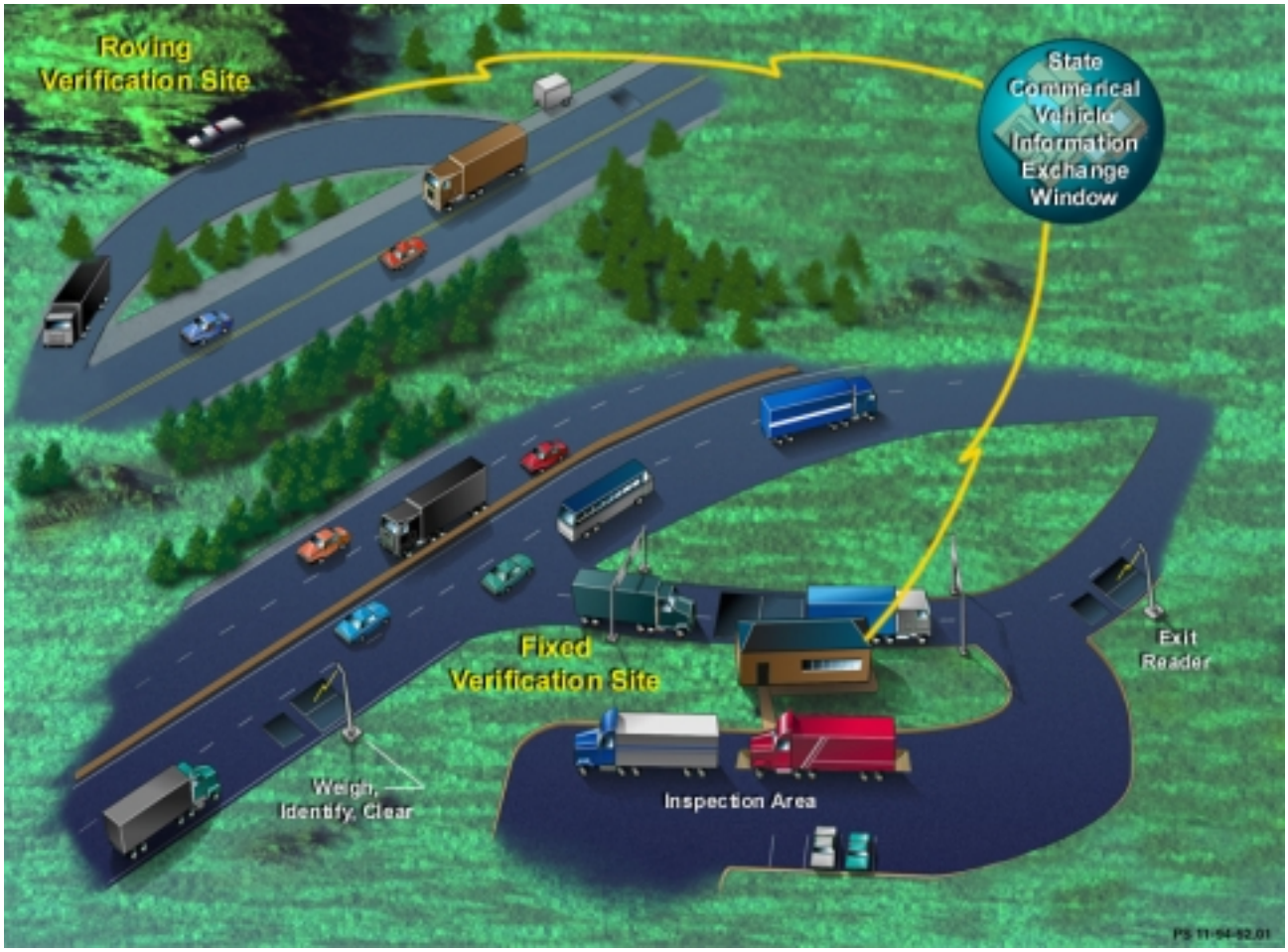


Figure 2-6 Electronic Screening Operational Concept

The ITS/CVO Program does not advocate deploying technology for its own sake. Before looking to technology for answers to CVO problems, stakeholders should:

- Understand the problems with current operations
- Understand the potential benefits of improved processes
- Evaluate the underlying business processes
- Re-engineer the business processes, if necessary.

This series of guides focuses on the technologies used in ITS/CVO. It does not directly address the business process re-engineering (BPR) that should accompany any discussion of significant change. Typically, a well-structured BPR project for an organization will include answering these questions:

- Why do we do what we do?
- Why do we do it the way we do?
- How can we fix problems in the current business processes?
- How can new knowledge and technology be applied to improve effectiveness and efficiency?

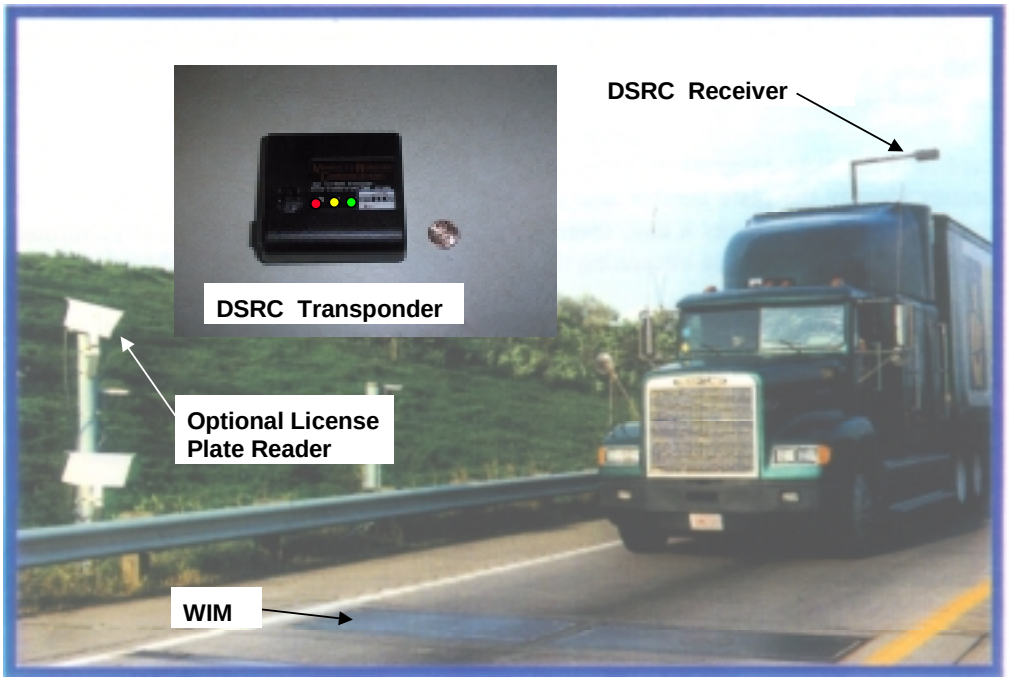


Figure 2-7 Electronic Screening Equipment

Many attempts at adopting new business processes and incorporating new technology never achieve the original objectives for undertaking the change. This is often because the impact of the technology on operations is not clearly understood by users until the system is nearly completely developed, and then it is often too late to change. We believe that a critical success factor for a CVISN program or project is that the CVO stakeholder community understand the operational impact of the new technology proposed by CVISN. A description of a new, proposed operational concept should include a description of the how stakeholders interact with the systems involved to carry out some task. Most stakeholders will be more interested in and concerned about the operational concepts than the details of the architecture, design, and implementation. The key CVISN operational concepts are summarized as follows. More detailed scenarios are presented in the other guides and references (see Table 2-1).

Share data among safety, credentialing, and screening processes – The CVISN Program is structured to encourage states to design and deploy these three elements in parallel. Doing so enables the synergy of being able to use data from one area to improve the processes of another. For example, basing the decision to grant a truck registration renewal on the prior safety history of the carrier.

Focus safety enforcement on high risks – Enhanced data exchange will allow all activities to focus resources on high risk operators. Providing enforcement personnel with current, detailed, accurate information about carriers, vehicles and drivers allows them to do a better job of selection of vehicles for inspection and allows them to focus on carriers, drivers, and vehicles that have the highest safety risk.

Electronic credentials and paperless vehicle – The "paperless vehicle" concept is supported, i.e., electronic records become primary and paper records become secondary. Electronic access to credentials information makes it possible to contemplate no longer requiring commercial vehicles to carry copies of credentials and decals onboard. Instead credentials would be checked and verified electronically. The concept is to support the complete credential life cycle electronically: application, fee payment, credential issuance, revenue distribution, modification, renewal, audit, sanctioning, appeals, and inspection. Data exchange between the public and private sector will be accomplished using formats and protocols defined in open standards. Paper could be produced from the electronic information if and when required.

Use open EDI standards – Open standards are used for interchanges between public and private systems. In particular, American National Standards Institute (ANSI) Accredited Standards Committee (ASC) X12 EDI transactions are used for carrier-state and for some state-core infrastructure information systems' interactions. Carriers in the United States have already embraced EDI for their fleet and business operations.

Ubiquitous (but secure) electronic data access – Good business processes can be enhanced through improved automated access to accurate information. Information sharing within a single jurisdiction and across jurisdictions using electronic networks is a cornerstone of the CVISN initiative. Information systems are only as good as the quality of the data they use. Data must be accurate, current, and safe from tampering or unauthorized disclosure.

Standard snapshots and reports for carrier and vehicle information – Standard information exchange is supported via carrier and vehicle (and eventually driver) snapshots. ITS/CVO involves multiple applications and interfaces among hundreds of state agencies and thousands of carriers. Information exchange will be enabled through the use of standards. Many elements of CVO require information about the current and past safety performance and credentials status for carriers, vehicles, and drivers. Collecting the most-used information into standard messages will simplify systems since interfaces can be defined once, rather than negotiated between every pair of stakeholders. Carrier and vehicle snapshots containing safety and credentials data are part of CVISN Level 1.

Mainline screening and automated roadside operations – Electronic screening is provided for vehicles equipped with US DOT ITS JPO-specified DSRC transponders. Stopping a truck or bus costs time and money and is inconvenient. The current weigh station screening process and safety inspection process can be greatly expedited through automation with technologies such as weigh-in-motion, hand-held computers, brake testing, and communications networks.

Use open DSRC standards – Open standards are used for interchanges between public and private systems. Dedicated Short Range Communications (DSRC) standards for the messages, data link, and physical layers are used for vehicle-roadside interactions. DSRC standards apply not only to electronic screening, but also to toll, traffic, fleet applications, and border crossing processes throughout North America. The use of open DSRC standards for communicating between the vehicle and the roadside will allow a single transponder to be used for multiple applications throughout the states (and eventually North America).

Conform to the architecture to gain interoperability – Interoperability is assured by a process of architecture conformance checks throughout a project's lifecycle, culminating in execution of standardized interoperability tests. Interoperability is achieved through conformance to the CVISN architecture. Interoperability of deployed systems is verified through testing. If a tested system is changed, the interoperability tests are re-run as part of the re-validation process.

Flexible deployment options – The architecture provides a common technical framework and a basis for developing interface standards. It does not specify a particular design for states or carriers; it allows them to select from a wide range of options to meet their particular needs. It only constrains design options in areas necessary to achieve interoperability and compatible practices. As technology changes, so will the architecture. Before incorporating new technologies into the architecture, feasibility should be demonstrated. Several technology options and implementation choices are likely to continue to support the CVISN architecture's concepts and standards. Stakeholders choose the approach that best fits their business needs and available resources.

Table 2-1 Operational Concepts

Key CVISN Operational Concepts
▪ Share data among safety, credentialing, and screening processes.
▪ Focus safety enforcement on high risks.
▪ Electronic credentials and paperless vehicle.
▪ Use open EDI standards, especially for interfaces between motor carriers and state agencies.
▪ Ubiquitous (but secure) electronic data access.
▪ Standard snapshots and reports for carrier and vehicle information.
▪ Mainline screening and automated roadside operations.
▪ Use open DSRC standards for communicating between the vehicle and the roadside.
▪ Conform to the architecture to gain interoperability.
▪ Flexible deployment options.

2.9 What Systems Comprise CVISN?

Figure 2-8 illustrates how the numerous systems operated by different stakeholders can be viewed as part of one, large, whole system, that is, CVISN. A brief description of each system is provided in Tables 2-2 through 2-4 following the figure. Some of these systems are not part of the initial CVISN Program deployment effort, referred to as CVISN Level 1. Please see the next chapter for a clarification of which systems are considered within the scope of Level 1.

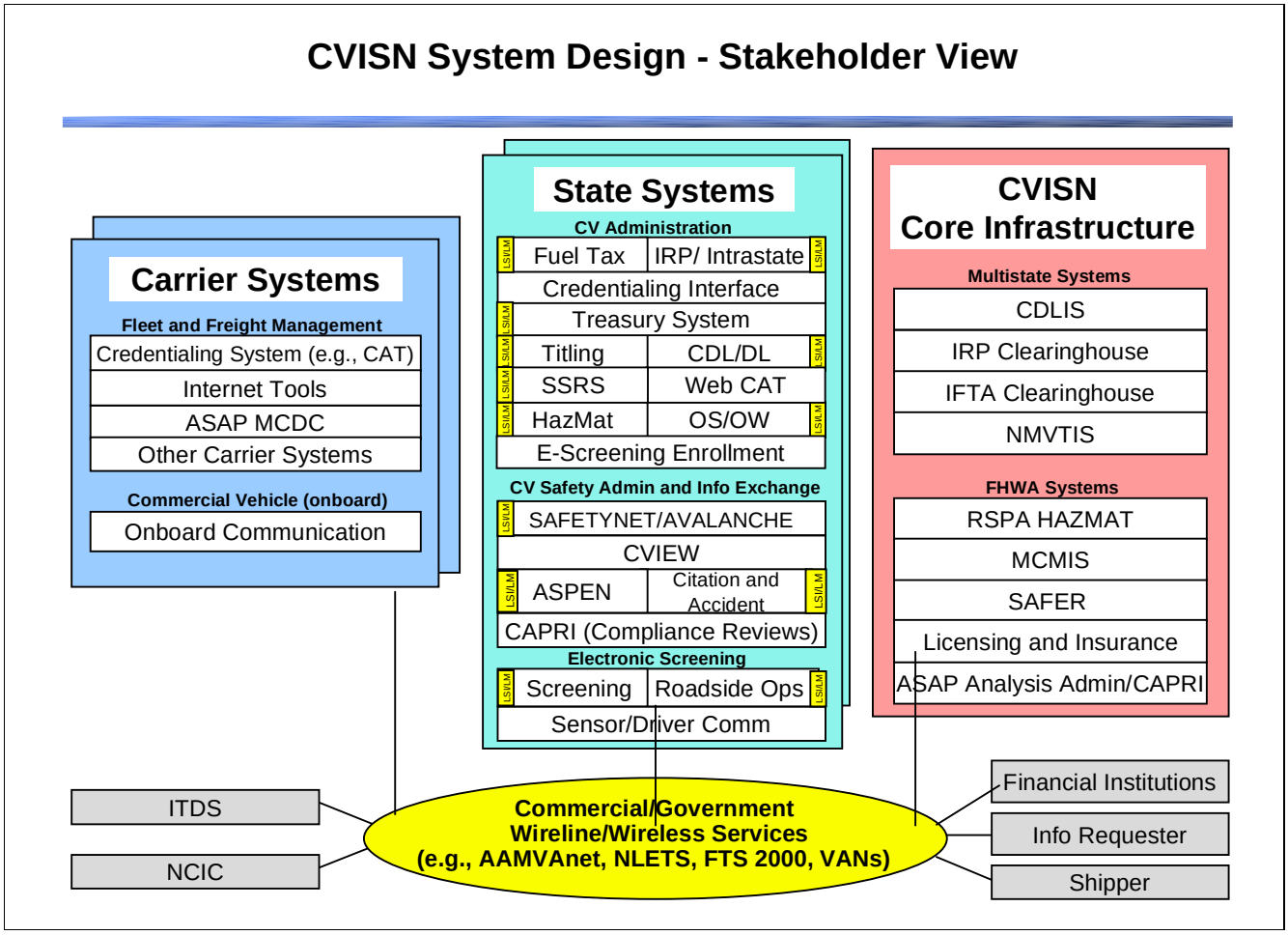


Figure 2-8 CVISN System Design – Stakeholder View

Table 2-2 Carrier Systems

CARRIER SYSTEMS	
System	**Description**
Credentialing System	Apply for and receive credentials; file fuel tax returns. Communicates with states via American National Standards Institute (ANSI) standard EDI transactions. One such system is the CAT system.
Internet Tools	Via Internet browser, access governmental or private web sites to apply for credentials, file fuel tax returns, and perform other CV-related functions.
ASAP MCDC	Automated Safety Assessment Program Motor Carrier Data Collection. Report compliance information.
Other Carrier Systems	Freight Administration, Fleet Hazardous Materials Management, and Fleet Maintenance. Other elements of fleet and freight management.
Onboard Communication	Communicate via DSRC, voice, etc. Record trip events.

Table 2-3 State Systems

STATE SYSTEMS	
System	**Description**
Fuel Tax	International Fuel Tax Agreement systems. Register for fuel tax credential and process fuel tax returns.
IRP/Intrastate	International Registration Plan and intrastate registration systems. Register commercial vehicles.
Credentialing Interface	Single interface for carrier interactions related to credentialing. Communicates with carriers via ANSI standard EDI transactions.
Treasury System	Process electronic payments.
Titling	Title new and used vehicles.
CDL/DL	Commercial Driver's License/Driver's License.
SSRS	Single State Registration System. Carrier registration.
Web CAT	State WWW site support for electronic credentialing.
HAZMAT	Hazardous Material. Register to carry HAZMAT and issue HAZMAT permits.
OS/OW	Issue Oversize/Overweight permits.
E-Screening Enrollment	Collect and evaluate requests for carriers to participate in electronic screening.
SAFETYNET /AVALANCHE	Collect safety inspections and report to FMCSA.
CVIEW	Commercial Vehicle Information Exchange Window. Collect snapshot segments (parts of snapshots) for interstate and intrastate carriers, vehicles, and drivers. Interface with SAFER for interstate snapshot exchange. Distribute snapshots to other state systems.
ASPEN	Record and report safety inspections.
Citation and Accident	Record citation and accident data.
CAPRI	Support compliance reviews.
Screening	Make pass/pull-in decision.
Roadside Ops	Roadside Operations. Process snapshots and control site traffic.
Sensor/Driver Comm	Sensor/Driver Communications. Process vehicle measurements (e.g., weight) and communicate via DSRC with driver.

Table 2-4 Core Infrastructure Systtems

Core Infrastructure Systems	
System	**Description**
CDLIS	Commercial Driver's License Information System. Pointer to past performance records for commercial drivers.
IRP Clearinghouse	International Registration Plan Clearinghouse. Administration of IRP base state agreement.
IFTA Clearinghouse	International Fuel Tax Agreement Clearinghouse. Administration of IFTA base state agreement.
NMVTIS	National Motor Vehicle Title Information System. Pointer to title information for all vehicles.
RSPA HAZMAT	Research and Special Programs Administration Hazardous Materials. Register carriers authorized to carry HAZMAT.
MCMIS	Motor Carrier Management Information System. Store safety data.
SAFER	Safety and Fitness Electronic Record/Data Mailbox. Collect snapshots for interstate carriers, vehicles, and drivers. Provide snapshots to user systems.
Licensing and Insurance	Register financial responsibility for interstate carriers.
ASAP Analysis Admin/CAPRI	Automated Safety Assessment Program Analysis Administration/CAPRI. FMCSA component of systems that support collection of compliance data from carriers and record and report compliance reviews.

3 What CVISN Capabilities Should a State Deploy First?

The Federal Motor Carrier Safety Administration (FMCSA) is using Commercial Vehicle Information Systems and Networks (CVISN) "levels" to allow definition of a specific set of capabilities that can be deployed incrementally by a state and its motor carriers. The definition of CVISN Level 1 has been baselined. The definition of CVISN Level 2 is being developed. Possible elements for Level 3 and beyond are being collected to support planning.

The level definitions include capabilities a state would deploy, capabilities motor carriers in a state would deploy, and capabilities for several critical national systems, referred to as core infrastructure systems.

3.1 What is CVISN Level 1?

Tables 3-1 and 3-2 summarize what is required for CVISN Level 1. Table 3-1 describes requirements for states. Table 3-2 describes requirements for the core infrastructure systems. The detailed requirements for CVISN Level 1 are provided in the *CVISN Operational and Architectural Compatibility Handbook (COACH)* [JHU/APL, POR-97-7067, 1997 – 1999].

3.2 What Does CVISN Level 1 Look Like When Deployed in a State?

A state must develop or otherwise acquire new systems and modify some existing systems to implement the CVISN Level 1 capabilities. **There are many ways to do this and still be in conformance with the National Intelligent Transportation Systems (ITS) Architecture and standards.** A typical way that is modeled on the approaches taken by the CVISN prototype states, Maryland and Virginia, is shown in Figure 3-1.

A more complete description of a generic state design is included in the *CVISN System Design Description* [JHU/APL, POR-97-6998, April 1999].

3.3 What Must Be Done to Deploy CVISN Level 1?

Implementing CVISN Level 1 is a significant undertaking for a state. A brief summary of key tasks and products involved is provided in Table 3-3. Chapter 6 provides more information on a recommended process for a state to follow in this endeavor.

Table 3-1 State CVISN Level 1 Capabilities

Capability Area	State CVISN Level 1 Capabilities
	▪ *An organizational framework for cooperative system development has been established among state agencies and motor carriers.* ▪ *A State CVISN System Design has been established that conforms to the CVISN Architecture and can evolve to include new technology and capabilities.* ▪ *All the elements of three capability areas (below) have been implemented using applicable architectural guidelines, operational concepts, and standards.*
Safety Information Exchange	▪ ASPEN (or equivalent) at all major inspection sites. ▪ Connection to the Safety and Fitness Electronic Records (SAFER) system to provide exchange of interstate carrier and vehicle snapshots among states. ▪ Implementation of the Commercial Vehicle Information Exchange Window (CVIEW) (or equivalent) system for exchange of intrastate and interstate snapshots within state and connection to SAFER for exchange of interstate snapshots.
Credentials Administration	▪ Automated processing (i.e., carrier application, state application processing, credential issuance, and tax filing) of at least International Registration Plan (IRP) and International Fuel Tax Agreement (IFTA) credentials; ready to extend to other credentials [intrastate, titling, oversize/overweight (OS/OW), carrier registration, and hazardous material (HAZMAT)]. Note: processing does not necessarily include e-payment. ▪ Connection to IRP and IFTA Clearinghouses. ▪ At least 10 percent of the transaction volume handled electronically; ready to bring on more carriers as carriers sign up; ready to extend to branch offices where applicable.
Electronic Screening	▪ Implemented at a minimum of one fixed or mobile inspection site. ▪ Ready to replicate at other sites.

