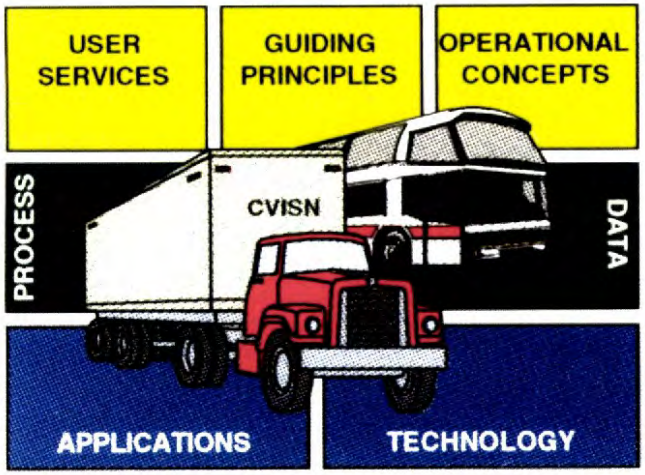
Commercial Vehicle Information Systems Network (CVISN)
Statement of Direction

November 3, 1995

Prepared for:

U.S. Department
of Transportation

Federal Highway Administration



Prepared by:

The Johns Hopkins University
Applied Physics Laboratory

Intelligent Transportation Systems (ITS) are transportation systems which utilize information, communication, sensor, and control technologies to achieve improved levels of performance. The US DOT has developed a National ITS Program Plan for ITS which provides a new vision for surface transportation in America. The ITS Program includes seven major elements:

- Travel & Transportation Management
- Travel Demand Management
- Public Transportation Management
- Electronic Payment
- Commercial Vehicle Operations (ITS/CVO)
- Emergency Management
- Advanced Vehicle Control & Safety Systems

The ITS/CVO element includes the ITS technologies which uniquely support Commercial Vehicle Operations (CVO). The scope of CVO includes the operations associated with moving goods and passengers via commercial vehicles over the North American highway system and the activities necessary to regulate these operations. It includes activities related to commercial vehicle credentials and tax administration, roadside operations, safety assurance, freight & fleet management, & vehicle operation.

The term Commercial Vehicle Information Systems Network (CVISN, pronounced "see' vision") refers to the ITS information system elements which support CVO. CVISN includes information systems owned and operated by governments, carriers, and other stakeholders. It excludes the sensor and control elements of ITS/CVO.

The DOT is sponsoring the development of a National ITS Architecture to provide a technical framework which describes how ITS elements fit together into an overall system. The CVISN Architecture is the ITS/CVO information systems portion of the National ITS Architecture.

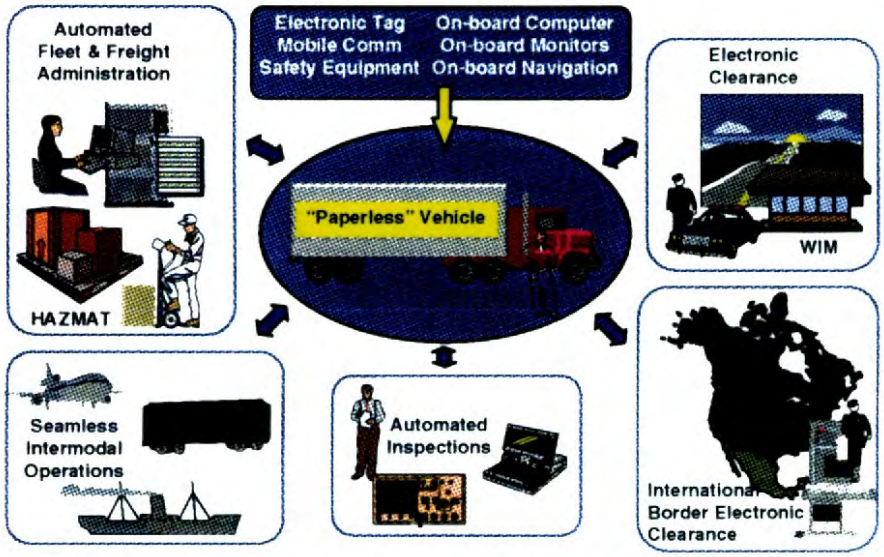
The CVISN Architecture will be documented in 1996. This will be used to develop standards and provide a technical framework for implementing the CVISN Pilot. This is an initial deployment of selected CVISN elements in a limited number (2-8) of states to demonstrate the operational feasibility and effectiveness of CVISN prior to full scale national deployment. It includes systems in the pilot states, carrier systems, and the CVISN Core Infrastructure. The CVISN Core infrastructure is a selected group of key CVO information systems that provide a mechanism for exchange of registration, fuel tax, HAZMAT, commercial driver license, and safety information among states.