Table 3-2 CVISN Core Infrastructure Systems CVISN Level 1 Requirements

System	CVISN Core Infrastructure Systems CVISN Level 1 Requirements
All the capabilities outlined below have been implemented using applicable architectural guidelines, operational concepts, and standards.	
SAFER	▪ Supports storage and exchange of carrier and vehicle snapshots including safety and limited credentials data. ▪ Supports storage and exchange of vehicle and driver Inspection Reports. ▪ Supports exchange of Carrier Profile Reports, compliance review data, crash data, and enforcement data. ▪ Supports Electronic Data Interchange (EDI) formats for input and output data. ▪ Interfaces to Motor Carrier Management Information System (MCMIS), SAFETYNET 2000, Licensing and Insurance and Commercial Driver's License Information System (CDLIS).
IRP Clearinghouse	▪ Accepts recap data from states. ▪ Supports EDI formats for output data. ▪ Performs remittance netting and uses the banking system for funds transfer.
IFTA Clearinghouse	▪ Web site for IFTA manuals, tax rate matrices, news and calendar. ▪ Accepts transmittal data and profile data from states. ▪ Supports EDI formats for input and output data. ▪ Generates transmittal reports.
Licensing and Insurance	Interface to SAFER to provide licensing and insurance data for snapshots.
RSPA HAZMAT	*FMCSA Research and Special Program Administration Hazardous Materials (HAZMAT) System. No change required to current operational capability.*
ASAP/CAPRI	*No change required to current operational capability.*
CDLIS	*No change required to current operational capability.*
NMVTIS	*Not included in CVISN Level 1 capability.*

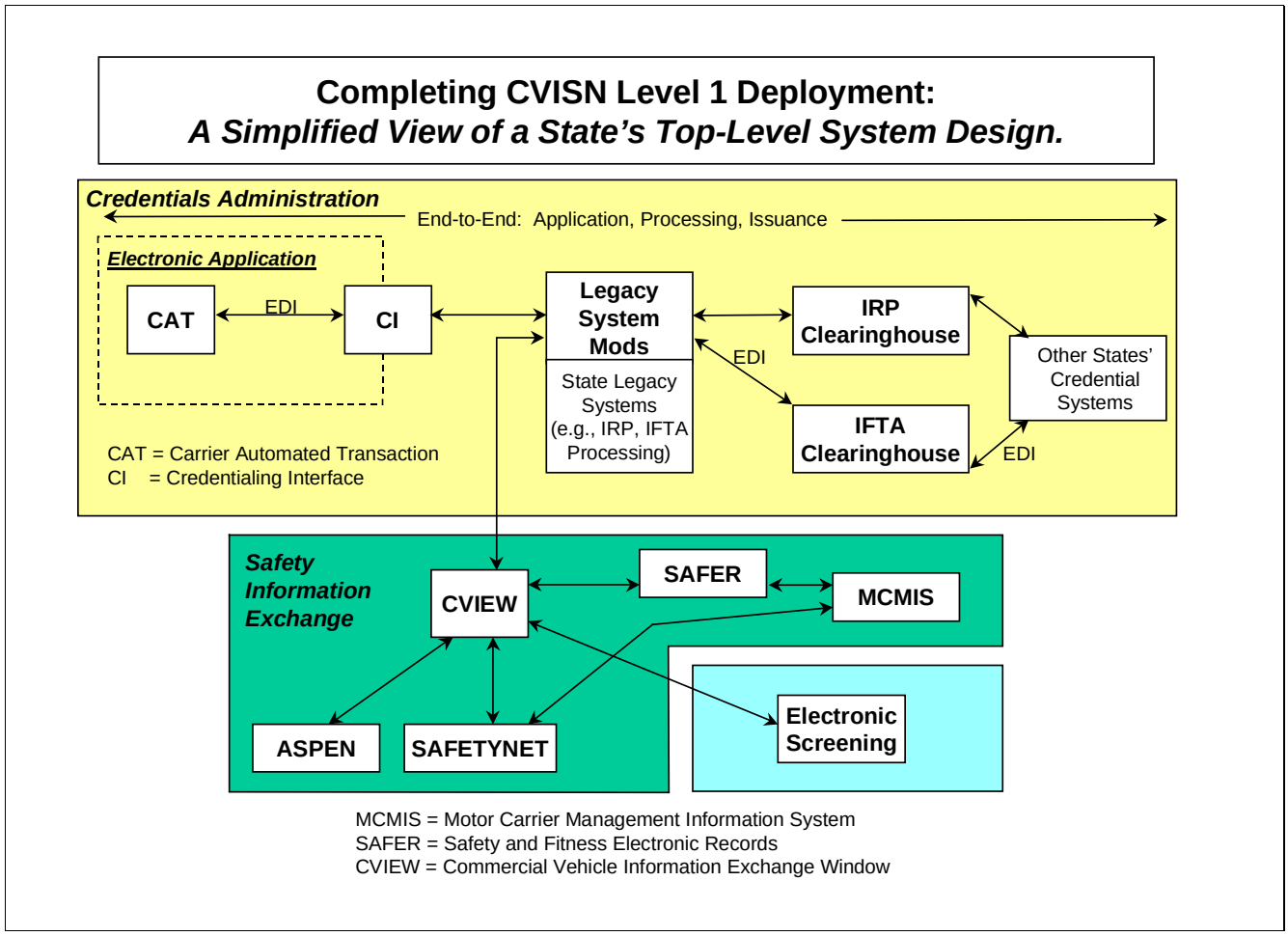


Figure 3-1 A Simplified View of a State's Top-Level System Design

3.4 What is CVISN Level 2 (Preliminary Definition)

CVISN Level 1 was defined as a pragmatic means of setting a goal that was ambitious but achievable. It purposely excluded many capabilities that were desirable and feasible with today's technology in order to control project scope and cost. If funding is available, these capabilities will be included in a future Level 2 phase of the CVISN Program.

A preliminary definition of the capabilities a state would implement for CVISN Level 2 is provided in the Table 3-4. The final definition will evolve in a cooperative effort among FMCSA, states, and other CVO stakeholders.

Table 3-3 Key Tasks Involved in CVISN Level 1 Deployment

	Activity or System	Key Tasks Involved in CVISN Level 1 Deployment
Coordination	**Program Formation**	▪ Form a Commercial Vehicle Operations (CVO) Working Group of stakeholder representatives including motor carriers. ▪ Develop a CVO Business Plan.
	Program Management	▪ Assign a Program Manager, System Architect, and Program Administrator. ▪ Develop a State CVISN Program Plan.
	System Engineering	▪ Develop a top-level system design that supports the required business processes. ▪ Develop technical specs for all the subsystems including specifications for EDI transactions. ▪ Define and execute a comprehensive integration and test effort. ▪ Design networks and communications to connect all subsystems.
New System Development	**ASPEN** (or equivalent)	▪ Acquire hardware and communications support for the FMCSA ASPEN software. ▪ Install systems and train personnel.
	CVIEW (or equivalent)	Develop or acquire CVIEW hardware, software, and communications.
	CAT (or equivalent)	▪ Enlist several motor carriers to be the first users of the new electronic credentialing capability. ▪ Develop or acquire carrier automated transaction (CAT) software that supports EDI transactions for data exchange. ▪ Work with carriers to install CAT and train users.
	CI	Develop or acquire credentialing interface (CI) hardware, software, and communications that support EDI transactions for data exchange.
	E-Screening System	Develop or acquire e-screening hardware, software, and communications that support dedicated short range communication (DSRC) standards.
System Modifications	**Networks and Communications**	Implement networks and communications to connect all the subsystems.
	IRP Legacy System	Modify existing IRP system to accept supplemental and renewal transactions from the CI. Connect to IRP Clearinghouse.
	IFTA Legacy System	Modify existing IFTA system to accept supplemental and renewal transactions and quarterly tax filings from the CI. Connect to IFTA Clearinghouse.
	Weigh Station Legacy System	▪ Modify the existing weigh station scales and signage to interface with the e-screening system. ▪ Expand and improve power and communications facilities. ▪ Potentially reconfigure lanes for e-screening.

Table 3-4 Preliminary State CVISN Level 2 Requirements

Capability Area	State CVISN Level 2 Capabilities
▪ *CVISN Level 2 includes CVISN Level 1 plus the following...* ▪ *All the elements of three capability areas (below) have been implemented using applicable architectural guidelines, operational concepts, and standards.*	
Safety Information Exchange	▪ Crash and Citation Data collected electronically at site for 10 percent of enforcement personnel. ▪ Voluntary use of Automated Safety Assurance Program (ASAP) by 10 percent of state motor carriers. ▪ Support electronic carrier safety audits. ▪ Use onboard safety monitors as inputs to inspections.
Credentials Administration	▪ Electronic payment for credentials. ▪ End-to-end processing (i.e., carrier application, state application processing, payment, and credential issuance) of intrastate registration, titling, OS/OW, carrier registration and HAZMAT credentials. ▪ Connection to National Motor Vehicle Title Information System (NMVTIS) and electronic federal carrier registration system. ▪ "Paperless" vehicle: no requirement for paper credentials on vehicle. ▪ Support for electronic state IRP and IFTA audits. ▪ At least 50 percent of the total transaction volume handled electronically.
Electronic Screening	▪ Participation in interoperability agreements among screening programs. ▪ Implemented at major weigh stations and inspection sites where there is significant traffic. ▪ Ready to replicate at other sites.

3.5 What is the Long Term Vision for CVISN?

With continuing rapid changes in technology and business practices, it is impossible to say for sure what may lie beyond CVISN Level 2. Some specific areas that now seem to hold promise for implementation beyond Level 2 include:

- Extension to integrate other CVO user services such as onboard safety monitoring, automated inspections, HAZMAT incident management, freight and fleet management, and intermodal freight functions.
- Closer integration with other ITS services for traffic management, traveler information, and incident response.
- Driver snapshots to distribute a standardized set of driver safety and credentials information.
- The use of eXtensible Markup Language (XML) standard transactions as a supplement to traditional X12 EDI for some business transactions.
- The use of DSRC at the 5.9-MHz frequency band.

Even though it is not possible to define all the specifics now, it is reasonable to assume that new technologies will continue to open opportunities for improving the safety and efficiency of CVO. The CVISN and ITS/CVO Programs may conclude as separate entities. But the CVO community will continue to improve safety and efficiency. The CVISN Program and its associated architecture, standards, deployment experience, institutional structures and stakeholder relationships will provide a good foundation for assimilating future technologies into CVO.

In the remainder of this section, we try to look ahead to the year 2005 and describe the vision for CVO shipping operations and the underlying business transactions.

Figure 3-2 illustrates the vision for CVO shipping operations by the year 2005. It is envisioned that trucking operations will have become much more efficient, largely due to the availability of accurate information in electronic form.

In 2005, carriers are able to equip their vehicles with a variety of productivity and safety improvements: mobile communications systems, navigation and tracking systems, onboard vehicle monitors, collision avoidance devices, crash restraints, and vision enhancement equipment.

Most trucks are equipped with ITS DSRC transponders that transmit messages to and receive messages from the roadside.

Enroute delays at weigh stations have been virtually eliminated. Electronic screening is used to check the vast majority of vehicles at mainline speeds. A screening message transmits vehicle, carrier, driver, and specially regulated load-type identifiers to roadside readers. The identifiers are used to access information stored in government information systems. Safety, credentials, tax, and permit information are checked at mainline speeds. Carriers that participate in screening programs can operate trucks with no paper credentials onboard.

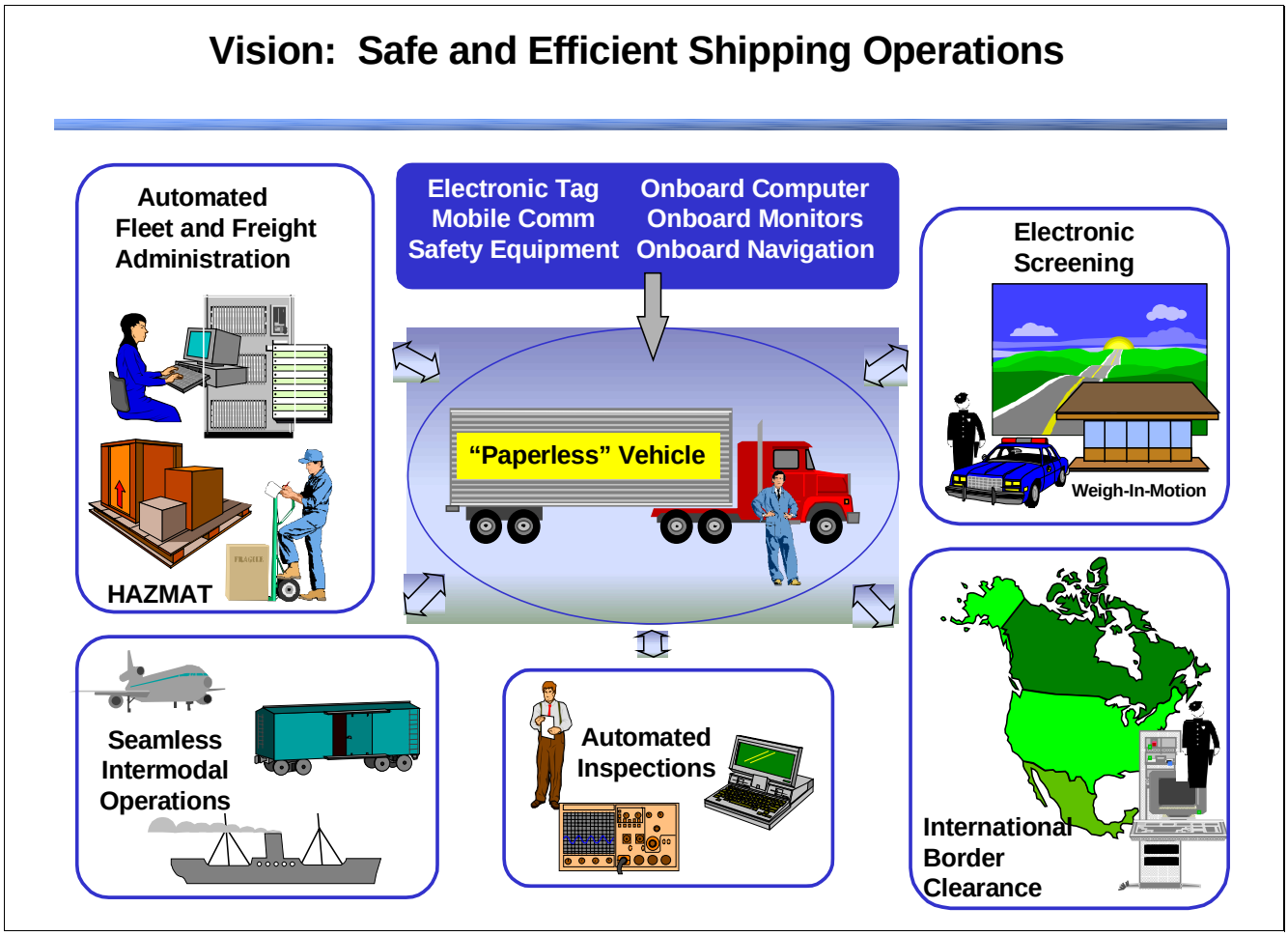


Figure 3-2 Vision of CVO Shipping Operations – Year 2005

Carriers that voluntarily adopt driver alertness management programs and equipment are exempted from maintaining trip logs. Other carriers maintain trip logs electronically.

International border crossings occur with little or no delay. Routine shipments are cleared by use of EDI well in advance of the vehicle approaching the border, and more often than not, the vehicle passes with less than a minute delay.

When inspections occur, they are conducted quickly with the aid of automated safety inspection equipment.

Electronic transactions support intermodal interchange among trucks, railroads, ships, and air freight lines. All trailers and containers are equipped with a standard intermodal tag. This tag can be read on highways, on rail lines, at truck and rail terminals, and at shipyards.

Carriers use fleet management systems to optimize schedules, routing, and maintenance. Accurate highway and traffic data are available to support routing. Carriers can choose to track vehicles throughout North America. Many carriers maintain databases of the location of each shipment. Standards are available to support cross-carrier queries and tracking, so a shipper can find the location of their shipment via an electronic query. HAZMAT handling data required to respond to HAZMAT incidents are available online to emergency personnel.

Figure 3-3 illustrates the vision for handling CVO electronic business transactions by the year 2005. It is envisioned that the vast majority of CVO business transactions are being conducted electronically. This includes transactions among carriers, shippers, government agencies, insurance companies, and other CVO stakeholders.

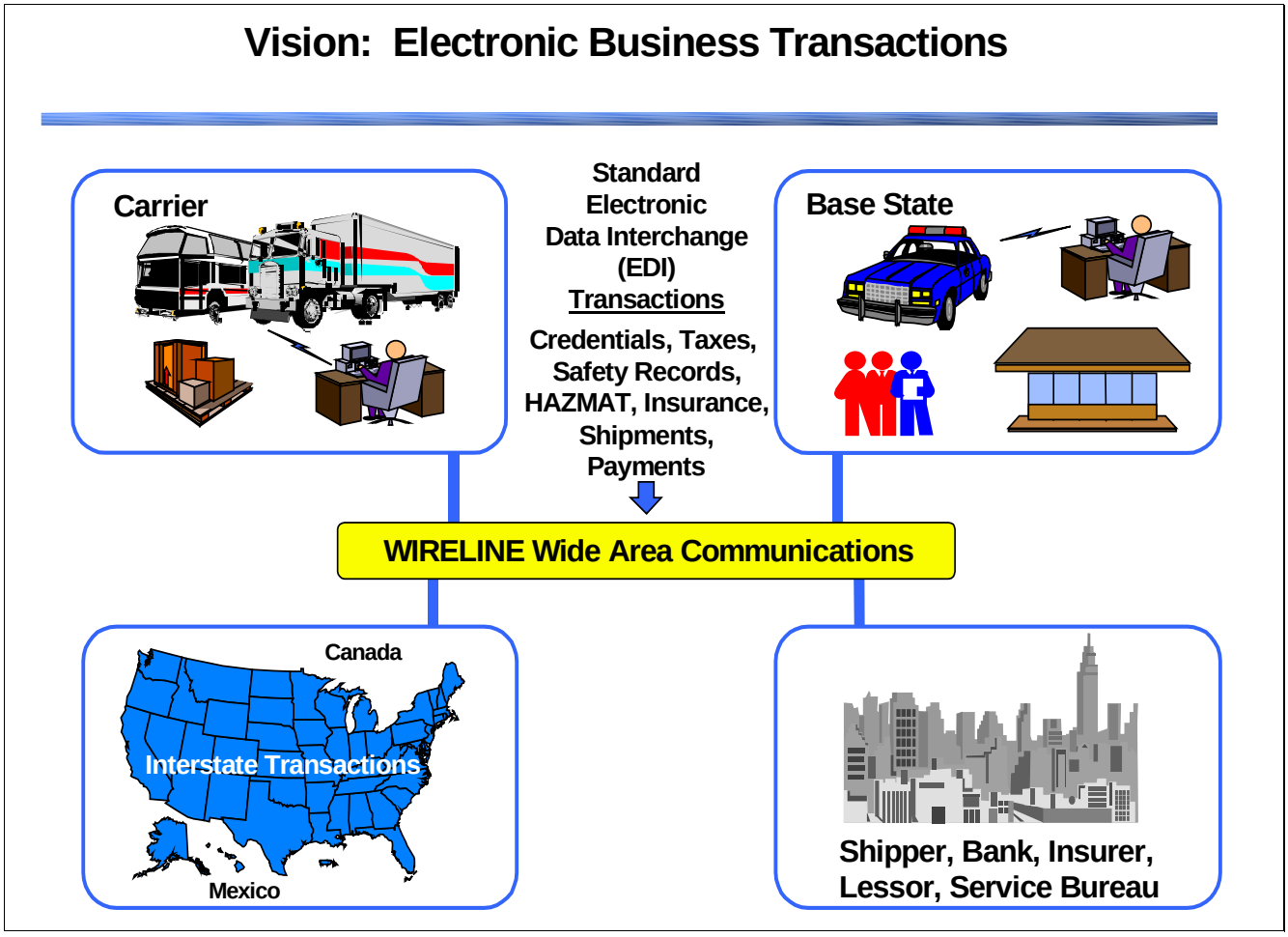


Figure 3-3 Vision of Electronic Business Transactions – Year 2005

In 2005, carriers apply and pay for credentials electronically, including registration, HAZMAT permits, and oversize/overweight (OS/OW) permits. They file and pay fuel taxes electronically. Carriers deal with a base state for all business transactions, including registration, permits, taxes, and screening. The base state handles any allocation of fees or taxes to other states, simplifying carrier administration. Credentials are distributed electronically. No bingo cards, stamps, decals, or paper permits are required for participating carriers.

Information from one process (e.g., registration) is available to other processes (e.g., fuel tax) in a timely manner. This avoids redundant data entry, improves data accuracy, and provides data to support better decision making. It permits crosschecks such as denying registration to a carrier with a poor safety history.

Some aspects of audits are conducted electronically with participating carriers. State systems send queries to carrier systems. The responses are compared to state records and often the audit is completed with little or no manual intervention.

States deal with carriers electronically, and states also deal with each other electronically. They routinely interchange electronic information about business transactions relating to safety, registration, tax, and screening. Shipping transactions are primarily electronic. Shippers place orders, track freight movement, receive invoices, and make payments electronically.

State highway planning and enforcement operations are planned and managed based on comprehensive, timely information. The information is gathered as a by-product of the administrative processes and roadside processes. It is anonymous; in other words, carrier and driver identifiers are removed and only the overall statistics are used.

Data privacy and integrity are assured via encryption and password techniques. In addition, the legal issues associated with the Privacy Act of 1974 are supported.

4 What Benefits are Expected from CVISN?

Benefits are summarized from two perspectives in this chapter. First, benefits are listed by capability area: safety information exchange, credentials administration, and electronic screening. Next, benefits are summarized by stakeholder groups: states, carriers, and shippers.

4.1 Benefits of Safety Information Exchange

The expected benefits resulting from the safety information exchange capabilities are providing more accurate and timely safety and related credentialing information to federal, state, and motor carrier personnel to allow them to improve the effectiveness of their safety programs. In the past, it has typically taken 90 days or more for the results of an inspection report to be available to the enforcement community. With the Commercial Vehicle Information Systems and Networks (CVISN) Level 1 changes, this time is reduced to less than 60 minutes. With better information, government agencies can focus limited resources on operators whose records indicate a safety history problem. Motor carriers can use the data to help evaluate their own performance and target areas for improvement.

Some specific safety benefits documented to date include:

- In a study of 40,000 commercial motor vehicle inspections, safety inspectors removed an additional 4,000 (increasing from 8,000 to 12,000) unsafe drivers and vehicles using advanced safety information systems instead of traditional methods. [USDOT, 1998]
- Improvement in safety data quality and transfer time through Electronic Data Interchange (EDI) vastly improves safety monitoring. Roadside inspectors receive more current, timely information. [USDOT, FHWA-JPO-97-013]
- The ability to identify hazardous cargo on vehicles involved in crashes can reduce the risk to those involved in the crash, the emergency response team, and the people living and working near the crash scene by reducing the time needed to properly handle the material. [Report to Congress, 1996]
- Electronic screening, automated roadside safety inspections, and onboard safety systems could reduce fatalities by 14 to 32 percent. [Report to Congress, 1996]

4.2 Benefits of Credentials Administration

The expected benefits resulting from the credentials administration capabilities are more efficient and responsive administrative processes for carriers and government agencies. It has been estimated that the cost of compliance with regulations for both carriers and government may be as high as $6 billion annually. Even a small percentage reduction in this figure can provide a high return on investment. In addition to the direct savings, having these processes automated will provide better information for measuring their cost and effectiveness and will provide a better environment for continual improvement of these processes and systems over time.

Some specific credentialing benefits documented to date include:

- A case study involving eight states estimated that the deployment of Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) technologies for electronic credentialing would have up to a 6:1 benefit/cost ratio. [Rubel, 1998]
- Electronic credential administration enables state agencies to share and exchange accurate, current, and protected motor carrier information both inside and outside the state. [Report to Congress, 1996]
- ITS/CVO technologies are predicted to deter tax evasion, which could save an estimated $500,000 to $1.8 million per State. [Report to Congress, 1996]
- Labor costs for administrative compliance are reduced significantly for medium and large-sized carriers using EDI, showing a benefit/cost ratio of 4:1 and 20:1, respectively. [American Trucking Associations Foundation, June 1996]

4.3 Benefits of Electronic Screening

The expected benefits resulting from the electronic screening capabilities are that state safety enforcement resources can be focused on high-risk operators and safe and legal carriers will be able to provide more efficient movement of freight.

Some specific electronic screening benefits documented to date include:

- Washington State Department of Transportation (WSDOT) officials expect to reduce road and bridge damage from oversize/overweight (OS/OW) loads through implementing multiple ITS technologies including roadway weigh-in-motion (WIM) scales at electronic clearance stations, improved mobile enforcement systems, and an automated permit system. Within a 10-year evaluation period of their infrastructure rehabilitation and preservation expenditures, WSDOT estimates the value of infrastructure costs avoided to grow from zero to a nominal 0.7 percent. ["Draft Guidelines for Participation in the Commercial Vehicle Information Systems and Networks (CVISN) Deployment Program," 1998]
- Carriers that pay their drivers by the hour can save time and money through reduced labor costs from electronic screening at weigh stations. Savings ratios are 3:1 to 7:1 for small carriers; 4:1 to 7:1 for medium-sized carriers; and 2:1 to 4:1 for large carriers. [American Trucking Associations Foundation, 1996]
- Roadside electronic clearance allows safe and legal carriers to bypass weigh and inspection stations saving time and money. [USDOT, 1998]

4.4 Summary of Benefits of CVISN to States

The benefits to states of implementing CVISN Level 1 include:

- Data interchange among states, carriers, financial institutions, and insurance companies will be electronic, and therefore more timely and accurate and less expensive.
- Administrators and enforcement personnel will have rapid, electronic access to required data.
- Credentials issuance, tax filing, interstate reconciliation, and audits will be automated to proceed more effectively and efficiently.
- Better enforcement of registration, licensing, weight, size, and tax regulations.
- Enforcement resources can be focused on noncompliant carriers and drivers.
- Better customer service to safe and legal motor carriers and drivers.
- In the long term, policies and practices can be based on measured data and careful analysis.

4.5 Summary of Benefits of CVISN to Motor Carriers

The benefits to motor carriers of implementing CVISN Level 1 include:

- Reduced administrative burden in regulatory compliance.
  - Electronic credentials application and electronic tax filing
  - Electronic access to credentials, tax, and safety data.
- Vehicles of safe and legal carriers will incur less delay.
  - Mainline electronic screening
  - Automated inspections
  - Automated international border crossing.
- Uniformity of credentialing and electronic screening services across North America.
- Reduced numbers of illegal and unsafe carriers, providing a “level playing field” for competition.

4.6 Summary of Benefits of CVISN to Shippers

The benefits to shippers as a result of doing business in states and with motor carriers that have implemented CVISN Level 1 include:

- Improved motor carrier safety
- More efficient and effective motor carriers
- Fewer delays and more predictable schedules
- Improved access to motor carrier safety information.

5 What is the Plan for National Deployment of CVISN Level 1?

The United States Congress passed the Transportation Equity Act for the 21st Century (TEA-21) into law in June of 1998. TEA-21 establishes the direction of the Intelligent Transportation Systems (ITS) Program through 2003. It requires that ITS projects funded from the Highway Trust Fund must be consistent with the National ITS Architecture and applicable standards. It sets a goal of nationwide deployment of the Commercial Vehicle Information Systems and Networks (CVISN) Level 1 capabilities in a majority of the states by September 30, 2003. The Federal Motor Carrier Safety Administration (FMCSA) has committed to provide all interested states the ITS/Commercial Vehicle Operations (CVO) architecture and standards, training, workshops, documentation, and other guidance necessary to achieve this goal.

5.1 What is the FMCSA Deployment Strategy for CVISN Level 1?

The FHWA (now FMCSA) established a National Deployment Strategy for CVISN capabilities in 1994. Although the details of the plan have evolved since, the major elements have not changed. As shown in Figure 5-1, the strategy consists of five major steps with a parallel mainstreaming effort.

❶ The first step developed the management (plans) and technical (architecture) frameworks necessary to coordinate the subsequent phases. This step established an essential foundation for achieving national interoperability.

❷ The second step was to prototype the technology in an integrated way in two Prototype States (Maryland and Virginia) to demonstrate operational concepts and validate requirements.

❸ The third step was to pilot the approach in eight additional Pilot States (California, Connecticut, Colorado, Kentucky, Michigan, Minnesota, Oregon, and Washington). This allowed testing and evaluating in a program of manageable size before proceeding to widespread deployment. The Prototype and Pilot State Initiatives are sometimes referred to collectively as the CVISN Model Deployment Initiative (MDI). As the projects have proceeded, the Prototype and Pilot efforts have merged into one effort. A few of the states are scheduled to complete the CVISN Level 1 deployment in 2000, the majority in 2001, and some will finish later. Schedules have slipped from original plans due to federal funding delays, year 2000 (Y2K) issues and long procurement cycles.

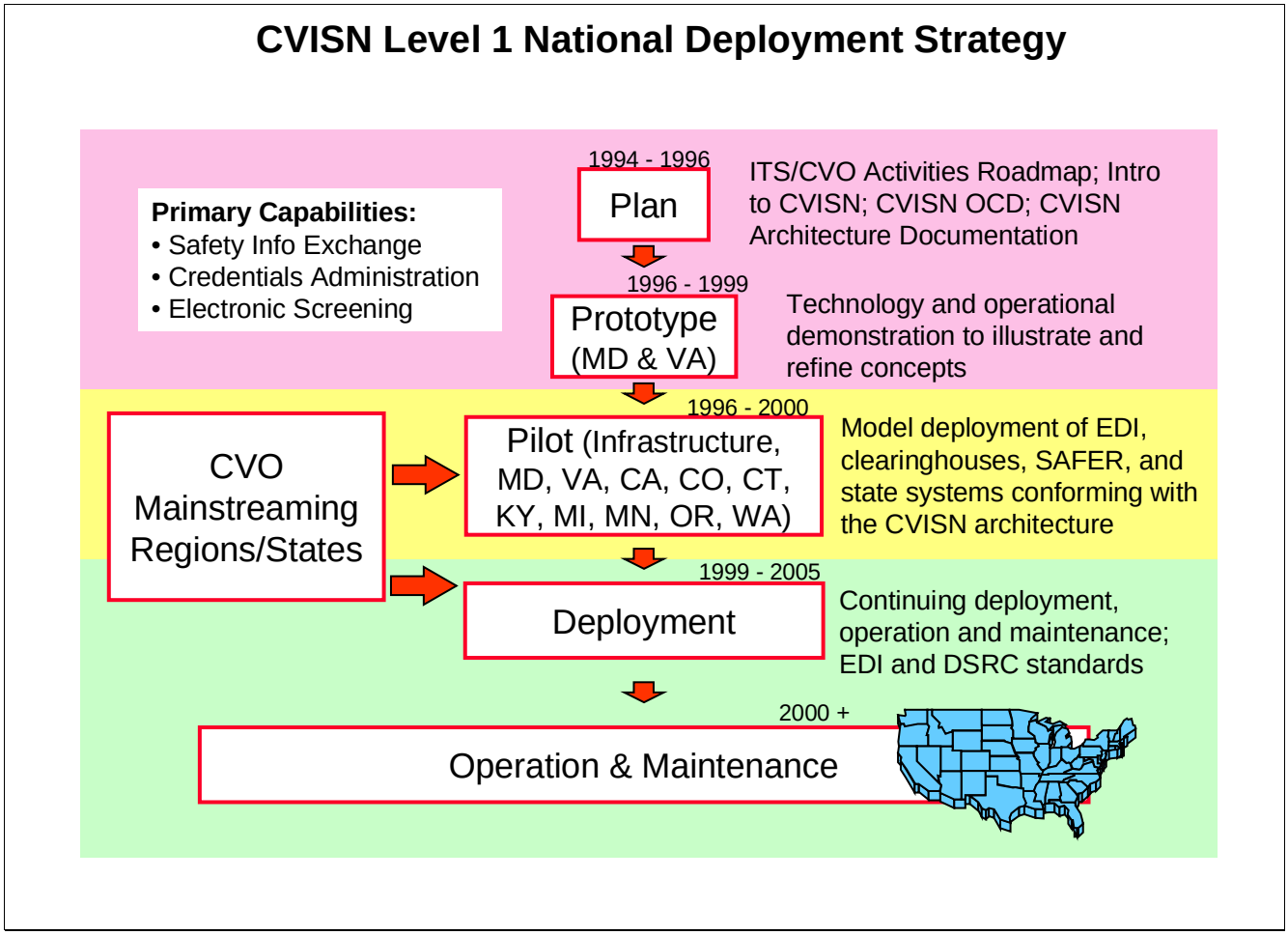


Figure 5-1 CVISN Level 1 National Deployment Strategy

❹ The fourth step will expand the program scope from the model deployment states to all interested states. Currently, the concepts, technology, costs and benefits are well understood, providing a good experience base for the next group of states. Congress has established a goal of deployment of CVISN Level 1 to a majority of states by September of 2003. It is expected that deployment will continue beyond that date and through 2005 as a final group of states work to complete deployment.

❺ The last step is operation and maintenance. Some of the model deployment states will enter this step in 2000. Having deployed CVISN Level 1 capabilities, their efforts will turn to operating and maintaining the systems that provide these capabilities, deploying to additional sites and carriers, as well as working to expand into additional capabilities (Level 2 and beyond).

5.2 What are the Elements of the ITS/CVO Program?

The purpose of the ITS/CVO Program is to foster the development and implementation of technology designed to assist trucks and buses in moving safely and freely throughout North America. The ITS/CVO Program encompasses many parts including:

- CVISN Program (discussed in Subsection 5.3)
- International Border Clearance (IBC) Project (outside the scope of this guide)
- ITS/CVO Mainstreaming (discussed in Subsection 5.4)
- ITS/CVO Training (discussed in Chapter 8)
- Various operational tests and small studies (outside the scope of this guide).

There are also ITS activities related to commercial vehicles in some elements of the Intelligent Vehicle Initiative (IVI), a newer program aimed at the vehicle portion of ITS. The IVI will include integration of commercial vehicle onboard systems to significantly improve safety.

5.3 What are the Elements of the CVISN Program?

The **CVISN Program** is a component of the ITS/CVO Program. It currently consists of five primary parts:

- CVISN Architecture and Standards Project
- CVISN Model Deployment Initiative (a.k.a., Prototype and Pilot Programs)
- Dedicated Short Range Communication (DSRC) Standards Demonstration Project
- CVISN Interoperability Test Project
- CVISN Deployment Workshops (discussed in Chapter 8).

CVISN Architecture and Standards Project – This project developed the CVISN operational concepts and CVISN architecture and refined them through the design stage. It established electronic data interchange (EDI) interface standards through the American National Standards Institute (ANSI) to promote information exchange through common open interfaces. It developed and will maintain the CVISN technical guides. It continues to feed back lessons learned from model deployment projects and standards efforts into the architecture design.

CVISN Model Deployment Initiative – The CVISN Model Deployment Initiative contains two elements:

- *CVISN Prototype Program:* started demonstrating CVISN in Maryland and Virginia in 1996 to verify the operational concepts, architecture, design, standards, deployment methodology, and interoperability tests.
- *CVISN Pilot Program:* started the model deployment of CVISN in California, Colorado, Connecticut, Kentucky, Michigan, Minnesota, Oregon, and Washington in 1996 to put CVISN operational concepts, designs, standards, methods, and interoperability testing into practice. (Note: Washington and Oregon formed a single team in this effort.)

DSRC Standards Demonstration Project – The DSRC Standards Demonstration Project involves several activities that are intended to expedite development and adoption of new DSRC standards to enable geographic and functional interoperability. Activities include:

- Working with standards development organizations (SDOs) such as the Institute of Electrical and Electronics Engineers (IEEE) and American Society of Testing and Materials (ASTM) to develop DSRC physical, data link, and message set standards.
- Prototyping the new DSRC standards in operational settings.
- Developing a migration strategy for moving to the new standards.
- Developing a set of interoperability tests to verify that systems have implemented the interoperability aspects of the DSRC standards correctly.

CVISN Interoperability Test Project – This project is developing a set of standardized test suites to test selected, critical aspects of interoperability. (Please see Chapter 7 for further information.)

5.4 What was the ITS/CVO Mainstreaming Program?

Mainstreaming was a highly successful FHWA initiative designed to foster and support ITS/CVO deployment and to communicate the program to all stakeholders. The Mainstreaming Program objectives were to:

- Incorporate ITS/CVO into state and metropolitan transportation planning.
- Coordinate ITS/CVO activities among agencies and states.
- Explain the ITS/CVO program to key decision makers.

Mainstreaming has occurred at three levels: state, regional, and national. Coordination is necessary at the state level because the states have the power and responsibility for building, maintaining and operating highways and regulating the motor carriers that use them. Coordination is required at the regional level because most trucks operate within a region (a.k.a., truckshed). Coordination at the national level ensures uniformity of services for interregional and national motor carriers.

The Mainstreaming Program evolved from an earlier ITS/CVO Institutional Issues Study. The Institutional Issues Study encouraged states to work together to identify issues with ITS/CVO and barriers to its implementation. The results from these studies were published in a series of reports in the mid 1990's. The approach of the Mainstreaming Program was to establish regional lead states to coordinate and promote ITS/CVO deployment in regional "trucksheds." A lead state was chosen from each of four regions. The lead states promoted the development of policies, plans and agreements that would expedite regional deployment of CVISN. They conducted regional forums a few times a year. These forums provided an opportunity for states to share plans, lessons learned and benefits related to their experiences in deploying ITS/CVO. The lead states encouraged each state to develop a State ITS/CVO Business Plan. They each established an ITS/CVO Regional Coordination Plan.

The lead states provided one or more ITS/CVO specialists, who were sometimes referred to as "ITS/CVO champions." These folks were skilled professionals experienced in CVO and worked with a group of states to promote and coordinate the application of ITS to CVO. The role of the champions was to participate in planning meetings, disseminate information, and organize forums. They now also serve as trainers for delivering the ITS/CVO courses and provide facilitation support at ITS/CVO Deployment Workshops. The champion role has in fact evolved

to that of a CVISN State Advisor (CSA). The CSA is a CVO professional who can provide a mix of advocacy, facilitation, training, and technical consulting services to states.

To date, 40 states have participated in the ITS/CVO Mainstreaming Program. The focus has been on encouraging process improvement and application of ITS/CVO technologies, in particular deployment of CVISN Level 1 capabilities. The majority of these states have completed the development of their State ITS/CVO Business Plans. All Regional ITS/CVO Coordination Plans have also been completed. See Figure 5-2 for a detailed description.

The ITS/CVO Mainstreaming Program is now wrapping up. Most states are shifting from high-level business planning to CVISN Level 1 deployment. The FMCSA has defined a process that it recommends for states to follow in CVISN deployment. This process includes a series of trainings and workshops sponsored by the FMCSA. Chapters 6 through 9 provide the details of this process.

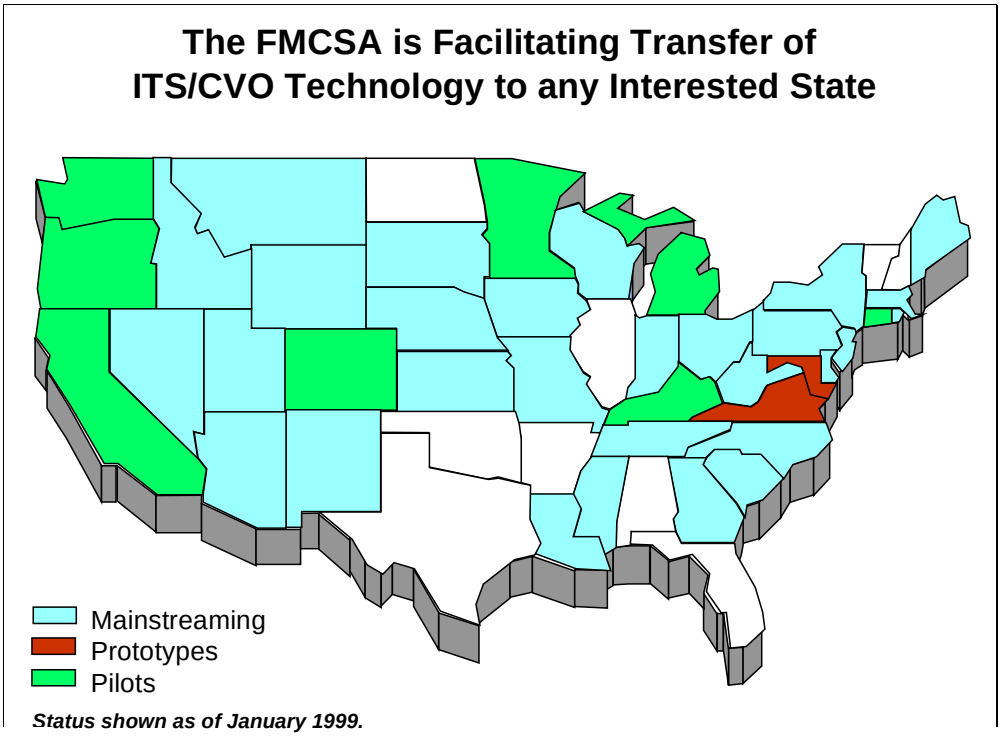
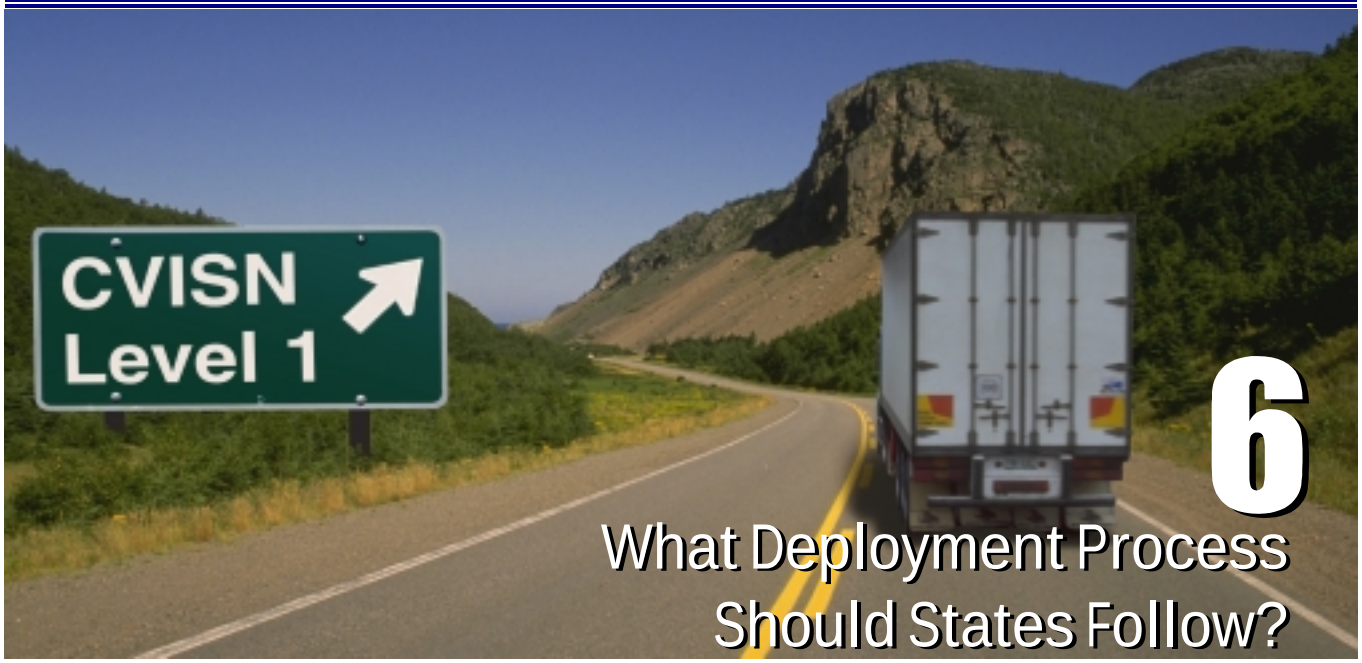


Figure 5-2 Transfer of ITS/CVO Technology to Interested States



6 What Deployment Process Should States Follow?

Commercial Vehicle Information Systems and Networks (CVISN) Level 1 includes three types of systems: national systems, state systems, and carrier systems. The national systems include Motor Carrier Management Information System (MCMIS), Safety and Fitness Electronic Records (SAFER), the International Registration Plan (IRP) Clearinghouse, and the International Fuel Tax Agreement (IFTA) Clearinghouse. These systems have all been deployed and are in some early stage of operation. State systems are being deployed one state at a time. As part of each state's deployment, it will partner with a limited number of carriers. After the state's systems have been proven with a few carriers, it is anticipated that many other carriers will begin to deploy their systems. Figure 6-1 shows a recommended process for states to use.

The Federal Motor Carrier Safety Administration (FMCSA) strongly recommends that Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) project teams use the process shown in Figure 6-1 to minimize risk and achieve conformance with the ITS National Architecture.

The recommended state deployment strategy for CVISN Level 1 consists of three key steps: Planning, Design, and Implementation and Deployment.

Planning – This step includes participation in two ITS/CVO training courses and the development of an ITS/CVO State Business Plan. These elements promote ITS/CVO awareness and are essential to effective coalition building among the state agencies involved in CVO and with industry.

Design – The purpose of this step is to permit the state to establish its CVISN program team, including at a minimum a CVISN program manager and a system architect. Once these individuals have been selected, a state can participate in the "Understanding ITS/CVO Technology" training course and in three CVISN Deployment Workshops. These activities will assist the state in developing its CVISN Program Plan and Top-Level Design.

Implementation and Deployment – In the final step (actually a series of steps or phases), states buy or build subsystems and integrate them into their operations to achieve deployment of CVISN Level 1 capabilities.

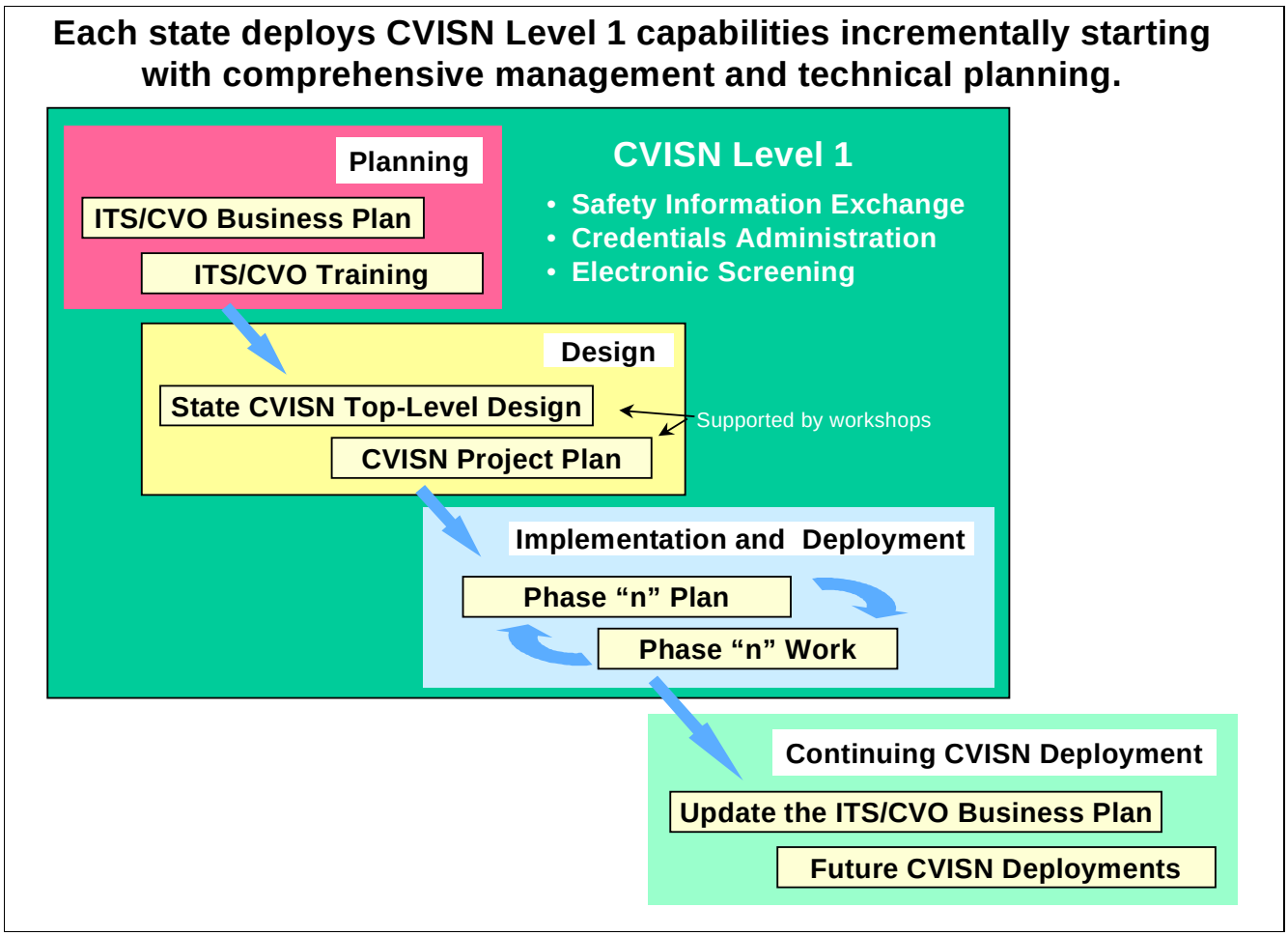


Figure 6-1 Recommended State Deployment Process for CVISN

The recommended Level 1 deployment process is intended to build on the CVISN Prototype and Pilot experience. An extensive set of technical documentation is available from the prototype and pilot programs. The workshops encourage the use of the system development approach used by the model deployment states. Several vendor products are now available as commercial off-the-shelf items (although modifications will likely be required in each state). The evaluation results and operational experience gained by the prototypes and pilots can also greatly benefit subsequent states.