The ITS/CVO Program is being organized to develop and deploy eight primary capabilities. Some of these are undergoing operational test or are in use now. Others will be developed over the next five years.

ITS/CVO Capabilities

Safety Information
Administrative Processes
Electronic Clearance
International Clearance
Automated Inspection
On-Board Safety
HM Incident Response
Fleet & Freight Admin

Vision: Safe and Efficient Shipping Operations



It is envisioned that in the year 2005, trucking operations have become much more efficient, largely due to the availability of accurate information in electronic form.

In 2005, the vast majority of trucks are equipped with ITS toll and traffic management transponders which transmit messages to and receive messages from the roadside. A clearance message transmits vehicle, carrier, driver, and specially regulated load type identifiers to roadside readers. The identifiers are used to access status information stored in government information systems. Credential, tax, permit, and safety status are checked and compliance verified at mainline speeds. Carriers which participate in clearance programs can operate trucks with no paper credentials on-board.

Carriers can equip their vehicles with a variety of productivity and safety improvements: mobile communications systems, navigation and tracking systems, on-board vehicle monitors, collision avoidance devices, crash restraints, and vision enhancement equipment.

Carriers use fleet management systems to optimize schedules, routing, and maintenance. Accurate highway and traffic data is available to support routing. Carriers can choose to track vehicles throughout North America. Intermodal transfers are supported by electronic data interchange. 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.

En-route delays have been virtually eliminated. Electronic screening is used to check the vast majority of vehicles at mainline speeds.

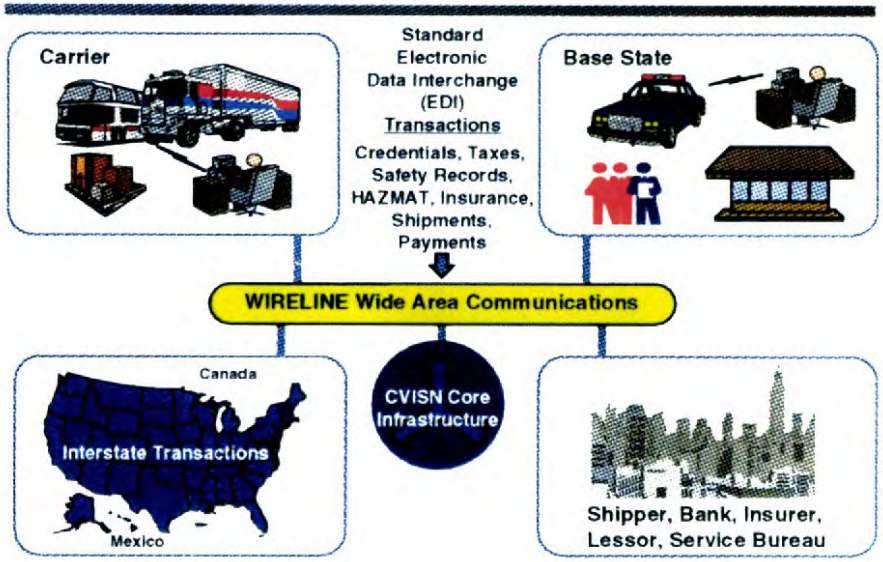
When inspections occur, they are conducted quickly with the aid of automated safety inspection equipment.

International border crossings occur with little or no delay. Routine shipments are often cleared as the vehicle passes at mainline speeds.

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

Vision: Electronic Business Transactions



It is envisioned that in the year 2005, the vast majority of CVO business transactions are being conducted electronically. This includes transactions among carriers, shippers, government agencies, and insurance companies.