It is anticipated that states will continue to deploy CVISN additional capabilities after the Level 1 deployment. These could include deploying to more sites, deploying to more carriers, or adding more capabilities.

In summary, this process is to:

- Complete a Business Plan that encompasses all ITS/CVO activities in the state or region.
- Attend the ITS/CVO technical training courses sponsored by FMCSA.
- Attend a series of CVISN Deployment Workshops designed to assure architecture conformance and interoperability of deployed systems.
- Complete a Program Plan that encompasses all CVISN projects or efforts in the state or region.
- Complete a System Design that describes the top-level design for all planned changes or additions to CVISN-related systems or products.

- Develop or modify systems to implement the design.
- Integrate systems into a "system of systems" and test to ensure that they work.
- Include CVISN standard interoperability tests as part of the integration and test effort to verify architectural compatibility.
- Follow the ITS/CVO Architecture Conformance Assurance Process.
- Develop and/or follow technical use agreements to ensure interoperability at the operational and programmatic levels.

6.1 ITS/CVO Business Plan

The FMCSA (formerly FHWA) has been carrying out its ITS/CVO Mainstreaming Program for several years. A key element of this program is for each participating state to complete an ITS/CVO Business Plan. Forty states have either completed or are currently working on their plans. This plan embodies a state's vision for CVO over the next 3 to 5 years. The objectives, recommendations, and common issues states encounter are described in Table 6-1.

Table 6-1 ITS/CVO Business Plan Guidelines

The objectives of the state business plans are to:
▪ Establish an ongoing CVO planning process. ▪ Promote public/private partnerships. ▪ Provide justification for obtaining ITS/CVO funding. ▪ Guide the integration of new ITS/CVO technologies. ▪ Establish public/private forums with broad membership to enable ongoing planning, issue identification, and issue resolution.
It is recommended that each plan include:
▪ Goals and Objectives (*Why?*) ▪ Projects (*What? Where?*) ▪ Technical Approach (*How?*) ▪ Organizations and Management (W*ho?*) ▪ Schedules and Milestones (*When?*) ▪ Funding (*How much?*).
Common issues States encounter:
The plan should specifically address any issues important to the state. Some of these will be state specific, but some common ones encountered are: ▪ *Data Security:* How can the state ensure adequate data privacy and integrity? ▪ *Interoperability:* How can the state ensure that its systems are interoperable with national systems, carrier systems, and other states' systems? ▪ *Process Changes:* What business processes should be changed to improve effectiveness and efficiency? ▪ *Policy Changes:* What changes in policy are necessary to enable process and system improvements? ▪ *Institutional Barriers:* What institutional barriers must be overcome to enable process and system change? How can this be done? ▪ *Expertise:* What process and systems expertise exists and what must be borrowed or acquired? ▪ *Build vs. Buy:* Which software packages should be purchased as commercial off-the-shelf and which must be custom developed by in-house staff or contractors? ▪ *System Integration:* How will new systems be integrated with existing (legacy) systems into a well integrated "system of systems"? ▪ *Testing:* How can a state establish a comprehensive test program to ensure that systems work as required?

Why is the ITS/CVO Business Plan So Important?

The plan will lay the framework for CVO projects over the next 3 to 5 years**. It will define the major projects to be undertaken.** These may include projects to change policies, improve business processes and construct facilities (e.g., weigh station upgrades) as well as technical, system development projects.

6.2 ITS/CVO Working Group

A side effect from **the planning process may in fact be more important than the plan itself.** A working group of stakeholders representing all the state CVO agencies develops the plan. Several representatives of the motor carrier industry are included. An FHWA Division Office representative is also included. This may be the first time that these folks have worked together. It may be the first time that state officials see how the motor carrier community views the state. It will broaden people's perspective and give them a means to work with others in their state to address issues of common concern. See Figure 6-2 for a detailed description.

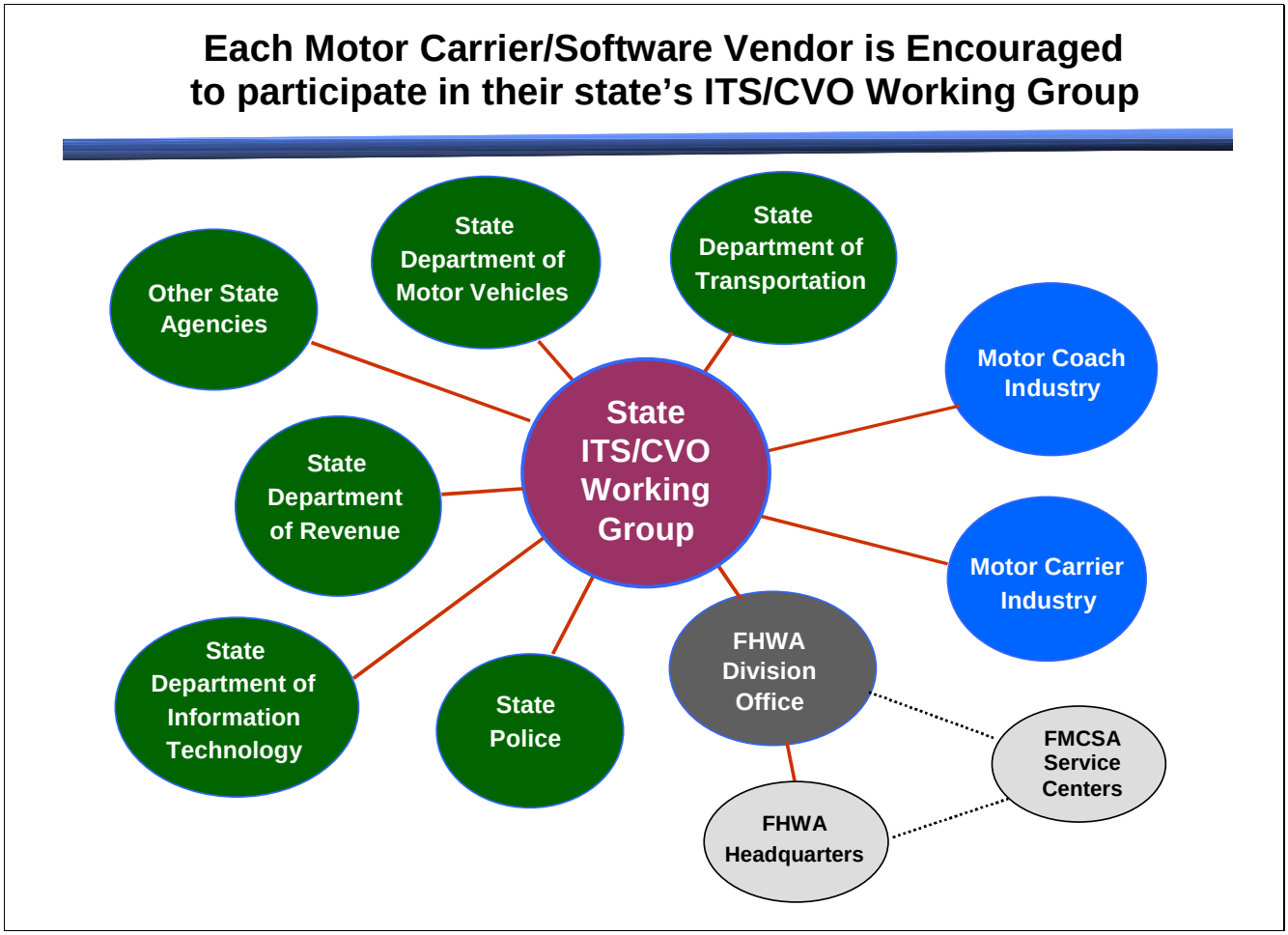


Figure 6-2 State ITS/CVO Working Group

6.3 ITS/CVO Training

The FMCSA has sponsored development and delivery of a series of three technical training courses for the states. These technical training courses are described in Table 6-2.

Table 6-2 ITS/CVO Technical Training

Course Title and Description	Length of Course
Introduction to ITS/CVO – provides an overview of the ITS/CVO program's purpose, structure, components, current and future implementation, and technology.	1½ days
ITS/CVO Technical Project Management for Nontechnical Managers – emphasizes skills development for managing the design and implementation of ITS/CVO technology.	2 days
Understanding ITS/CVO Technology Applications – provides an overview of the CVISN architecture, technology, and standards, and how to apply them to ITS/CVO.	2 days

The training courses are designed to build awareness of and commitment to ITS/CVO deployment among the states. They are offered on an ongoing, as-needed basis. They include a mix of lectures, exercises, and case studies. The target audience includes state managerial staff, FMCSA field staff, and industry representatives.

6.4 CVISN Deployment Workshops

The CVISN Deployment Workshops are a series of three workshops to assist states in implementing the CVISN Level 1 Capability. At the workshops, the states will develop preliminary products necessary to prepare for CVISN deployment. These products include a preliminary CVISN Program Plan and a top-level system design.

It is critical that the state CVISN Program Manager, CVISN System Architect, and CVISN team members from each state agency attend the workshops as a team.

It is anticipated that the series will include Scope, Planning, and Design Workshops as described in Table 6-3.

Table 6-3 CVISN Deployment Workshops

Workshop Title and Description	Length of Course
Scope Workshop – will produce a preliminary CVISN top-level system design. This design will include a project scope, state system design templates, and initial operational scenarios.	3 to 4 days
Planning Workshop – will produce a preliminary CVISN Program Plan. This Program Plan will include a work breakdown structure, performance milestones, organizational responsibilities, and schedule for Phase 1 (see Subsection 6.7).	3 to 4 days
Design Workshop – will review and provide feedback on an updated top-level design. This design will be developed as the product of detailed analysis and design efforts by the state subsequent to the Scope Workshop.	3 to 4 days

Why Should a State Participate in the Workshops?

There are several important reasons that a state should participate in these workshops:

- The workshops are a **proven process** that has worked successfully for the CVISN Prototype and Pilot States. The workshop content has been refined based on feedback from this initial group of 10 states.
- The workshops will provide **an opportunity to learn from the experience of the Prototype and Pilot States**. These lessons learned may help new CVISN states save time and money by avoiding mistakes and maximizing their ITS/CVO investments. The designs and program plans used by these states will be part of the workshop materials. In addition, representatives of several states will be available as a resource during the workshops.

- The workshops will provide states with the **tools** to move toward their ITS/CVO and CVISN deployment goals. The Program Plan and top-level system design will provide a blueprint for future systems development and implementation in a manner that is consistent with the National ITS Architecture and applicable standards. The Program Plan will provide estimates of staffing requirements, costs, and technical needs that will guide states in obtaining and allocating necessary resources to ensure effective implementation.

- The workshops will emphasize **consistency with the National ITS Architecture**. Section 5206 of the Transportation Equity Act of the 21st Century (TEA-21) requires that all ITS projects funded from the Highway Trust Fund, including congressionally designated projects, must be consistent with the National ITS Architecture and applicable standards.

6.5 State CVISN System Design

The State CVISN System Design should identify system requirements, software requirements, interface requirements, and top-level design of the system hardware, software, and networks. Typically, the state's system design description will include tables, diagrams, and text that identify top-level requirements, design elements, and interface standards.

6.6 State CVISN Program Plan

The State CVISN Program Plan is the logical next step for states that have completed their ITS/CVO Business Plan. The business plans have a strategic focus, and define program goals and projects at a conceptual level. The program and project plans have a technical focus, and define the state information system design. Other important differences between the Business Plans and Program Plans are indicated in Table 6-4.

Table 6-4 ITS/CVO Business Plan and CVISN Program Plan Descriptions

Planning Horizon	*ITS/CVO Business Plan*	A medium- to long-term planning horizon of 3 years or more.
	CVISN Program Plan	A short-term planning horizon of less than 3 years.
Scope	*ITS/CVO Business Plan*	The broad application of ITS technologies to CVO in the areas of safety assurance, credentials administration, roadside screening, and carrier operations.
	CVISN Program Plan	Information systems and networks that are related to implementing CVISN Level 1 capabilities in the areas of safety information exchange, electronic credentialing, and electronic screening.
Content	*ITS/CVO Business Plan*	Describes projects at a conceptual level, including general approaches and organizational responsibilities, relative priorities, approximate duration, and order-of-magnitude cost estimates.
	CVISN Program Plan	Includes specific work assignments, phases, schedules, and budgets. (Per-project details are provided in the state project plan.)

6.7 Obtaining Deployment Funding

The workshops result in two accomplishments: an effective working group with a common understanding and objectives and a comprehensive State CVISN Program Plan. Both of these will be essential for the next step for a successful deployment.

Recall that the FMCSA recommends a three-step deployment process: planning, design, and implementation and deployment. The maximum amount of Federal ITS Funds to be made available for all three phases is $3 million. This represents the 50 percent ITS Federal share of the estimated $6 million total cost. (The estimate is based on the plans and

experience of the CVISN Pilot States.) The planning step is estimated to require $50,000 of Federal ITS Funds. The design step is estimated to require $350,000 of Federal ITS Funds.

Some states will have obtained full funding prior to the workshops or during the workshops from state or congressionally designated funds. Other states will need to use the State CVISN Program Plan produced by the workshops as a justification for obtaining adequate funding to support the CVISN Level 1 deployment program. When this is the case, the working group must:

- Identify potential sources of funding, including public/private partnerships.
- Prepare "proposals" (presentations, applications, proposals, etc.) as needed by each targeted funding source.
- Use the working group as an advocacy team to build consensus for the plan among state legislature and executive agencies, the motor carrier industry, and other stakeholders.

Table 6-5 Sources of Deployment Funding

Federal Sources
▪ ITS/CVO deployment incentive funding ▪ Congressionally designated ITS projects ▪ Motor Carrier Safety Assistance Program (MCSAP) ▪ Performance and Registration Information Systems Management (PRISM) ▪ Federal-aid highway programs ▪ New TEA-21 programs (e.g., Borders and Trade Corridors).
State Sources
▪ Legislative appropriations ▪ Agency operating budgets ▪ Pooling (public/private partnerships) ▪ Innovative financing.
Private Sources
▪ User fees ▪ Public/private partnerships.

The *ITS/CVO Funding Strategies for States* [Cambridge Systematics Inc., 1998] provides a report on potential funding sources. Some potential sources of funding are listed in Table 6-5.

6.8 Incremental Deployment

Deploying CVISN Level 1 capabilities is a major undertaking that typically takes several years. In order to reduce risk, it is strongly recommended that states use an incremental deployment approach. It is critical that this large program be broken into a series of 3- to 6-month time periods called phases. Specific results or products are defined for each phase. These are defined in detail for each phase just before it begins, and more broadly for subsequent phases. The use of phases allows taking a big job and breaking it into small, manageable pieces. If a state completes the first couple development phases on time and meets all the objectives, this provides assurance that the plan is realistic. If not, it allows the state to revise the plan and take corrective action prior to committing extensive resources to a project that is not properly structured for success. Incremental development and measurable milestones ensure stakeholder participation and feedback and real visibility into program or project progress.

Figure 6-3 shows that the first phase is devoted to developing the state top-level design, preparing the State CVISN Program Plan, establishing full funding for the program, and issuing major contracts for products and technical services. Each subsequent phase is a development phase that results in some type of demonstration or operational capability. More information on phases is provided in the *CVISN Guide to Program and Project Planning* and the *CVISN Guide to Phase Planning and Tracking.*

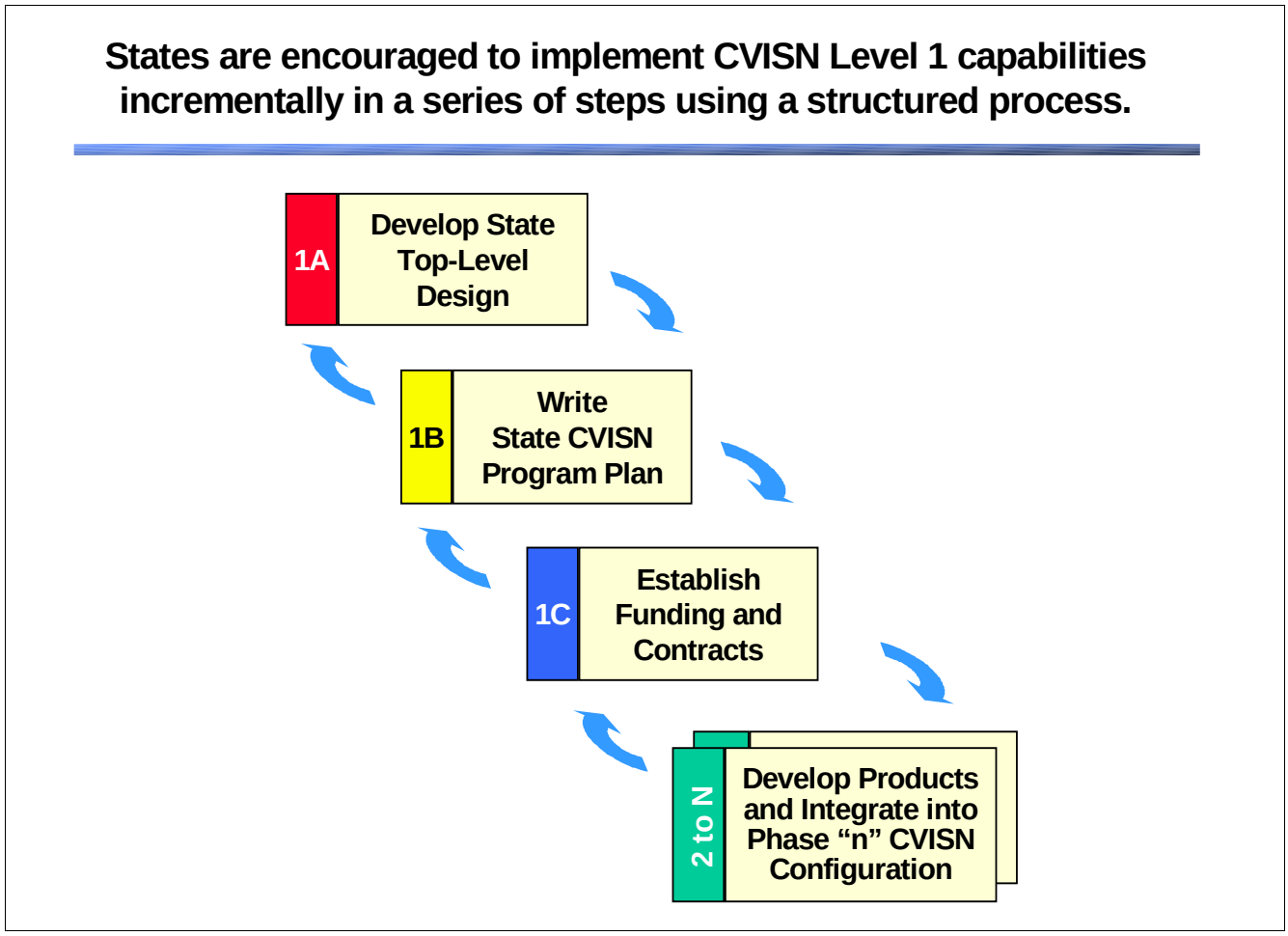


Figure 6-3 CVISN Incremental Deployment Approach

7 How Do States Assure Conformance with the National ITS Architecture?

Most of us have an idea of what is meant by the architecture of a building. It means the overall design of a building, including the structural elements and style. The information technology community uses the term to mean the same thing with respect to information systems.

> ***Architecture***
> *The overall structure (elements and interfaces) and unifying design characteristics (principles, concepts, and standards) of a system.*

7.1 What is the National ITS Architecture?

The Intelligent Transportation Systems (ITS) Program has developed a National ITS Architecture, which was defined and baselined in 1996. ITS has been interpreted to be a "system of systems," and its architecture serves as the master blueprint for ITS to assist in achieving the United States Department of Transportation (USDOT) vision of building a transportation system that is international in reach, intermodal in form, intelligent in character, and inclusive in nature.

The National ITS Architecture is an organized approach to implementing, in a consistent manner across the U.S., the various ITS user services envisioned for the next 20 years or more. It is a framework that lays out the boundaries, players, and strategies for the process of information management. This framework provides guidance in developing standards and making deployment decisions that result in safety, efficiency, economies of scale, and national interoperability. The development of the National ITS Architecture was a 3-year effort and was the first step toward achieving the vision Congress put forth for ITS in 1991; a vision of a seamless, multimodal, national intelligent transportation system that would have a consistent personality across this country.

The National ITS Architecture is comprised of several "subsystems" that are components of the overall ITS. Commercial Vehicle Operations (CVO) comprises four of these subsystems, and a more detailed architecture consistent with, and derived from, the National ITS Architecture exists to support it. The ITS/CVO Architecture was developed to

> ***National ITS Architecture***
> *The functions associated with ITS user services; the physical entities or subsystems within which the functions reside; the data interfaces and information flows between physical subsystems; and the communications requirements associated with the information flows.*

provide a technical framework for the development of systems for implementing various ITS/CVO user services that utilize information systems and networks. It is intended to guide implementations throughout all of North America, to foster commercial motor vehicle safety and efficiency across the United States and beyond its borders into Mexico and Canada.

7.2 What is the CVISN Architecture?

The Commercial Vehicle Information Systems and Networks (CVISN) architecture is a framework that serves as guidance for stakeholders in the CVO community to develop information systems, standards, interfaces, and subsystems to support identified user services. These user services are based upon stakeholder needs and requirements, and are an outgrowth of analyzing "operational scenarios" within the commercial motor vehicle environment.

The CVISN architecture is a subset of the National ITS Architecture. Figure 7-1 is a version of the National ITS Architecture's "sausage" diagram that highlights the CVO-unique subsystems with thick borders and shading.

The top-level picture of the CVISN architecture in Figure 7-2 shows the CVO-unique subsystems from the National ITS Architecture, the equipment packages (shown as round-cornered boxes) in those subsystems, the other subsystems and terminators they connect to, and where standards are to be used.

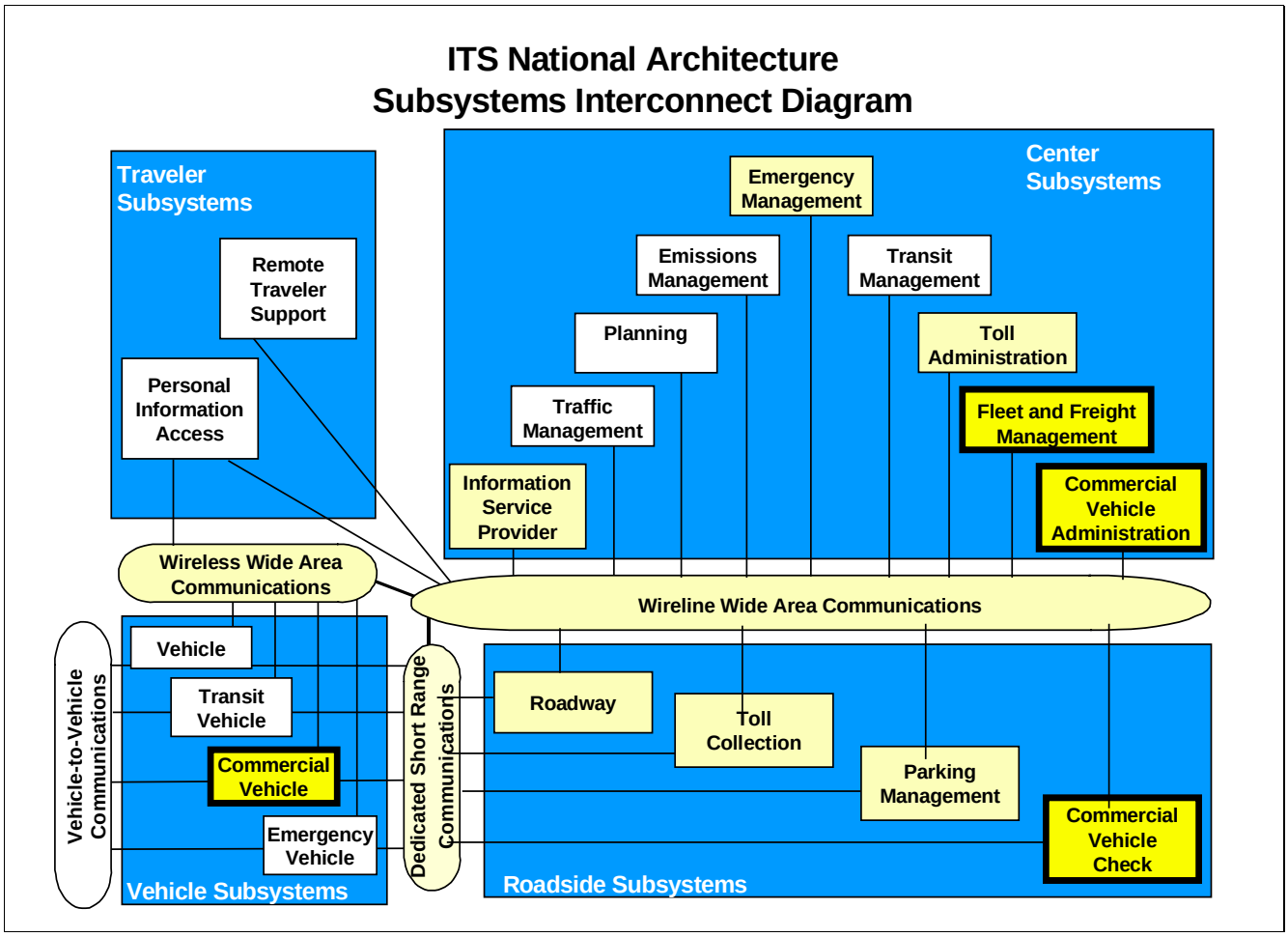


Figure 7-1 ITS National Architecture Subsystems Interconnect Diagram

The CVISN architecture is a concept. It is defined by a set of documentation that describes requirements, standards, operational concepts, notional designs, implementation guidance, and other supporting technical and management information. The architecture defines:

- The functions associated with ITS/CVO user services,
- The physical entities or subsystems within which such functions reside,
- The data interfaces and information flows between physical subsystems, and
- The communications requirements associated with information flows.

The CVISN Architecture is the CVO information systems and networks portion of the National ITS Architecture. The CVISN Architecture documentation begins with the National ITS Architecture and adds more detail in some areas [e.g., operational concepts and the Electronic Data Interchange (EDI) message requirements] to facilitate further development.

Factors that influence the architecture are constantly changing. The needs of motor carriers evolve in response to changes in the marketplace caused by factors such as global competition.

New technologies emerge and old ones become obsolete. Public policy and legislation change. In order to keep the architecture current and useful, the

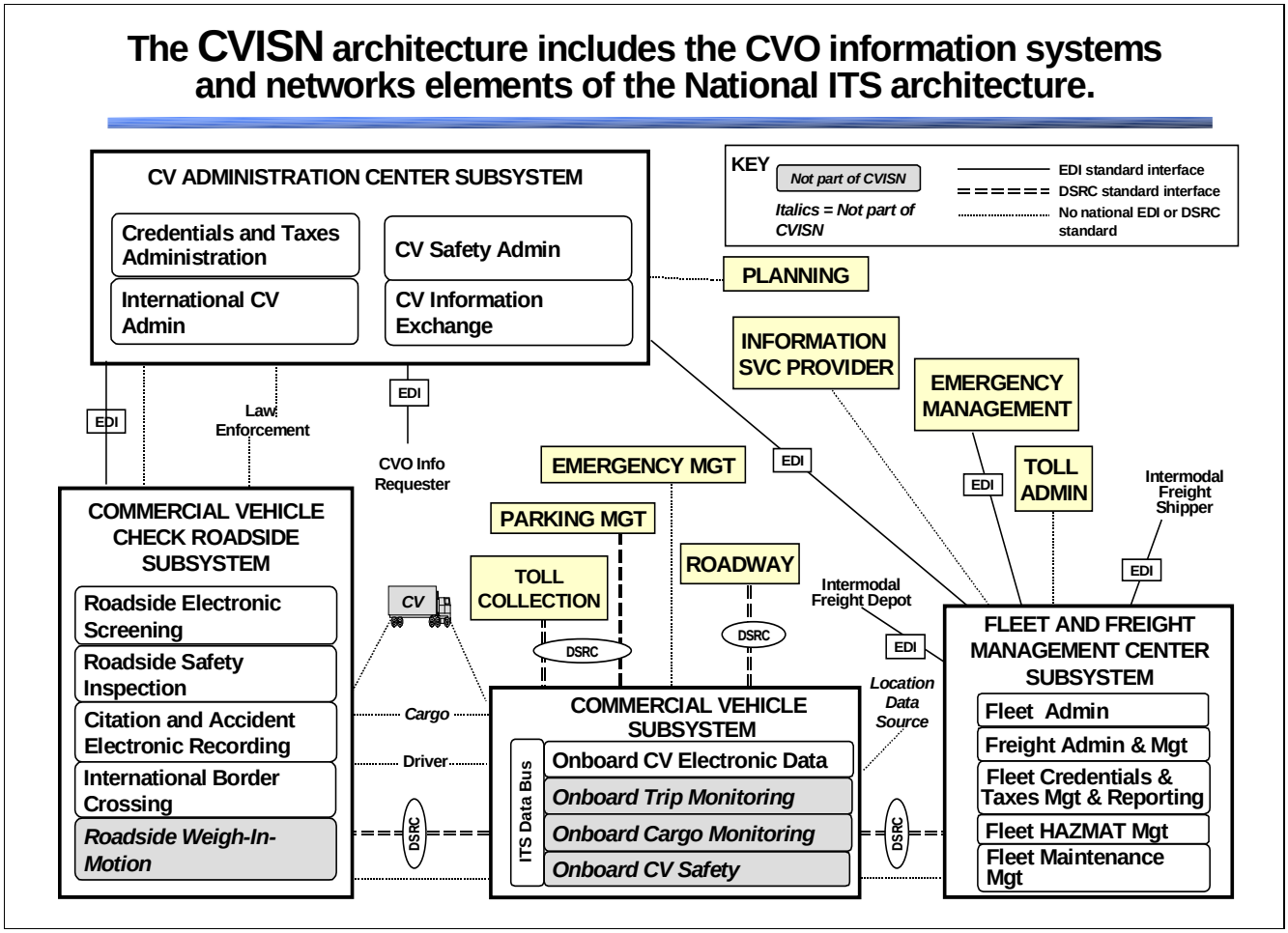


Figure 7-2 CVISN Architecture

Federal Motor Carrier Safety Administration (FMCSA) plans to continue to maintain and enhance the architecture at least through the Level 1 deployment period.

> ***CVISN Architecture***
> *The ITS/CVO information systems and networks portion of the National ITS Architecture. The CVISN Architecture documentation begins with the National ITS Architecture and adds more detail in some areas to facilitate further development.*

7.3 What Does it Mean to "Conform to the Architecture?"

In order to conform to the ITS/CVO Architecture, deployed systems must satisfy a set of conformance criteria. These criteria are defined in the CVISN Operational and Architectural Compatibility Handbook (COACH). The COACH fundamentally requires deployed systems to **adhere to open interface standards, support CVISN operational concepts, and use shared process and data definitions**.

The COACH documents are recommended as a relatively concise set of checklists to assist at various checkpoints. The COACH is divided into five parts as detailed in Table 7-1.

Table 7-1 COACH Parts

Part	Description
Part 1	Operational Concept and Top-Level Design Checklists
Part 2	Program Management Checklists
Part 3	Detailed System Checklists
Part 4	Interface Specification
Part 5	Interoperability Test Criteria

Parts 1, 4 and 5 actually specify conformance requirements. Parts 2 and 3 provide process guidance that is intended to help organize projects and develop designs that lead to conforming systems.

The COACH Part 5 states these requirements in a manner that is specific and testable. An example of a COACH conformance requirement is:

3.1 1. The CAT sends each kind of valid credential application/modification using ANSI ASC X12 EDI transaction set 286.

Conformance can be thought of at three levels: technical, operational, and administrative. A definition and example of each is shown in Table 7-2.

Table 7-2 Levels of COACH Conformance

Conformance Category	Definition	Example
Technical Conformance	Hardware and software products and systems meet specific standards.	▪ A dedicated short range communication (DSRC) tag is certified to meet a particular standard. ▪ A carrier automated transaction (CAT) is certified to pass applicable interoperability tests.
Operational Conformance	Systems and associated operational practices meet specified conformance criteria.	▪ Weigh stations use a common criterion or algorithm for determining which vehicles should be given a "red light" during an electronic screening process. ▪ States follow uniform practices for verification checks on International Registration Plan (IRP) applications.
Administrative Conformance	Programs run by different states follow common policies.	▪ States agree to honor tags provided by other states in the electronic screening program supported by their state. ▪ States agree to make interstate credentialing status data from their systems available to Safety and Fitness Electronic Records (SAFER).

The ITS/CVO architecture specifies several American National Standards Institute (ANSI) Accredited Standards Committee (ASC) X12 EDI, American Society for Testing and Materials (ASTM), and Institute of Electrical and Electronics Engineers (IEEE) interface standards. The standards primarily address the exchange of information between public and private entities. Conforming to the architecture is essentially using these standards to attain technical conformance and supporting common administrative policies and operational practices to achieve operational and administrative conformance. The common operational practices and administrative policies are not precisely defined at this point in time. They are evolving as stakeholders define them through operational practice agreements worked out in stakeholder associations such as American Association of Motor Vehicle Administrators (AAMVA), American Association of State Highway and Transportation Officials (ASHTO), American Trucking Associations (ATA), Commercial Vehicle Safety Alliance (CVSA), International Full Tax Agreement (IFTA), IRP, Institute of Transportation Engineers (ITE), ITS America, National Electrical Manufacturers Association (NEMA), National Private Truck Council (NPTC) and others.

7.4 What are the Benefits of Conformance to the Architecture?

The primary goal of the architecture is to allow stakeholders to achieve geographic and functional interoperability of some ITS/CVO systems (e.g., credentialing software) and interchangeability of some CVISN systems (e.g., DSRC tags). Interoperability refers to the ability of two or more systems or products to work together to accomplish a shared function. Interchangeability refers to the ability to substitute one product for another. Interoperability and interchangeability allow users to select vendors and promote development of a competitive marketplace. Figure 7-3 shows a hypothetical example of what happens when systems are not interoperable. Suppose that the desired, shared function is to have a roadside system cooperate with a national safety database to determine if a particular vehicle is known to be stolen. Assume that data is stored in a state roadside system according to license plate number. When you want to call up the safety history of a vehicle, you need to know the license plate number with this state system. On the other hand, the information in a national database of stolen vehicle information may be stored and retrieved based on the vehicle identification number (VIN). So even though both systems have information on the same vehicle, they are not interoperable because they cannot work together to accomplish the task of finding out if a vehicle is stolen. They could be made to be interoperable if they adopted a common identifier for storing and retrieving vehicle information, such as the VIN.

Although the primary goal of conformance to the architecture is to support interoperability and interchangeability, there are other benefits:

- The architecture provides a framework for **planning**.
- It identifies where **standard interfaces** are required.
- The architecture allows customers to specify the technical characteristics of procured systems necessary for interoperability.
- It provides detailed specifications to allow them to **implement and test** that interoperability characteristics have been achieved.
- It provides a framework for states to develop **operational practice agreements** that lead to administrative process uniformity and system interoperability.
- The architecture supports **market development** by providing a framework for states and motor carriers to identify common needs, thereby creating a market large enough to support investment by system integration contractors, product vendors, and service providers.

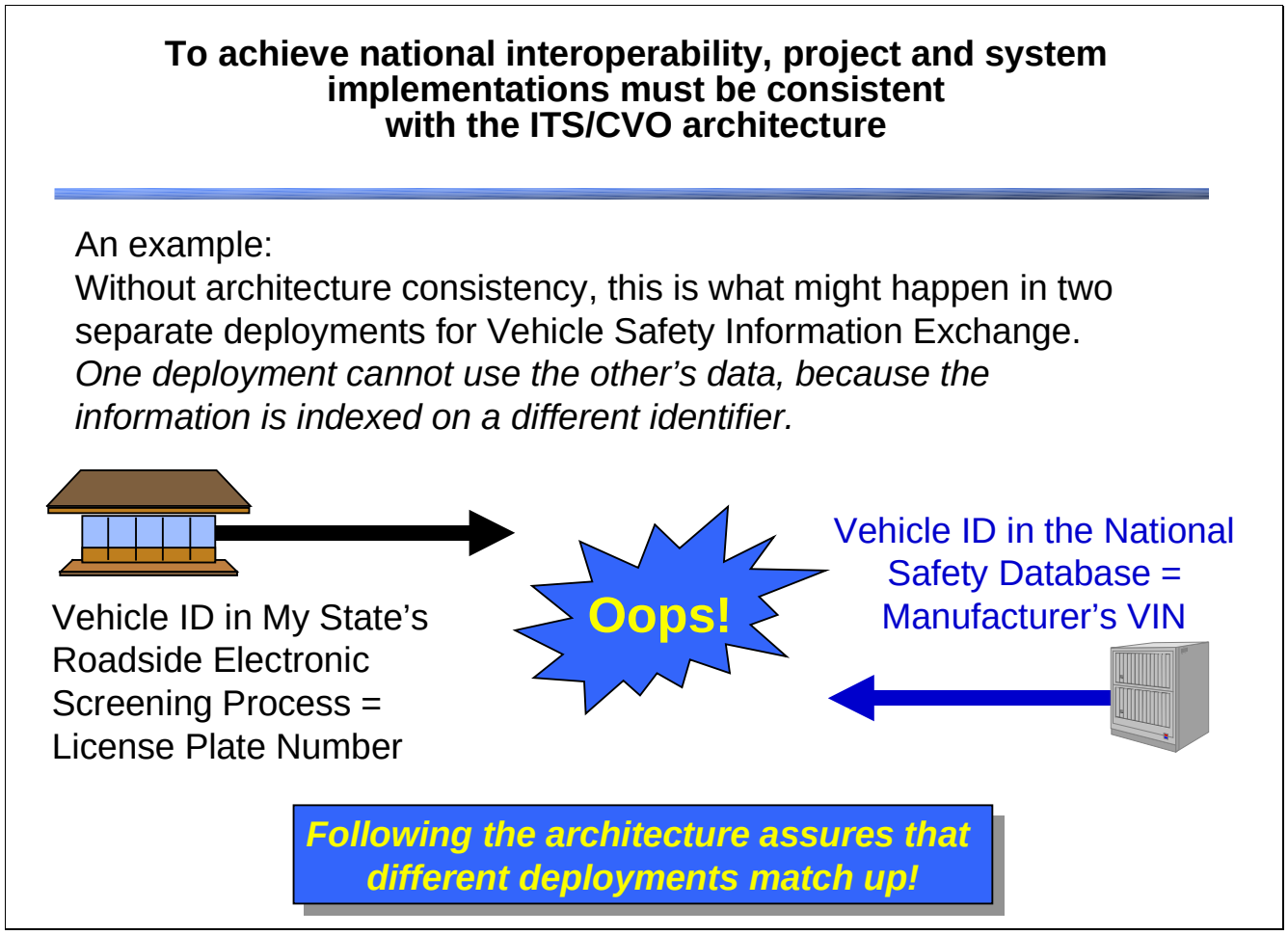


Figure 7-3 Achieving National Interoperability

7.5 Are States Required to Conform to the Architecture?

Participation in the CVISN Program is voluntary for states and carriers. However, if a state chooses to participate and to use Federal funds, some conditions apply. The U.S. Congress has mandated that the implementation of ITS using funds authorized by the Transportation Equity Act for the 21st Century (TEA-21) must be in conformance with the National ITS Architecture and Standards. The FHWA issued more specific, interim guidance in the fall of 1998.

The interim guidance will be in place as a rulemaking process proceeds. This will apply to any ITS project receiving any funding from the Highway Trust Fund. (If a project is under construction or has completed final design as of October 2, 1998, it is exempt and other exemptions will be considered.)

In the summer of 2000, the FHWA plans to issue a Notice of Proposed Rulemaking (NPRM) to begin the process of defining the conformance requirements for recipients of funds. The final NPRM has not been determined. The ITS/CVO stakeholder community currently seems to support the idea that the USDOT should require the use of USDOT-adopted standards and interoperability tests for ITS/CVO projects that are recipients of Federal Highway Trust Funds (see section of TEA-21 5206, subparagraph e). Some potential required conditions on recipients are under consideration. See Table 7-3 for Architecture Conditions and Conformance.

7.6 What Process is Recommended to Ensure Conformance?

The FMCSA has developed a recommended Conformance Assurance Process (CAP) to be used by states. It defines evaluation criteria for ITS/CVO architectural conformity, and establishes a mechanism for fostering conformance in a deployment. The CAP recommends that each ITS/CVO project have a plan that will consist of an incremental checkpoint system for assessing architecture conformance. At each checkpoint, documents should be submitted to a Conformance Assessment Team (COAT), described in Subsection 7.8, to review the design and to identify issues and potential interoperability problems. During the procedure at each checkpoint, the assessment teams will document and identify any conformance barriers or problems. If problems are discovered, remedial actions will be developed and implemented. Progress toward resolution should be tracked, and action assignments and resolutions should be documented to serve as a monitoring and lessons learned tool for future CVO deployments. The steps of the CAP are summarized in the Table 7-4.

The CAP recommendations are based on lessons learned from early ITS/CVO projects. These processes steer the projects toward architecture conformance, interoperability, and user satisfaction. Each step involves specific activities on the part of the management and development teams and specific completion criteria. The recommended CAP is closely integrated with the overall deployment process as shown in Figure 7-4.

Table 7-3 Architecture Conditions and Conformance

Required Architecture Conditions
The following required conditions on recipients are under consideration for inclusion in the NPRM:
Use the interface standards recommended for ITS/CVO.
Ensure via testing that ITS/CVO systems are technically interoperable at the hardware and systems/software level.
Ensure ITS/CVO systems are interoperable at the operational level.
Ensure ITS/CVO systems are interoperable at the program administration level.
Required Architecture Conformance
The NPRM may possibly also recommend that project teams use these processes to achieve the required architecture conformance:
Complete and maintain a Business Plan that encompasses all ITS/CVO activities in the state or region.
Attend the ITS/CVO technical training courses sponsored by FMCSA.
Attend a series of CVISN Deployment Workshops designed to assure architecture conformance and interoperability of deployed systems.
Complete and maintain a Program Plan that encompasses all CVISN projects or efforts in the state or region.
Complete and maintain a System Design that describes the top-level design for all planned changes or additions to CVISN-related systems or products.
Submit CVISN deployments to standard interoperability tests to verify architectural compatibility.
Follow the ITS/CVO Architecture Conformance Assurance Process.

Table 7-4 Conformance Assurance Process Steps

Phase	Who	Task
Program Initiation	Program Team	The lead agency and stakeholders within the state/consortium should sign a Memorandum of Agreement (MOA). The MOA should commit them to the program and the ITS/CVO objectives as well as to being in conformance with the National ITS architecture and CVISN architecture and standards.
	COAT	Verify that the COACH Part 1 checklists have been completed and reflect commitments to the CVISN architectural and operational concepts.
Top-Level Design	Program Team	The lead agency should follow best program management practices as demonstrated through strategic business planning and CVISN program planning. It should define a top-level design consistent with the ITS/CVO and CVISN architectures.
	COAT	Assess the program plan and project plans and top-level design and verify conformance with the CVISN architecture as specifically defined in COACH Part 2.
Detailed Design	Program Team	Develop an ITS/CVO detailed design that is consistent with appropriate CVISN design features and standards.
	COAT	Assess the detailed design and verify conformance with the CVISN architecture as specifically defined in COACH Part 3 and 4.
Implement	Program Team	Design and develop each subsystem. Integrate each subsystem into a working whole system.
	COAT	No activity.
Test	Program Team	Test for functionality, performance, and interoperability.
	COAT	Assess implemented subsystems and verify conformance with the CVISN architecture (as specifically defined in COACH Part 5) through interoperability testing using standard test cases supported by the FMCSA. Help to tailor tests and analyze results.

7.7 How is Interoperability Testing Done?

Interoperability tests are standardized interface tests. Their purpose is to test if the systems under test are in conformance with the architecture. By checking for conformance with the architecture, interoperability tests are intended to verify that independently developed ITS/CVO systems will work together to accomplish a shared function. The tests are primarily focused on verifying that interfaces are built according either to ANSI ASC X12 EDI standards and Implementation Guides or to ASTM and IEEE standards for DSRC. The tests verify that the systems can use common message formats to exchange data and that the data has the same meaning to all (e.g., a particular status bit set means “IRP application accepted”). They also verify that the systems exchange sequences of messages as required to carry out some overall function (e.g., IRP registration application, processing, invoicing, and payment).

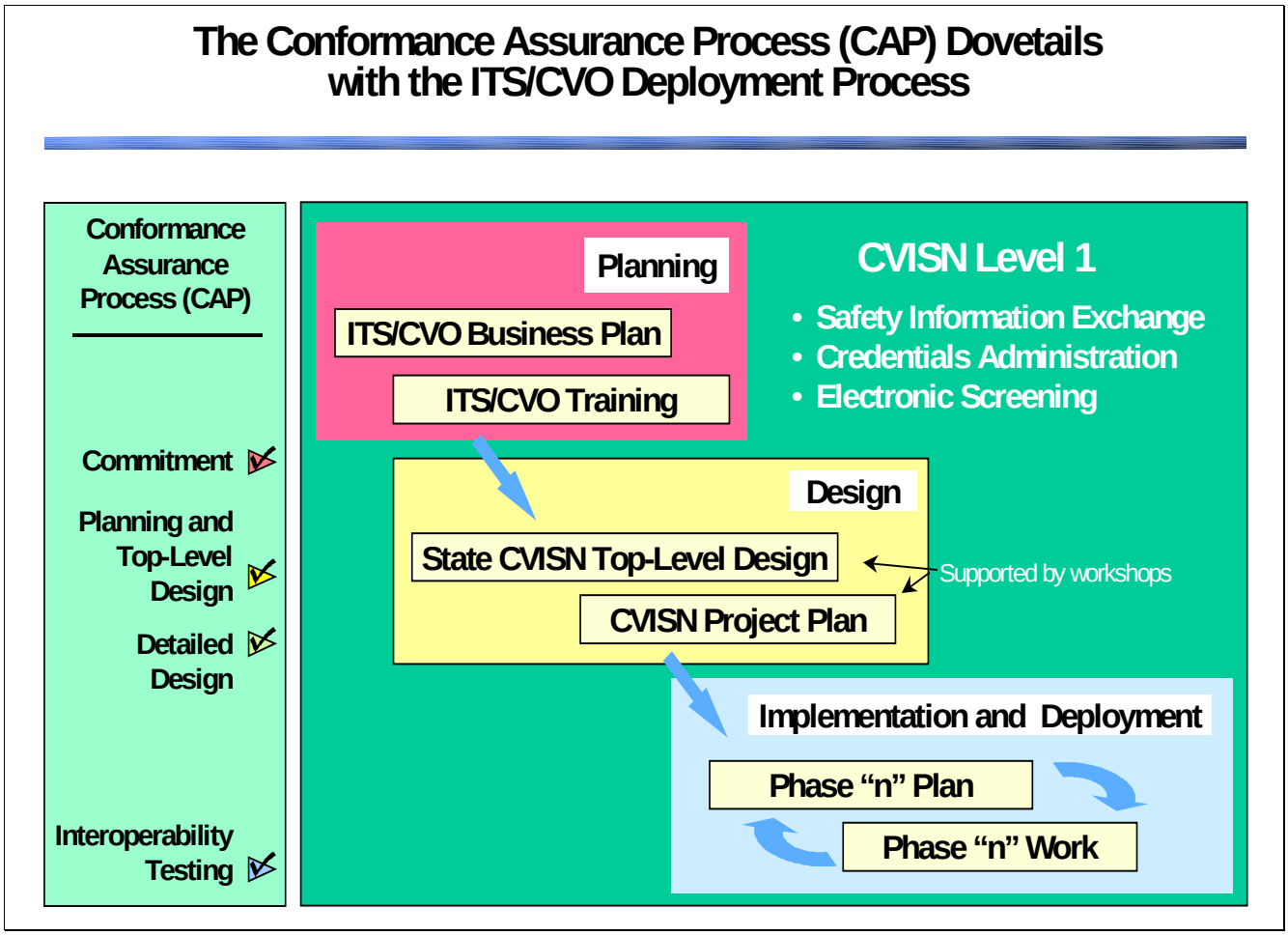


Figure 7-4 CAP Dovetails with ITS/CVO Deployment Process

The interoperability tests are developed once and then used by many jurisdictions. They can be used during initial system development and for regression testing (repeating tests previously passed by earlier system versions) as systems are updated. Executing the interoperability tests is the final part of the conformance assurance process.