In 2005, carriers apply and pay for credentials electronically, including operating authority, registration, and permits. They file and pay taxes electronically. Carriers deal with a base state for all business transactions, including registration, permits, taxes, and clearance. 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., registrations) 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 cross checks 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 operating authority, registration, tax, clearance, and safety transactions.

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.

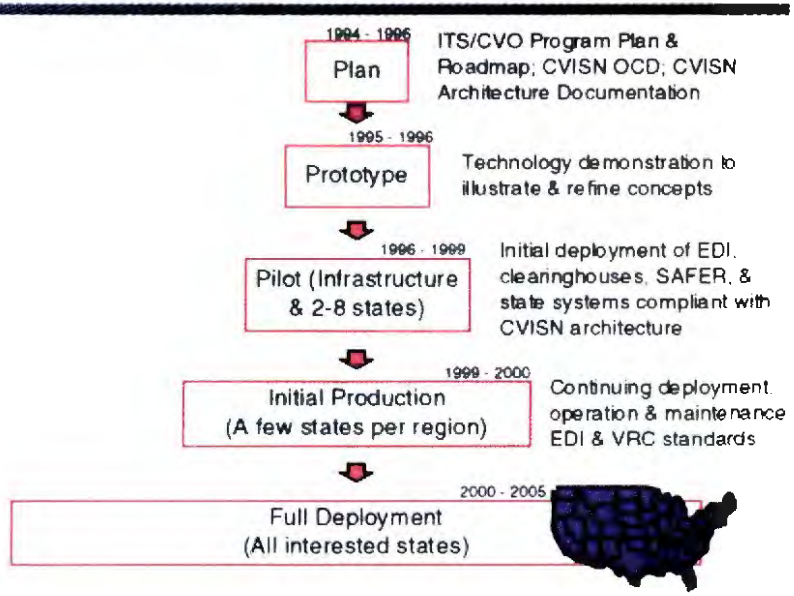
Data privacy and integrity are assured via encryption and password techniques.

The FHWA ITS/CVO Management Approach

The FHWA has established an ITS/CVO Program to carry out the CVO portion of ITS and achieve the vision summarized above and described in the National ITS Program Plan. The program management approach is summarized below.

- The **FHWA ITS Joint Program Office (JPO)** is providing the focal point for Federal leadership in the development of ITS/CVO systems.
- The FHWA ITS JPO bas set a **high priority** on the development and deployment of CVO/ITS User Services. The JPO views CVO as one of the first areas that is sufficiently well defined to support relatively quick development and deployment.
- The **ITS America CVO Technical Committee** and its subcommittees are providing an interactive stakeholder forum relating to ITS/CVO Program planning activities.
- This SOD is one of a series of documents that will be used to **fully inform CVO stakeholders** of FHWA concepts and plans.
- The FHWA will use the **CVISN Architecture as a technical framework** for the development of interoperable information systems which support ITS/CVO services.
- The FHWA will sponsor **studies & operational tests** to validate concepts and develop cost/benefit information.
- The FHWA will conduct **mainstreaming** activities to expedite the widespread deployment of ITS/CVO concepts and systems. These will include planning, standards development, outreach, and piloting efforts.
- The FHWA will sponsor a **CVISN Pilot** to demonstrate the operational feasibility and effectiveness of CVISN concepts and systems.
- The CVISN Pilot will demonstrate selected ITS/CVO services in a **limited number of states (2-8)**. The pilot will run from 1996 through 1999.
- Participation in the CVISN Pilot will be based on a state's ability to meet **criteria** established by the FHWA (e.g., institutional readiness, participation in regional programs, technical experience, inter-agency data sharing, and representation from diverse states).
- The CVISN Pilot will fund key **multi-state data sharing** projects (e.g., the IRP Clearinghouse) to connect to pilot project states via standard interfaces.
- The FHWA will provide the results of the CVISN Pilot to other states in the form of a ***CVISN Deployment Tool Kit***. This will include computer-based management and technical documentation and planning tools to facilitate deployment of CVISN in other states.
- The FHWA will **foster the national deployment** of CVISN after the pilot to the extent that funding allows.
- It is anticipated that CVISN Pilot & deployment tasks will stimulate **process improvement & reengineering** efforts in CVO that will provide significant benefits beyond those obtained through automation alone.