There are two types of interoperability tests: **pair-wise** and **end-to-end**. Pair-wise tests verify that interfaces between selected pairs of products or systems meet the applicable standards. End-to-end tests verify data flow and data usage among all required products or systems from initial input through final outcome.

Figure 7-5 shows an example of a pair-wise test. The system under test is a CAT system. A standardized test suite package has been developed for this test. A CVISN Test Facility has been established at The John Hopkins University/Applied Physics Laboratory (JHU/APL) that can be used to support test execution. The carrier can follow the procedures provided in the test suite package and use the test data provided there to submit EDI transactions to the test facility, just as it would to a state system. The test facility will respond to the transactions just as a state system should. This allows the motor carrier (or their vendor) to test the CAT software against a known system that conforms to the architecture.

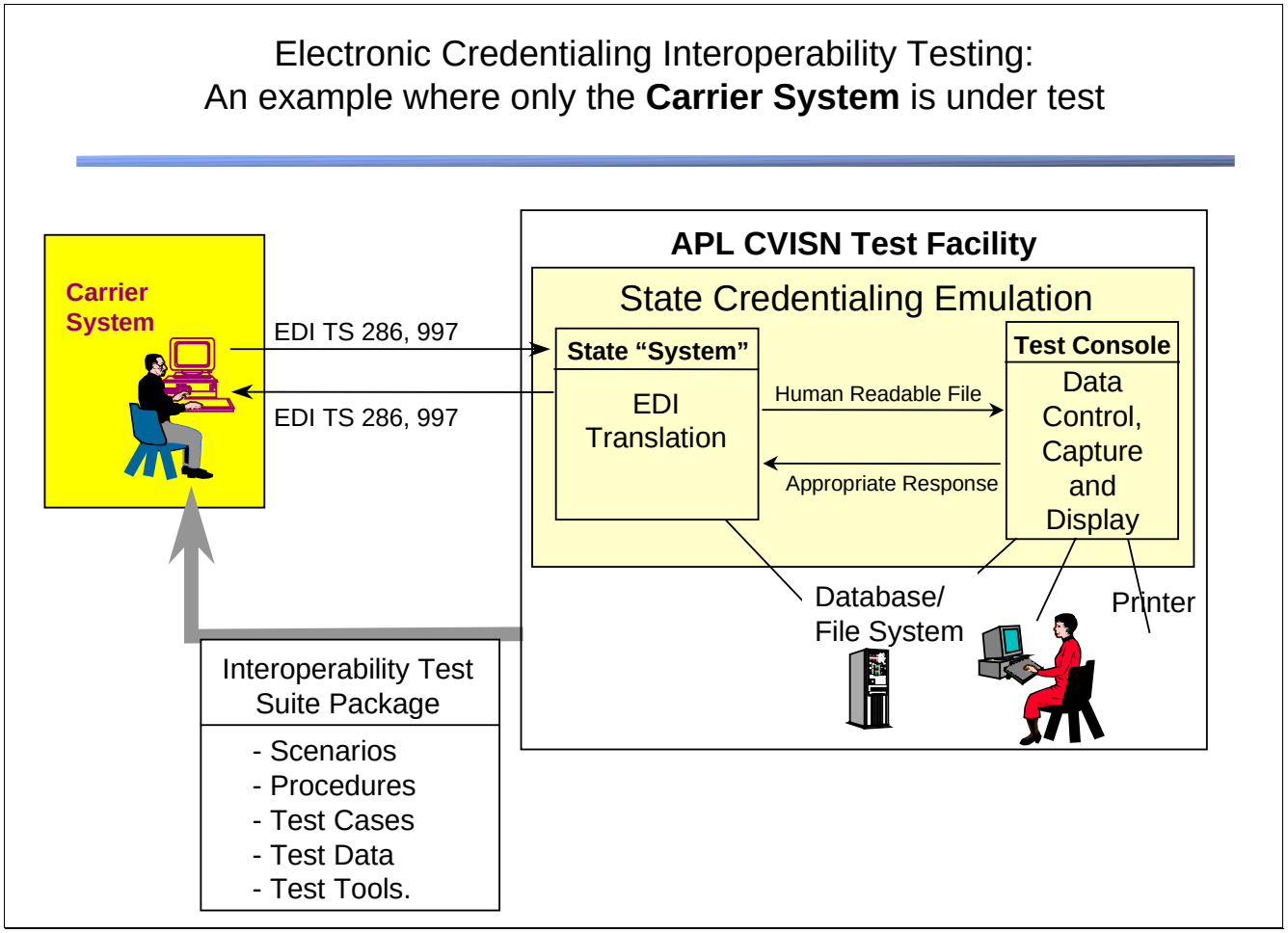


Figure 7-5 Electronic Credentialing Interoperability Testing

Standardized interoperability test suites are being developed to test selected, critical aspects of interoperability. The process for developing and using the interoperability tests is illustrated in Figure 7-6. JHU/APL is developing 22 pair-wise test scenarios (of 250 possible) and 13 end-to-end tests (out of 75 possible). The tests cover selected aspects of safety information exchange, credentials administration, and electronic screening. JHU/APL has the responsibility to develop the tests and the CVISN Test Facility. States and carriers have the responsibility to execute the tests. JHU/APL can provide support to the test execution at the option of the state.

7.8 Who is Responsible for Ensuring Conformance?

A COAT should be established to evaluate ITS/CVO projects at various checkpoints in the deployment cycle. The roles and responsibilities of stakeholders involved in the process of assuring consistency are described below and illustrated in Figure 7-7.

Lead Agency – The entity allocating funds or responsible for program management will be accountable for meeting program and project goals and objectives.

Conformance Assessment Team – The COAT should consist of, at a minimum, the program system architect, an ITS/CVO specialist from the FHWA Division Office, an ITS/CVO specialist from an FMCSA Service Center, and an architecture and standards expert. The system architect leads the COAT.

The ITS/CVO specialists from Division Offices and Service Centers will participate in the COAT. They will have the ultimate responsibility and authority to certify that designs and implementations are in conformance with the architecture.

The architecture and standards expert should be someone very familiar with the ITS/CVO architecture and standards, the experiences of the CVISN model deployment states, and the CVISN Core Infrastructure systems. This expert is probably a consultant hired by the state, but may occasionally be a state employee, such as an employee of a state university. The architecture and standards expert is an on-call consultant (especially during the requirements and design phases) who reviews the products of those phases, helps tailor the interoperability tests, and may help analyze the test results. This expert reviews technical documents and the results of interoperability tests and provides their findings to the other members of the COAT. Each expert can work with several states so that the cost for each state is minimized.

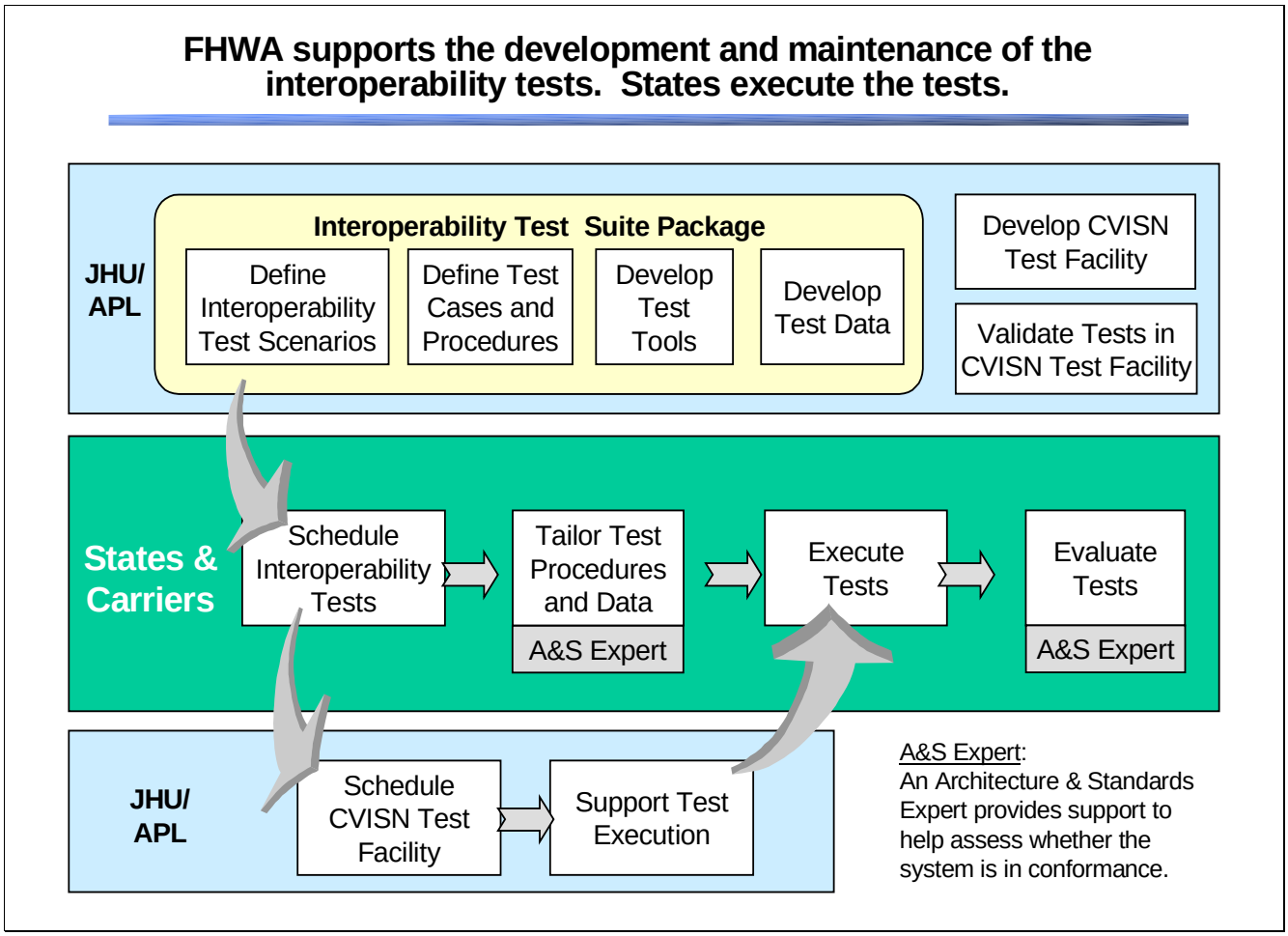


Figure 7-6 Development of Interoperability Tests

The COAT functions as an occasional team. The FHWA Division Office representative and the state system architect are likely to work in the same area and be able to get together for meetings. The FMCSA Service Center ITS/CVO expert and the architecture and standards agent may be more remotely located and may often attend via teleconference or video conference.

Interoperability Testers – The interoperability test team should include system users and independent testers. The COAT may assist the interoperability test team in tailoring the standard test suite package and in evaluating the test results. The FMCSA is supporting the initial CVISN Level 1 interoperability test capability through sponsoring construction and maintenance of reusable test plans, test cases, and test data.

7.9 What Guidance is Available for Conformance Assurance?

This chapter provided an introduction to ITS/CVO architectural conformance assurance. More information on this specific topic of conformance can be obtained from the FMCSA's *ITS/CVO Conformance Assurance Process (CAP) Description* and the COACH. In addition, the whole approach of training, workshops, guides, and management recommended by the FMCSA for ITS/CVO deployments is designed to work with a CAP in a way that minimizes risks by leveraging the past experience of others. Figure 7-8 summarizes the CAP.

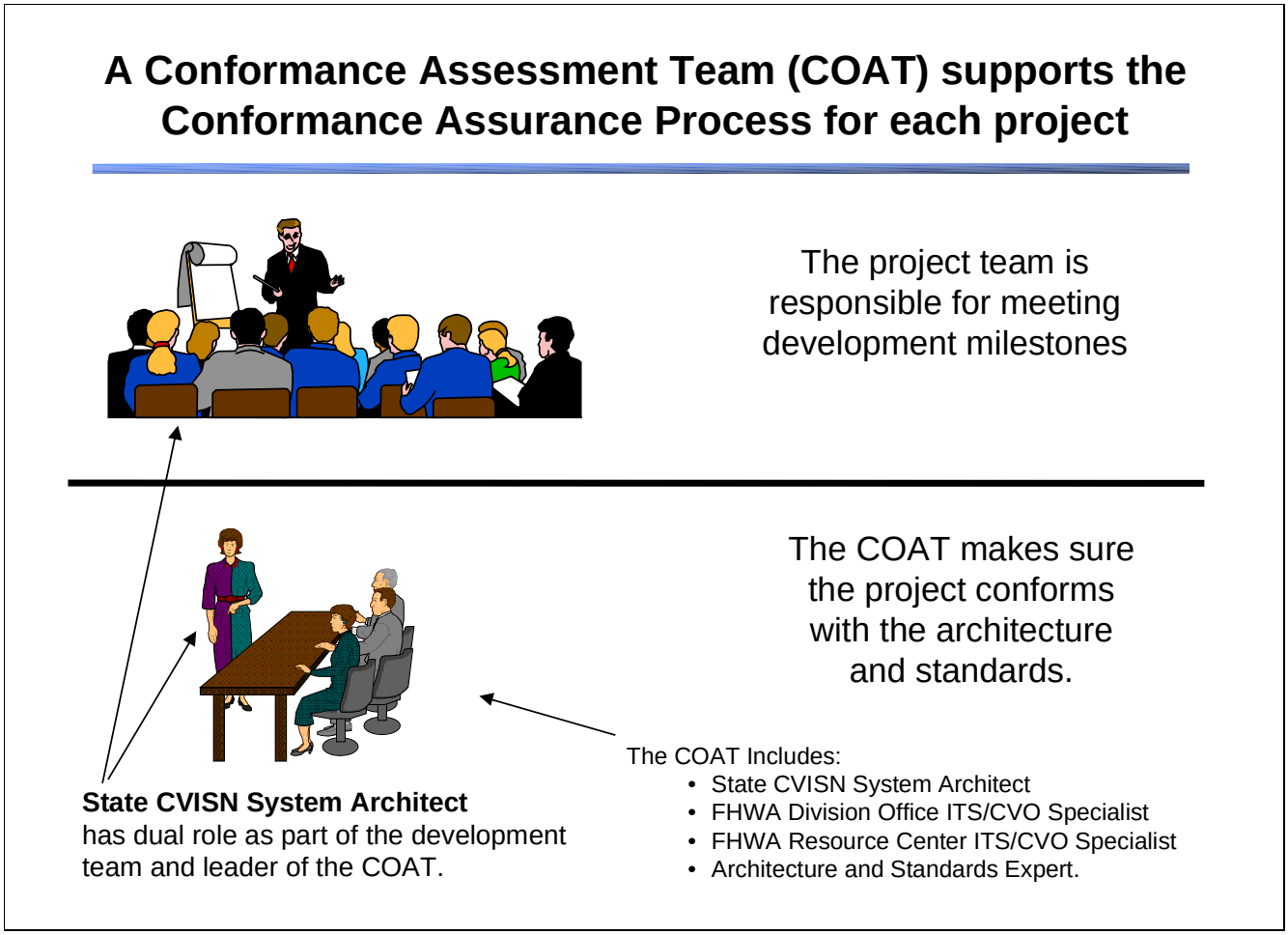


Figure 7-7 Interoperability Test Team

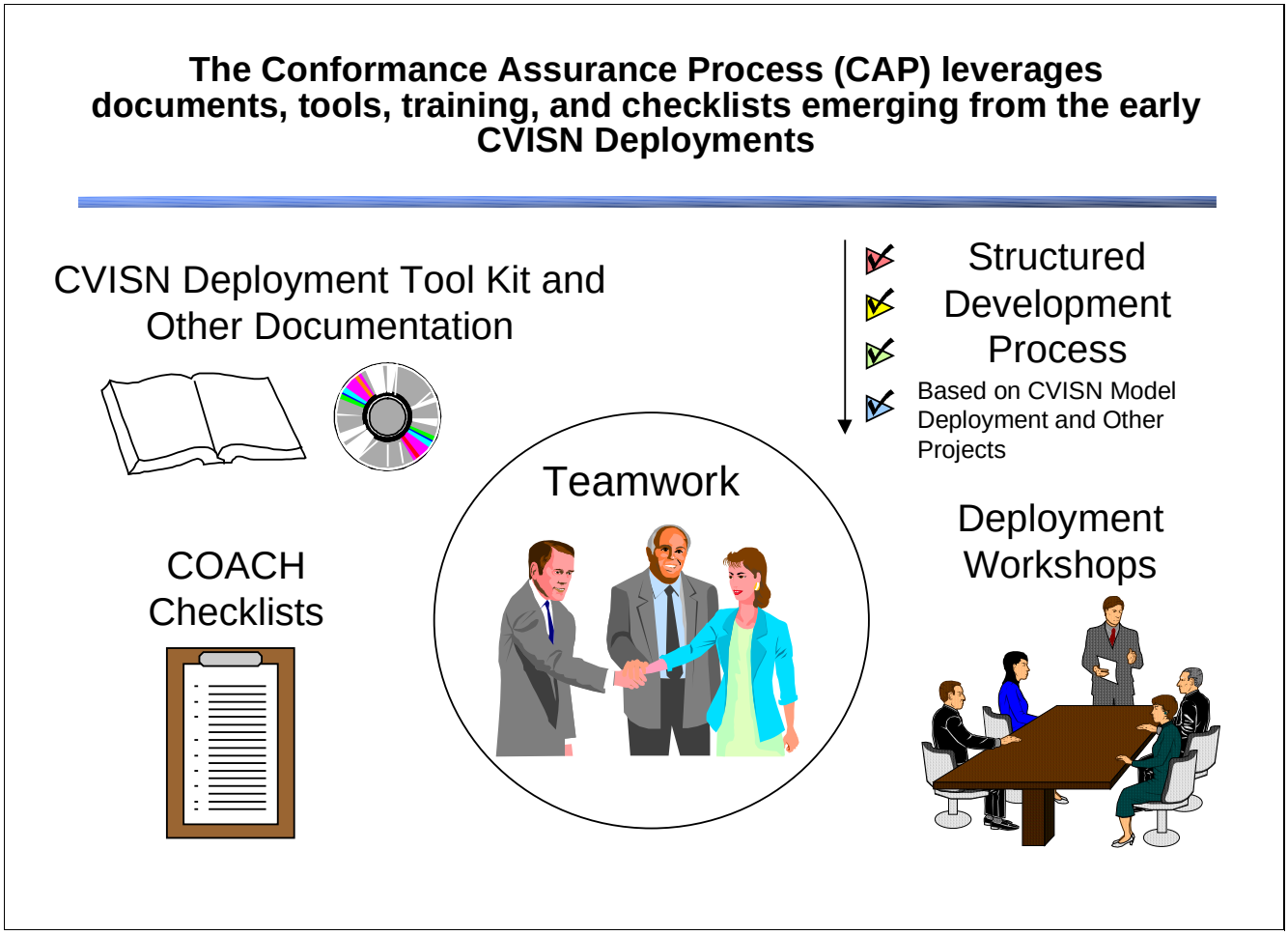


Figure 7-8 Conformance Assurance Process

8 What Resources are Available to Help States ?

The Federal Motor Carrier Safety Administration (FMSCA), formerly FHWA, has worked with several partners over the past few years to develop resources to support states planning to deploy Commercial Vehicle Information Systems and Networks (CVISN). These resources include:

- Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) Training Classes
- CVISN Deployment Workshops
- CVISN Tool Kit
- CVISN Technical and Management Guides
- ITS/CVO World Wide Web (WWW) Sites
- FHWA Outreach and the FMCSA Technology Truck
- Advisory Support.

Collectively, these elements comprise an integrated strategy for providing support to the deployment process. As Figure 8-1 indicates, the objective is to transfer information and lessons learned from folks experienced in ITS/CVO to newcomers to give them the benefit of prior work and reduce cost and risk.

8.1 Training

The FMCSA sponsors a series of three training courses to provide an awareness level of understanding for CVO stakeholders. Approximately six teams of two or three trainers each teach the courses. Teams are used to provide at least two trainer perspectives in each class. The trainers include state managers and technical personnel, university staff, system developers, and consultants. All were chosen for their specific background and knowledge of CVO and ITS. All have been through a comprehensive series of 3-week long "Train-the-Trainer" workshops.

ITS/CVO Training

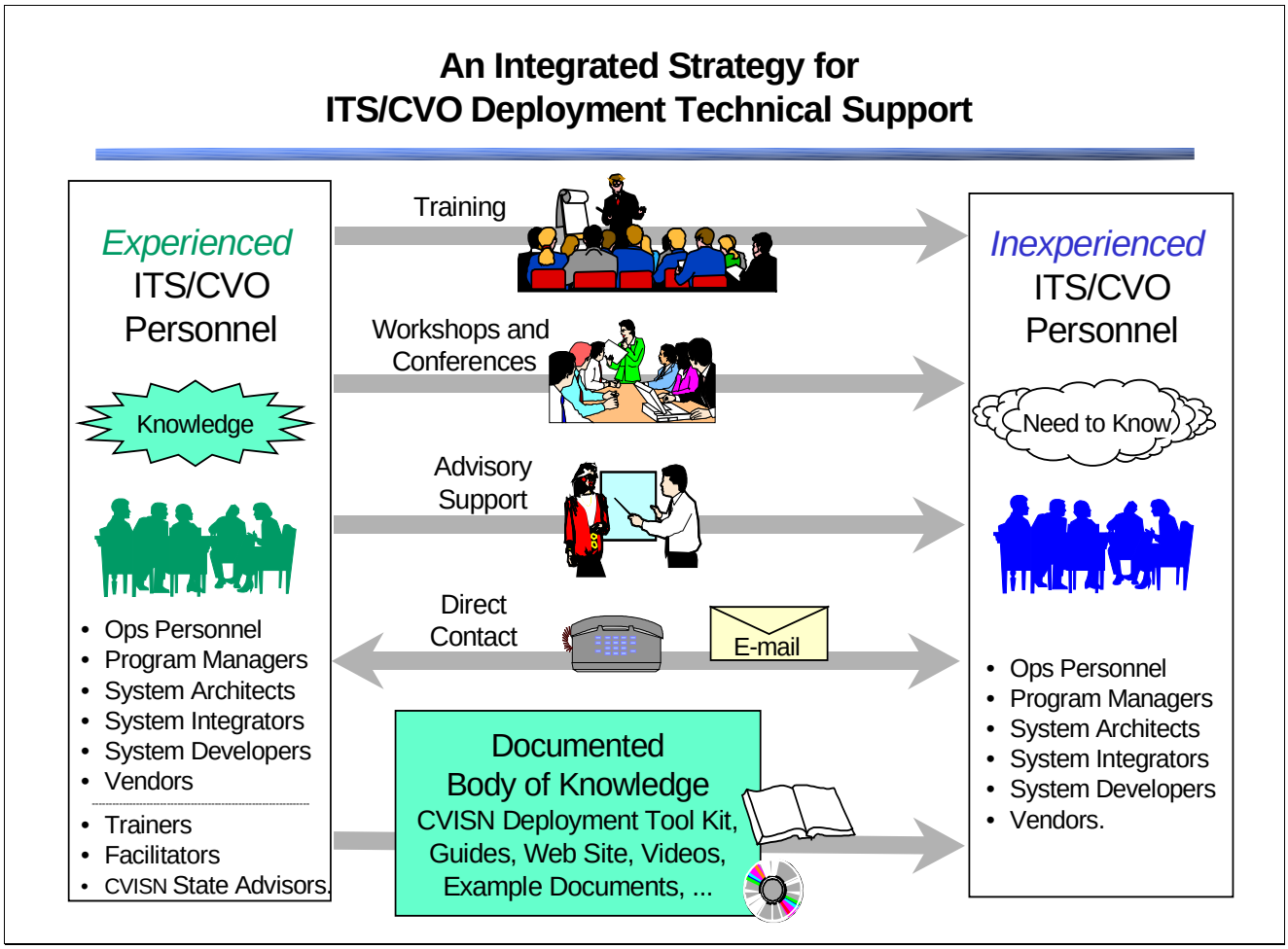


Figure 8-1 Integrated Strategy for ITS/CVO Deployment Technical Support

Courses include short lecture segments along with class discussions and small group exercises. A fictional state, Midland, is used as an example throughout the course series to provide a case study. Students and instructors are also encouraged to discuss their own real-world knowledge and experience. The courses are summarized in Table 8-1.

What Training Materials Will be Provided?

As part of the training, each student is provided with a training notebook that includes a copy of all graphics used in the course and additional reference material.

This notebook provides a very useful reference when the participant begins to work on the CVISN deployment project back in their home state.

The training notebook from each course is available for downloading from the ITS Electronic Document Library (EDL) on the Internet at http://www.its.fhwa.dot.gov/cyberdocs/welcome.htm. The EDL Document Numbers are:

8103 – Introduction to ITS/CVO

8063 – ITS/CVO Technical Project Management for Nontechnical Managers

8143 – Understanding ITS/CVO Technology Applications.

Table 8-1 Technical Training Course Descriptions

Course Title	Introduction to ITS/CVO	ITS/CVO Technical Project Management for Nontechnical Managers	Understanding ITS/CVO Technology Applications
Duration	1 ½ days (12 hours)	2 days (16 hours)	2 days (16 hours)
Content	ITS/CVO program's purpose, structure, components, current and future implementation, and technology	Skills development for managing the design and implementation of ITS/CVO technology	Overview of CVISN architecture and technology, standards, and how to apply them to ITS/CVO
Target Audience	Technical or nontechnical managers and staff from the states, FMCSA, motor carrier industry, and other key stakeholders	Program and other nontechnical managers and staff from the states and FMCSA	Technical and program managers and staff from the states, FMCSA, motor carrier industry, and other key stakeholders
Required for Workshops?	Recommended	Required	Required

8.2 Workshops

The CVISN deployment workshops are designed to help state teams produce specific products including their top-level design description and CVISN Program Plan. They will be offered according to a specific schedule at a limited number of locations. They will include brief introductory lectures followed by hands-on technical sessions, and will emphasize teamwork. The target audience for the workshops is state CVISN program managers and CVISN system architects, state operations and information technology staff, state motor carrier association representatives, and FMCSA field staff.

How Do the Workshops Differ from the ITS/CVO Technical Training Courses?

The ITS/CVO training courses are prerequisites to, not replacements for, the workshops. The second and third courses are required for states that wish to participate in the workshops. Some of the important differences between the training courses and workshops are summarized in Table 8-2. Even though the training course and workshops cover some of the same subject matter, they are intended to support states at different points in the deployment process. They are structured to complement and build on each other, not to provide a choice of one or the other.

Table 8-2 ITS/CVO Training Courses and CVISN Workshops

	ITS/CVO Training Courses	CVISN Deployment Workshops
Purpose	Learn, build awareness and commitment	Produce CVISN Program Plan and state system design
Schedule	Ongoing as needed	Series of 3 workshops over ~ 1 year for a group of states
Format	Mix of lectures, exercises, and case studies	Brief introductory lectures, hands-on technical work sessions
Orientation	Individual	Team
Audience	▪ State managerial staff ▪ FMCSA field staff ▪ Industry representatives (Introduction course only).	▪ Project Manager and Architect ▪ State operations and IT staff ▪ State Motor Carrier Rep (invited) ▪ FMCSA field staff.
Product	Awareness of concepts and tools	State CVISN Program Plan and top-level design description.

What Type of Support Will My State Receive in the Workshops?

The workshops will be designed and led by ITS/CVO subject matter experts from the Johns Hopkins University/Applied Physics Laboratory (JHU/APL), the organization that managed the design of the CVISN architecture and the Model Deployment Initiative (MDI). Members of the ITS/CVO Technical Training Program course delivery teams will provide additional support. These trainers include CVISN Pilot State program managers, ITS/CVO mainstreaming regional champions, and other public and private sector personnel with experience in ITS/CVO. The trainers will be available to work with individual states during the workshop breakout sessions. In addition, other CVISN Pilot State personnel will be available to assist with the workshops in their regions.

Some of the ITS/CVO trainers will also serve as CVISN State Advisors (CSAs). They will be available to make visits to individual states either before the workshops begin or between the workshops, to assist with prework and questions. The amount of time available will be fairly limited due to funding constraints. Nevertheless, this is another valuable resource available to the states.

8.3 CVISN Tool Kit

CVISN Tool Kit

The CVISN Tool Kit is a comprehensive set of technical documentation and planning tools assembled on a CD-ROM to assist states in the deployment of CVISN.

As part of the CVISN MDI, JHU/APL has the task of capturing, recording, and distributing the information, knowledge, insights, and lessons learned that might be of value during and after the ITS/CVO MDI. The collected material will be distributed in the "CVISN Tool Kit" on a standard compact disk. The CVISN Tool Kit will include documentation developed by the states, FMCSA, and their subcontractors.

The documentation on the Tool Kit will be linked to the CVISN Web Site for the user to browse and download the latest versions of material. Although the CD can be used as a standalone tool on your workstation, it is most effective when combined with an Internet browser (Netscape or Microsoft Internet Explorer) used to download updates and other information from the CVISN Web Site.

The tool kit is being developed incrementally with new items to be added as CVISN deployment proceeds. The first version was available in the fall of 1999. The CVISN Tool Kit includes the items listed in Table 8-3. The contents will evolve over time.

Table 8-3 CVISN Tool Kit Content

General CVISN Documents and Standards
▪ Introduction to CVISN
▪ CVISN Statement of Direction (SOD)
▪ CVISN Operational Concept Document (OCD)
▪ CVISN Guides (series of 8)
▪ CVISN Operational and Architectural Compatibility Handbook (COACH) (all 5 parts)
▪ CVISN System Design Description
▪ Lessons Learned Summary - MD and VA Prototypes; CVISN Pilot States
▪ Examples of Pilot State CVISN Program Plans and other documents
▪ White Papers and Fact Sheets on ITS/CVO Projects
▪ Credentialing Interface (CI) Design Document
▪ Electronic Data Interchange (EDI) Standards and Implementation Guides
▪ Dedicated Short Range Communication (DSRC) Standards
▪ Interoperability Test Strategy
▪ Interoperability Test Suite Package
▪ Sample Test Plans
▪ CVISN Glossary.

Table 8-3 CVISN Tool Kit Content (Con't)

SAFER and CVIEW
▪ SAFER System Overview ▪ SAFER Project Plan ▪ SAFER/CVIEW User and System Requirements Document ▪ SAFER/CVIEW Logical and Physical Requirements Document ▪ Snapshot White Paper (SAFER and CVIEW) ▪ SAFER Master Test Plan ▪ SAFER O&M Plan ▪ CVIEW Information Package ▪ CVIEW Requirements Document ▪ CVIEW Design Document ▪ CVIEW O&M Plan.
Spreadsheets and Other Tools
▪ Technical and Administrative Point of Contact Information ▪ Planning and Design Worksheets ▪ Representative System Flow ("Thread") Diagrams (Templates and Examples) ▪ WWW Access Links.

8.4 CVISN Guides

The CVISN guides are a series of documents intended to serve as a way for those who have traveled a path to pass knowledge on to others who may travel the same (or a similar) path. These guides will provide a means for advising future CVISN deployment state personnel on how to make use of what was already developed and learned during the CVISN model deployment initiative.

JHU/APL has collected material for the guides from a number of sources. These sources include the partners in the CVISN MDI, the workbooks developed for the CVISN Pilot Workshops and Conferences, lesson learned sessions conducted during the MDI, and textbooks and other reference material. The guides include hints, tips, and potential pitfalls from the "front line" - those people actually implementing these improved systems.

Each of these guides will address a process (e.g., planning) or an application area (e.g., electronic screening). Each guide will be concise, with references to textbooks and other documents for details, as appropriate.

What Guides Are Available?

A series of eight guides will be available by the spring of 2000. The guides can be grouped into three categories.

- Management Guides
  - Introductory Guide to CVISN (this document)
  - Program and Project Planning
  - Phase Planning and Tracking.
- Technical Process Guides
  - Top-Level Design
  - Integration and Test.
- Technical Application Guides
  - Safety Information Exchange
  - Credentials Administration
  - Electronic Screening.

What is the Scope of Each Guide?

The **management guides** describe how to apply proven project management methods to organize and execute a state CVISN deployment project:

📖 Introductory Guide to CVISN – provides an introduction to CVISN and the CVISN deployment process. Summarizes the resources available to states to help in the deployment process.

- 🕮 Guide to Program and Project Planning – describes a comprehensive State CVISN Program Plan and a planning process. Provides guidance on how to tailor the plan and process to your situation, ideas on how to develop the plan, and possible tools to help with the process.
- 🕮 Guide to Phase Planning and Tracking – describes what would be in a State CVISN Phase Plan and its associated development process. Provides guidance on how to tailor the plan and process to your situation, ideas on how to develop the plan, and possible tools to help with the process.

The **technical process guides** describe how to apply system engineering methods to the problem of designing, testing, and integrating CVISN Level 1 capabilities in as state:

- 🕮 Guide to Top-Level Design – describes best practices for developing a top-level design for the systems necessary to implement CVISN Level 1 capabilities, and provides guidance on how to utilize the experience and products coming out of the CVISN MDI and other ITS/CVO initiatives.
- 🕮 Guide to Integration and Test – describes the integration and test process and what would be in a comprehensive Integration and Test Plan (including test specifications, test scenarios, test data, etc.). Provides guidance on how to tailor the plan and process to your situation, ideas on how to develop the plan, and possible tools to help with the process.

The **technical application guides** address how to apply the National ITS Architecture and the experience gained from the CVISN MDI and other ITS/CVO initiatives to a particular CVISN Level 1 application area:

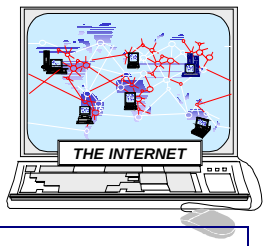
- 🕮 Guide to Electronic Screening – describes the state of the practice in electronic screening systems, and provides guidance on how to design your electronic screening systems based on the experience and products coming out of the CVISN MDI and other ITS/CVO initiatives.
- 🕮 Guide to Credentials Administration – describes the state of the practice in credentials administration systems, and provides guidance on how to design your credentials administration systems based on the experience and products coming out of the CVISN MDI and other ITS/CVO initiatives.
- 🕮 Guide to Safety Information Exchange – describes the state of the practice in safety information exchange systems, and provides guidance on how to design your safety information exchange systems based on the experience and products coming out of the CVISN MDI and other ITS/CVO initiatives.

Guide scope and structure will vary depending on the type of guide and specific subject. Typically, each guide will address questions such as:

- What is it? (The “it” refers to the subject of the guide.)
- Who does it benefit?
- How does it fit into the big picture?
- What are the governing concepts?
- What standards, designs or systems already exist?
- What process is recommended?
- What alternatives should be evaluated?
- What is required to conform to FMCSA guidance?
- What are the CVISN model deployment states doing and what have they learned?
- What resources are available to help?

8.5 ITS/CVO World Wide Web Sites

A CVO site on the World Wide Web (WWW) is maintained by JHU/APL at:



☞ http://www.jhuapl.edu/cvo/

This site provides planning and technical information for the CVISN Program and is used to distribute program documentation for review and use. Most of the documents produced by JHU/APL (e.g., EDI Implementation Guides, CVISN Guides) are available on this web site.

FMCSA also maintains an excellent site containing news and reports related to ITS/CVO:

☞ http://www.avalon-ais.com/itscvo/main.htm

Other WWW sites that are good sources of planning and background information for ITS/CVO include:

☞ *Other WWW ITS/CVO Sites:*

- Federal Highway Administration: http://www.fhwa.dot.gov
- ITS Electronic Document Library http://www.its.fhwa.dot.gov/cyberdocs/welcome.htm
- ITS Joint Program Office: http://www.its.dot.gov
- ITS Cooperative Deployment Network (ICDN): http://www.nawgits.com/jpo/icdn.html
- ITS America: http://www.itsa.org
- National Governors' Association: http://www.nga.org
- University of Kentucky Transportation Center: http://cvoz.uky.edu
- CVO Work Group: http://www.gcmpic.ai.uic.edu/cvogrp/cvo.html
- Center for Transportation Research and Education, Iowa State University: http://www.ctre.iastate.edu/projects/attech/midwest
- The Oak Ridge National Laboratories Technology Truck: http://www.ornl.gov/dp111/index.htm

8.6 Advisory Support

A variety of technical and administrative experts are available to assist the states in achieving their CVISN goals. These include:

- JHU/APL CVISN project managers and architecture and standards experts
- Experienced personnel from the Model Deployment (Prototype and Pilot) States, including state project managers, system architects, and functional managers
- ITS/CVO specialists from the FHWA Division Offices and FMCSA Service Centers
- Personnel from FHWA Headquarters
- ITS/CVO trainers and CVISN State Advisors (CSAs)
- ITS America staff
- Motor carrier associations staff [American Trucking Associations (ATA), National Private Truck Council (NPTC), Owner-Operator Independent Driver Association (OOIDA) and others)]
- State associations staff [American Association of Motor Vehicle Administrators (AAMVA), Commercial Vehicle Safety Alliance (CVSA), International Registration Plan (IRP) Inc., International Fuel Tax Agreement (IFTA) Inc., and others)]
- Private consultants.

Advisory Support

8.7 Outreach and the FMCSA Technology Truck

ITS/CVO Technology Truck

☞ http://www.ornl.gov/dp111/index.htm

The FMCSA is conducting several activities to increase the awareness of ITS/CVO in the stakeholder community. These include:

- Motor Carrier Industry Awareness Seminars
- ITS/CVO Brochures
- Technology Truck – A national demonstration vehicle containing ITS/CVO technologies, classroom-type facilities, and informational kiosks.

8.8 How Do the Workshops, Guides, and COACH Fit Together?

The CVISN Deployment Workshops, guides, and COACH have all been designed to work together to help lead a state through the deployment process. Figure 8-2 shows the relationships of these elements.

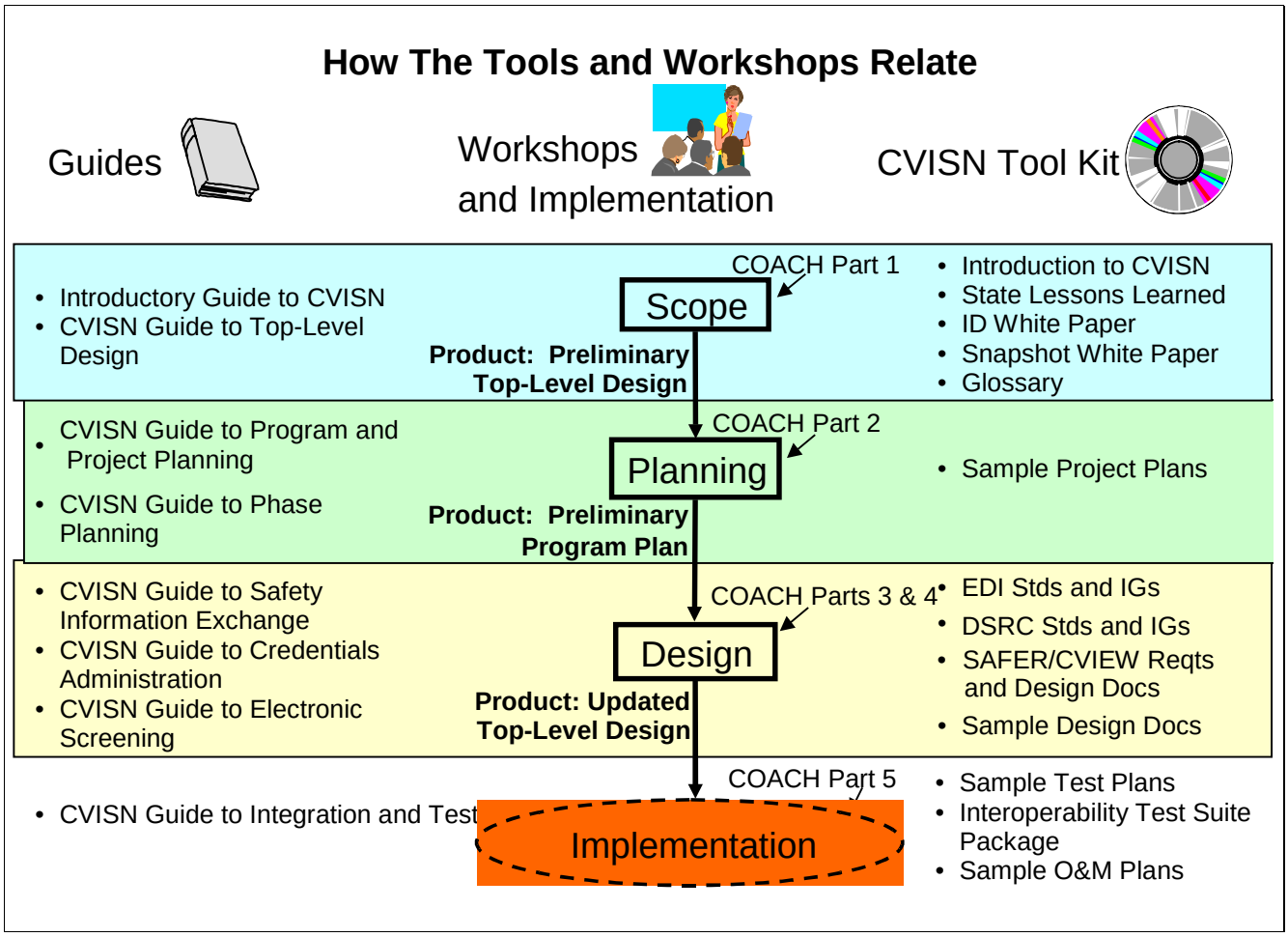


Figure 8-2 Relationship Between Tools and Workshops

9 What Should My State Do Next?

The Federal Motor Carrier Safety Administration (FMCSA) recommends that states follow the process of preparing Intelligent Transportations Systems/Commercial Vehicle Operations (ITS/CVO) business plans, attending training courses, and participating in deployment workshops. These activities have been set up to assist states in deploying Commercial Vehicle Information Systems and Networks (CVISN) Level 1. The process is summarized in Figure 9-1. This approach allows you to learn from the experience of others and is designed to provide you the information and support you need, when you need it. It allows you to formulate a good plan with solid cost estimates that you can use to pursue public/private partnerships and support proposals for state or federal funding. FMCSA personnel review the plans produced by this process, provide constructive feedback and "accept" them when they have met predefined criteria.

A majority of states (approximately 40) have already started the ITS/CVO deployment process and are proceeding along the steps. If your state is one of these, you have already started! If you have not been involved in these efforts, contact CVO stakeholders in your state or the ITS/CVO Specialist in your state's FHWA Division Office and ask how you can get involved. It is critically important that you work as part of a team that includes representatives from all the CVO stakeholder organizations in your state.

9.1 How Does My State Get Started in the ITS/CVO Business Planning Step?

If your state has not been participating in the ITS/CVO Mainstreaming process, please contact the ITS/CVO Specialist in your state's FHWA Division Office and find out how to get involved. (Chapter 10 provides points of contact.) A key first step is to form an interagency ITS/CVO team that is interested in pursuing the CVISN program.

9.2 How Does My State Get Started in the ITS/CVO Training Step?

Please contact the ITS/CVO Specialist in your state's FHWA Division Office to obtain information about how to schedule training course deliveries in your state or attend sessions being given in other states. (Chapter 10 provides points of contact.)

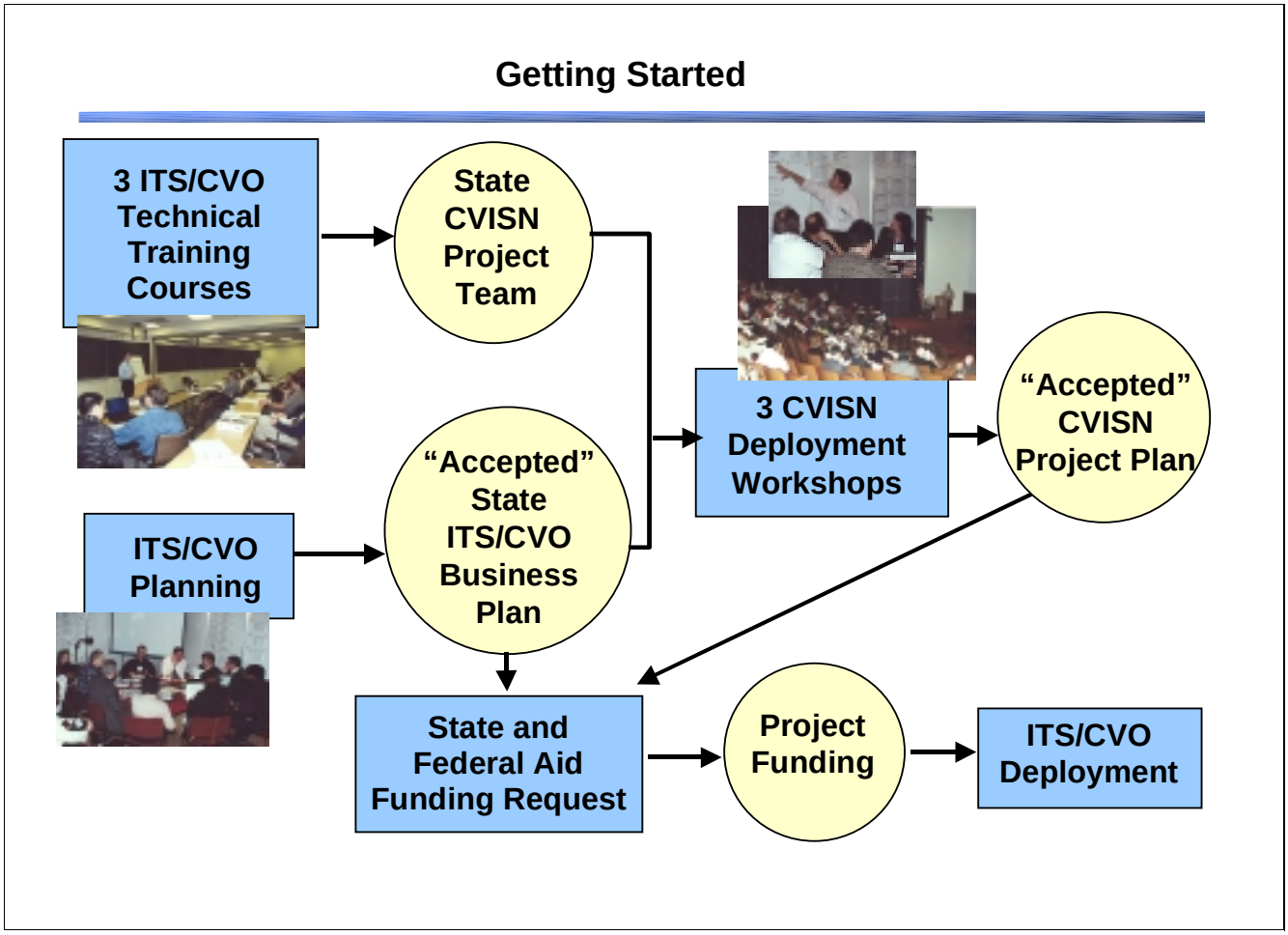


Figure 9-1 Initiating CVISN Level 1 Deployment Process

9.3 How Does My State Get Started in the ITS/CVO Workshops?

A letter from the FHWA was distributed to all states in January of 1999 that described the plans for workshops and offered interested states the opportunity to register. Some of this information is included below. Please contact the ITS/CVO Specialist in your state's FHWA Division Office to obtain information about current workshop schedules. (Chapter 10 provides points of contact.)

What Are FMCSA's Expectations of States that Attend the Workshops?

The FMCSA expects that each participating state will be committed to completing the full cycle of the workshops, and upon completion, to beginning deployment of the ITS/CVO systems and services that meet its unique economic, administrative, and transportation needs, as outlined in the State ITS/CVO Business Plan. The workshop process will help the state to ensure that its deployment activities will be

consistent with the National ITS Architecture and standards. This architectural consistency, in turn, will ensure that each state has a solid platform for future deployment activities and that each state's ITS/CVO systems will be interoperable with other states' systems and national systems.

The CVISN Prototype and Pilot States, as a condition for receiving federal funds, were required to agree to undertake the series of activities described in the CVISN "Level 1" definition. The FMCSA believes that these are a core set of capabilities that, when implemented as a group, will maximize the potential safety and efficiency benefits of ITS/CVO. The new group of CVISN states will be expected to follow this model, based on the positive experience of many of the Prototype and Pilot States. The new CVISN states will develop a program plan and top-level design for full deployment of the CVISN Level 1 capabilities, set priorities among these capabilities, and implement them in a manner that is consistent with the CVISN architecture and standards.

Is Additional Work Required Before and Between the Workshops?

The participating states will be given "prework" to complete before attending the first workshop, and in preparation for subsequent workshops. The purpose of this prework is to ensure that the states bring to each successive workshop the baseline information and ideas that they need to work effectively over the 3- to 4-day workshop period. For example, prior to the first workshop, each state's team will be asked to review a series of reference documents (e.g., the CVISN System Design Description, the CVISN Operational and Architectural Compatibility Handbook, and the CVISN Glossary). In addition, the team will be asked to complete a series of prework templates such as an inventory of active CVO projects and existing information systems.

At the workshops, each state initiates a part of their Program Plan or State CVISN Design that they then complete in preparation for the next workshop. At each of the subsequent workshops, a new part of a state's plan or design is initiated with the final product of the workshops (a state's completed CVISN Program Plan and CVISN Design) being completed after the third workshop. Therefore, the commitment to participate fully in terms of completing deliverables on time and having a state's CVISN Team attend all three workshops cannot be stressed enough.

Which People from a State Should Attend the Workshops?

Each state must identify a core team that will participate in all three of the workshops. This CVISN team must include the following individuals:

- The state's CVISN program manager,
- The state's CVISN systems architect,
- A program administrator, who could be a representative of a participating state agency or a consultant working with the state,
- Operations staff representing the state's major CVO functional areas [International Registration Plan (IRP), International Fuel Tax Agreement (IFTA), safety information systems, roadside safety inspections, size and weight enforcement, and credentials enforcement],
- Staff from the state department of information technology or information technology units within the state CVO agencies,
- Representative of the state Department of Transportation,
- Representative of the FHWA Division Office; and
- A motor carrier industry representative (invited).

In total, each state will need to bring approximately nine people to the workshops. The above list can have some of the roles combined.

What Are the Requirements for Participating in the Workshops?

The workshops are open to all states that are interested in pursuing ITS/CVO deployment. Based on the experience of the Prototype and Pilot States, the FMCSA has set the following criteria for interested states to complete prior to attending the workshops.

Required

Have a State ITS/CVO Business Plan that has been accepted by the FMCSA. The completion of the ITS/CVO Business Plan represents the successful collaboration of multiple agencies and the motor carrier industry, and signifies the state's commitment to using ITS/CVO technologies to improve the safety and efficiency of commercial vehicle operations.

Complete technical training courses. The technical training courses are designed to provide non-CVISN states an understanding of the national ITS/CVO program; its components, objectives, and expected outcomes; and the challenges inherent in planning for and deploying ITS/CVO technologies. The first course, *Introduction to ITS/CVO*, is recommended for workshop participants but can be waived for personnel with prior ITS/CVO knowledge and experience. The second course, *ITS/CVO Technical Project Management for Nontechnical Managers*, and third course, *Understanding ITS/CVO Technology Applications*, are required for the personnel who will represent each state at the workshops.

Commit a core CVISN team to workshop participation. The states must commit the core members of its CVISN team, as described above, to participation in all three of the workshops.

Recommended

Obtain high-level commitment for implementing the State ITS/CVO Business Plan. A state may not be ready for the workshops if it is having difficulty obtaining the commitment of state agencies to begin business plan implementation.

Establish a state ITS/CVO advisory committee. Each state is encouraged to develop an ongoing advisory committee (or steering committee or working group) to oversee their ITS/CVO programs, particularly CVISN-related activities. This committee should include representatives of all CVO-related agencies, the trucking and motor coach industries, the FMCSA, and other key stakeholder groups.

Identify potential public/private partnerships and sources for program and project funding. It is recommended that states identify potential funding sources for ITS/CVO deployment prior to and during the workshops, so that they may begin deployment upon completion of the workshops and program plans. Potential funding sources include state agency operating budgets and general funds, federal-aid highway funds, Motor Carrier Safety Assistance Program (MCSAP) grants, and congressionally designated projects to individual states or priority corridors. States that have difficulty identifying potential funding sources may wish to delay workshop participation.

Support of senior management of CVO agencies. Similarly, it is strongly recommended that the states obtain the support of the senior management of CVO agencies, as well as, where appropriate, legislators, governors, and state budget officials, for ITS/CVO deployment before or during workshop participation. This high-level support will help the state to obtain the human, financial, and technical resources necessary to support deployment once the workshops and program plans are completed.

States that are interested in participating in the CVISN workshops should contact their FMCSA State Director and discuss whether the state has met all of these criteria or not. The State Director may recommend specific activities (e.g., designation of the CVISN program manager and systems architect) that the state should undertake in preparation for the workshops.

Where Will the Next Set of Workshops Take Place?

The FMCSA will sponsor three or four series of workshops largely in parallel, with each workshop series incorporating up to 10 states. Unlike the CVISN Pilot State Workshops, which were held at the Johns Hopkins University Applied Physics Laboratory (JHU/APL) in Maryland, these next series of workshops will be held in different regions of the country. The goal of the regional delivery is to reduce travel costs for participating states, as well as to ensure that states sharing common economic and transportation needs are working together.

It is anticipated that three series of workshops will be offered in calendar year 1999: one in the central part of the country, one in the west, and one in the Northeast (jointly sponsored with the I-95 Corridor Coalition). Where possible, the workshops will be hosted by the CVISN Pilot States in each region.

When Will the Workshops Take Place?

A preliminary workshop delivery schedule is shown in Figure 9-2. Please contact the ITS/CVO Specialist in your state's FHWA Division Office to get a current schedule.

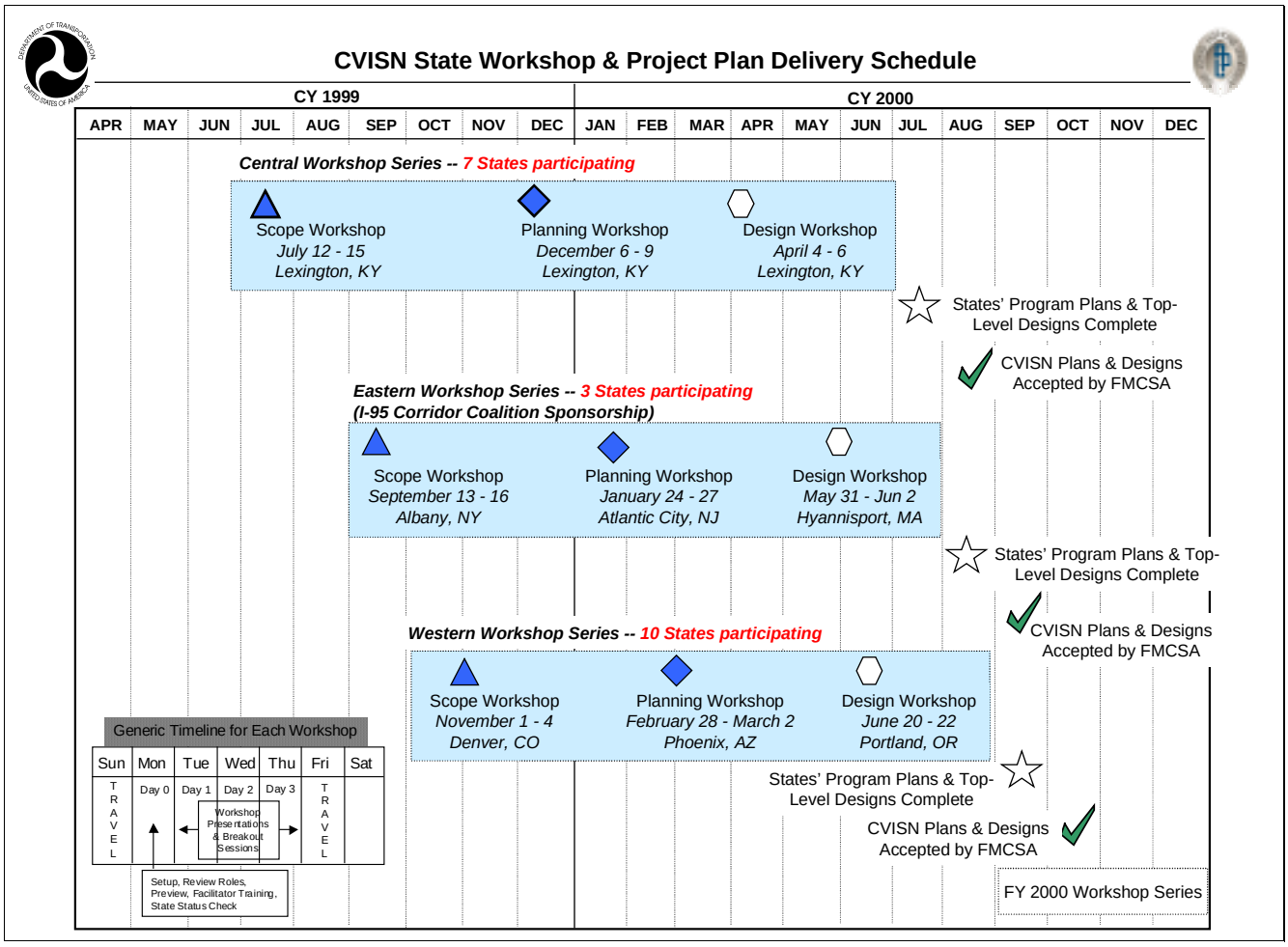


Figure 9-2 CVISN Workshop Delivery Schedule

What Is the Cost of Participation in the Workshops?

There is no registration fee for participating in the workshops. In addition, the FMCSA will provide grants of $20,000 with a 50/50 match requirement to help defray the cost of travel expenses to the workshops by a state's CVISN Team. These grant funds are only for those states that have not received ITS funds through congressionally designated projects. However, states that have received funds from congressionally designated projects may use a portion of their moneys to cover their CVISN Team's travel expenses to the workshops.

How Does My State Register for the Workshops?

States may register for the workshops by obtaining a registration form from the ITS/CVO Specialist at your state's FHWA Division Office (please see Chapter 10 for points of contact). The completed form should be forwarded to your FHWA State Director. The State Director will follow up with more specific information to assist the state in getting ready for these workshops. States that are members of the I-95 Corridor Coalition will receive future information directly from the Coalition.

Chapter 8 provided a description of resources available to help states. Please refer to Chapter 8 for:

- A description of the CVISN Guide series
- A description of the ITS/CVO Training Materials
- A description of the CVISN Tool Kit contents
- A listing of World Wide Web (WWW) Sites related to ITS/CVO.

Points of contact and references included below are grouped into these categories:

- Points of Contact
- CVO
- ITS
- ITS/CVO
- CVISN Program

- CVISN Architecture and Standards
- CVISN Deployment.

Points of Contact

Many people are participating in the CVISN Program and can provide help and guide you to additional resources. Often your state FHWA Division Office is the best place to start. Several other key points of contact are listed in Table 10-1 to help you get started.

Table 10-1 Key Points of Contact

Points of Contact
FHWA Division Office, ITS/CVO Specialist Please see the FHWA Field Office Web Site at http://www.fhwa.dot.gov/field.html#fieldsites to contact the FHWA Service Center sites (or the state division office sites directly) for the points of contact and their phone numbers in each state's FHWA Division Office.
FHWA Headquarters, ITS/CVO Program Manager *Doug McKelvey* US Department of Transportation Federal Highway Administration Office of Motor Carrier and Highway Safety, Room 3419 400 Seventh Street, SW Washington, DC 20590 *Phone:* 202-366-9246 *Fax:* 202-366-7908 *E-Mail*: doug.mckelvey@fhwa.dot.gov.

Table 10-1 Key Points of Contact (Con't)

Points of Contact
FHWA Headquarters, ITS/CVO Training and Workshops Manager *Jeff Loftus* US Department of Transportation Federal Highway Administration Office of Motor Carrier and Highway Safety Room 3419 400 Seventh Street, SW Washington, DC 20590 *Phone*: 202-366-4516 *Fax:* 202-366-7908 *E-Mail*: jeffrey.loftus@fhwa.dot.gov.
ITS America, ITS/CVO Coordinator *Steve Keppler* ITS America 400 Virginia Avenue, S.W. Suite 800 Washington, D.C. 20024-2730 *Phone*: 202-484-4662 *Fax:* 202-484-3483 *E-Mail:* skeppler@itsa.org.
JHU/APL, CVISN Document Coordinator *John Hardy* 11100 Johns Hopkins Road Laurel, MD 20723-6099 *Phone:* 240-228-7072 *Fax:* 240-228-6149 *E-Mail:* John.hardy@jhuapl.edu.

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Part 4 - Interface Specification, POR-97-7067, January 1998

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- EDI Implementation Guide for CV Credentials **(TS286)** Volume III - IFTA Credential Transactions, POR-97-6996 D.3.1, December 1998
- EDI Implementation Guide for CV Credentials **(TS286)** Volume IV - Oversize/Overweight Credential Transactions, POR-97-7068 D.2.1, December 1998
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Appendix A
ITS/CVO List of Acronyms

AAMVA	American Association of Motor Vehicle Administrators
AASHTO	American Association of State Highway and Transportation Officials
ACRP	Automated Compliance Review Pilot
ADVANCE	Advanced Driver and Vehicle Advisory Navigation Concept
AHS	Automated Highway System
AMASCOT	Automated Mileage and Stateline Crossing Operational Test
ANSI	American National Standards Institute
APL	The Johns Hopkins University Applied Physics Laboratory
APPN	Advanced Peer-to-Peer Networking
APTS	Advanced Public Transportation Systems
ASAP	Automated Safety Assurance Program
ASC	Accredited Standards Committee
ASPEN	(Not an acronym)
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
ATIPE	Advanced Technologies for International and Intermodal Ports of Entry
ATIS	Advanced Traveler Information Systems
ATM	Asynchronous Transfer Mode
ATMS	Advanced Traffic Management Systems
AVC	Automatic Vehicle Classification
AVCS	Advanced Vehicle Control Systems
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location
BPR	Business Process Re-engineering
BSWG	Base State Working Group
CA	Credentials Administration
CAP	Conformance Assurance Process
CAPRI	Carrier Automated Performance Review Information
CARS	Credentials Administration Requirements Specifications
CASE	Computer Aided Software Engineering
CAT	Carrier Automated Transaction
CDL	Commercial Driver's License
CDLIS	Commercial Driver's License Information System
CFR	Code of Federal Regulations
CH	Clearinghouse
CI	Credentialing Interface
CIS	Credential Input System; Central Information Site
CMV	Commercial Motor Vehicle
CMVSA	Commercial Motor Vehicle Safety Act
COACH	CVISN Operational and Architectural Compatibility Handbook
COAT	Conformance Assessment Team
COVE	COmmercial VEhicle
CR	Compliance Review
CSA	CVISN State Advisor
CSFR	Carrier Safety Fitness Rating
CSI	Cambridge Systematics, Inc.
CV	Commercial Vehicle
CVIE	(Obsolete; see CVIEW)
CVIEW	Commercial Vehicle Information Exchange Window
CVIS	Commercial Vehicle Information System
CVISN	Commercial Vehicle Information Systems and Networks
CVL	Commercial Vehicle Licensing
CVO	Commercial Vehicle Operations
CVSA	Commercial Vehicle Safety Alliance
CVSP	Commercial Vehicle Safety Plan
DARPA	Defense Advanced Research Projects Agency
DBA	Doing Business As
DHCP	Dynamic Host Configuration Protocol
DL	Drivers License
DMV	Department of Motor Vehicles
DNA	Digital Network Architecture
DOT	Department of Transportation
DPIU	Data Processing Interface Unit
DSRC	Dedicated Short Range Communication
DTSW	Dynamic Downhill Truck Speed Warning System
DVIS	Driver/Vehicle Inspection System
EDI	Electronic Data Interchange
EDL	Electronic Document Library
EDIFACT	EDI For Administration, Commerce, and Transport
EEOS	Electronic One-Stop Shopping
EFT	Electronic Funds Transfer
EIA	Electronics Industry Association
EPIC	Expected Processing and International Crossing
ESAL	Equivalent Single Axle Loads
ETC	Electronic Toll Collection
ETTM	Electronic Toll and Traffic Management
FARS	Fatal Accident Reporting System
FDDI	Fiber Distributed Data Interface
FFE	Flat File Equivalent
FHVUT	Federal Heavy Vehicle Use Tax
FHWA	Federal Highway Administration
FIPS	Federal Information Processing Standards

FMCSR	Federal Motor Carrier Safety Regulations
FMMS	HAZMAT Fleet Management and Data Monitoring System
FNC	Federal Networking Council
FSR	Feasibility Study Report
FTA	Federation of Tax Administrators; Federal Transit Administration
FTP	File Transfer Protocol
FTS2000	Federal Telecommunications System 2000
GCWR	Gross Combination Weight Rating
GIS	Geographical Information System
GPS	Global Positioning System
GVW	Gross Vehicle Weight
GVWR	Gross Vehicle Weight Rating
HAZMAT	Hazardous Material
HELP	Heavy Vehicle Electronic License Plate Program
HM	Hazardous Material
HMTA	Hazardous Material Transportation Act
HMTUSA	Hazardous Material Transportation Uniform Safety Act
HOS	Hours of service
HOV	High Occupancy Vehicle
HSWIM	High Speed Weigh-In-Motion
HTTP	Hypertext Transfer Protocol
HVUT	Heavy Vehicle Use Tax
IACP	International Association of Chiefs of Police
IANA	Intermodal Association of North America
IBC	International Border Clearance
IBEX	International Border Electronic Crossing
IBTTA	International Bridge, Tunnel, and Turnpike Association
ICC	Interstate Commerce Commission
ICDN	ITS Cooperative Deployment Network
IDT	Intelligent Decision Technologies
IEEE	Institute of Electrical and Electronics Engineers
IEN	Information Exchange Network
IES	Information Exchange System
IFTA	International Fuel Tax Agreement
IMS	Information Management Systems
INS	Immigration and Naturalization Service
IOU	Idaho, Oregon, Utah
IP	Internet Protocol
IR	Inter-regional; Infra-red
IRP	International Registration Plan
ISA	Information Systems Architecture
ISDN	Integrated Services Digital Network
ISTEA	Intermodal Surface Transportation Efficiency Act
ITDS	International Trade Data System
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems (formerly IVHS)
ITSA	Intelligent Transportation Society of America
IVI	Intelligent Vehicle Initiative
JHU/APL	The Johns Hopkins University Applied Physics Laboratory
LAMP	Licensing Application Migration Project
LAN	Local Area Network
LCL	Less-Than-Carload
LIMS	Lockheed Martin Information Management Systems
LM	Legacy Modification
LPR	License Plate Reader
LSI	Legacy System Interface
LTL	Less-Than-Truckload
MACS	Mainline Automated Clearance System
MAPS	Multi-Jurisdictional Automated Preclearance System (MAPS)
MCDC	Motor Carrier Data Collection
MCMIS	Motor Carrier Management Information System
MCSAP	Motor Carrier Safety Assistance Program
MDI	Model Deployment Initiative
MEOSS	Mid-West Electronic One-Stop Shopping
MOA	Memorandum of Agreement
MOE	Measure Of Effectiveness
MONY	Michigan/Ontario/New York
MOOO	Multi-Jurisdictional Oversize and Overweight Organization
MPO	Metropolitan Planning Organization
NAFTA	North American Free Trade Agreement
NATAP	North American Trade Automation Prototype
NCHRP	National Cooperative Highway Research Program
NCIC	National Crime Information Center
NCP	Network Control Program
NDR	National Driver Register
NETC	New England Transportation Consortium
NGA	National Governors' Association
NHTSA	National Highway Traffic Safety Administration
NIER	National Institute for Environmental Renewal
NIMC	National Incident Management Coalition
NLETS	National Law Enforcement Telecommunication System
NMVTIS	National Motor Vehicle Title Information System
NOI	Notice Of Investigation
NPRM	Notice of Proposed Rulemaking
NPTC	National Private Truck Council
NSF	National Science Foundation
NTSB	National Transportation Safety Board
NYRPC	New York Regional Processing Center
OBC	On-Board Computer
OCD	Operational Concept Document
OMC	Office of Motor Carriers
OMCHS	Office of Motor Carrier and Highway Safety

OOIDA	Owner-Operator Independent Driver Association
OOS	Out of Service
OOSD	Out of Service Driver
OOSV	Out of Service Vehicle
OS/OW	Oversize/Overweight
OSI	Open System Interconnection
OST	Office of the Secretary of Transportation
PASS	Port of Entry Advanced Sorting System
PDPS	Problem Driver Pointer System
POE	Port of Entry
PRISM	Performance and Registration Information Systems Management
PSC	Public Service Commission
PUC	Public Utility Commission
RAPP	Regional Automated Permit Processing
RES	Roadside Electronic Screening
RFTA	Regional Fuel Tax Agreement
ROC	Roadside Operations Computer
ROVER	CVO ROving VERification Van
RPC	Regional Processing Center; Remote Procedure Call
RSIS	RS Information Systems
RSPA	Research and Special Program Administration
RTVDM	Registration, Title, Vehicle Dealers and Manufacturers
SAE	Society of Automotive Engineers
SAFER	Safety and Fitness Electronic Records
SafeStat	Safety Status
SAFETYNET	(Not an acronym)
SafeVUE	SAFER and CVIEW Visual User Environment
SASHTO	Southern Association of State Highway and Transportation Officials
SCAPI	SAFER CVIEW Application Programming Interface
SCE	Selective Compliance Enforcement
SDO	Standard Development Organization
SE	Southeastern States
SEB	State Entry Beacon
SHRP	Strategic Highway Research Program
SMDS	Switched Multimegabit Data Service
SMTP	Simple Mail Transfer Protocol
SNA	Systems Network Architecture
SSN	Social Security Number
SSRS	Single State Registration System
STCC	Standard Transportation Commodity Code
STOLEN	State On-line Enforcement System
TCAM	Telecommunications Access Method
TCC	Transportation (US DOT) Computer Center
TCP/IP	Transmission Control Protocol/ Internet Protocol
TEA-21	Transportation Equity Act for the 21st Century
TIA	Telecommunications Industry Association
TIN	Tax Identification Number
TOCM	Transportation Operation Coordination Committee
TPM	Technical Performance Measure
TRALA	Truck Rental And Leasing Association
TRANSCOM	Transportation Operations Coordination Committee
TRB	Transportation Research Board
TS	Transaction Set
UCR	Unified Carrier Register
UDP	User Datagram Protocol
USDOT	United States Department of Transportation
VAN	Value-Added Network
VIN	Vehicle Identification Number
VISTA	Vehicle Information System for Tax Apportionment
VISTA/RS	VISTA Registration System
VISTA/TS	VISTA Tax System
VMS	Variable Message Sign
VRC	Vehicle to Roadside Communication
VRTC	Vehicle Research Testing Center
VTAM	Virtual Telecommunications Access Method
VTIE	Vehicle Title Information Exchange
WAN	Wide Area Network
WASHTO	Western Association of State Highway Officials
WBS	Work Breakdown Structure
WIM	Weigh-In-Motion
WRA	Western Regional Agreement
WSDOT	Washington State Department of Transportation
WTA	Washington Trucking Associations
XML	eXtensible Markup Language
Y2K	Year 2000

Commercial Vehicle Information Systems and Networks (CVISN)

CVISN is the collection of state, federal and private sector information systems and communications networks that support commercial vehicle operations (CVO).

Many improvement initiatives are currently underway to develop new systems and upgrade existing systems to add new capabilities and allow electronic exchange of information using open interface standards. This will enable delivery of new electronic services to states and carriers in the broad areas of safety, credentials administration, and electronic screening. Specific examples of new services include:

- providing timely safety information to inspectors at the roadside,
- providing operating credentials to motor carriers electronically,
- allowing states to exchange registration and fuel tax information electronically, and
- conducting electronic screening of commercial vehicles at fixed and mobile sites while vehicles travel at highway speeds.
- In summary, CVISN components apply emerging technologies to improve the effectiveness and efficiency of state and private CVO stakeholders in the three broad functional areas of safety, credentials, and electronic screening.