CVISN Nationwide Deployment Strategy



The CVISN Program is proceeding in five major steps. The first step develops the management (plans) and technical (architecture) frameworks necessary to coordinate the subsequent phases. The second step is to prototype the technology in an integrated way to demonstrate operational concepts and validate requirements. The third step is to pilot the approach in a limited number (2-8) of states. This allows testing and evaluating in a project of manageable size before proceeding to widespread deployment. The fourth step, initial production, will expand from the pilot states to an equal number of partner states. This should be a smooth expansion, since the partner states will be coordinating with a pilot state in the same region throughout the pilot. The final step allows for deployment to all interested states. By this time the technology, concepts, costs, and benefits should be well understood and documented. Deployment should be straightforward with little risk.

Throughout this process, FHWA is focusing on mainstreaming, which means moving ITS/CVO services beyond the concept development phase and into operation. As part of mainstreaming, certain organizational strategies will be required to support the technical activities. The ITS/CVO Program will develop policies, plans, programs, and projects at the state, regional, and national levels: at the state level because the states have the power and responsibility for building and maintaining highways and for taxing and regulating the motor carriers that use them; at the regional level because most trucks operate at the regional level; and at the national level because of the need to ensure uniformity of services for interregional and international motor carriers.

Planned organizational mainstreaming activities include:

Pilot State Business Plans: Fund 2-8 states to participate in the CVISN Pilot Project and thereby become an early deployer of ITS/CVO technology.

Partner State Business Plans: Fund 7 additional states to partner with a pilot state and to begin to develop state CVO Business Plans and accelerate the transfer of knowledge about CVISN.

Regional CVO Champions & Planning Forums: Support a regional program director who can lead planning forums and policy development and otherwise "champion" ITS/CVO service deployment in each region.

National Clearinghouse Agreements: Fund national working groups as required to develop policies, agreements, and expedite deployment.

Benefit / Cost Studies: Fund benefit / cost studies to synthesize the evaluations of individual CVO projects.

CVISN Guiding Principles

Statements of principle are being used to document fundamental concepts and guidelines supported by the CVO community. These are summarized here & listed below.

Summary

- CVISN treats stakeholders equitably and responds to their needs.
- Information technology is used to improve CVO administrative efficiency for carriers and government.
- Electronic verification ensures effective regulatory compliance without unnecessary vehicle delay.
- Safety assurance activities focus resources on higher risks.
- The CVISN architecture enables electronic information exchange.
- The CVISN deployment approach mitigates risk & proceeds in manageable steps, starting with legacy systems.
- The CVISN architecture leads to available & maintainable systems.

General ITS/CVO

- The priorities for ITS technology deployment will be determined by **stakeholder consensus**.
- Participation in ITS/CVO programs is **voluntary**. Any carrier can participate in government ITS programs with a modest investment.
- The **Federal Government will expedite** the deployment of ITS technology by providing technical, managerial, and funding support.
- **Measures of effectiveness (MOEs)** will be used to assess ITS CVO technology applications and guide investment decisions.
- Government ITS projects will **treat stakeholders equitably**.
- Governmental CVO policies and practices will be structured to primarily **benefit safe and legal carriers**.
- **Information technology** will be used to facilitate continuous process improvement and/or process re-engineering.
- The **United States will work with Canada and Mexico** to implement compatible policies and interoperable systems.

Credential & Tax

- Authorized users will be able to **electronically** exchange **credential and tax related information and funds**.
- Methods used to share data will ensure **security** of **data files and messages**, and protect against unauthorized access to information.
- Electronic exchange of credential and tax related **information and funds** among jurisdictions will take place according to **uniform and open standards**.
- North American jurisdictions will use **interoperable systems** to exchange CVO credential and tax information.
- Credential and tax information needed to verify the legal operation of carriers, drivers, and vehicles will be available to enforcement officials **throughout North America**.
- It will be practical to use **electronic transactions**, in place of paper credentials, to verify that vehicles meet credential and tax requirements for legal operation.
- It will be practical to use **electronic transactions**, in place of paper documents, for inter-jurisdictional exchange of information and fees related to administration of commercial vehicle operations.
- Individual states will be the **authoritative source** of information on credentials they issue.

Roadside Operations

- Roadside operations will **focus on eliminating unsafe and illegal carriers, drivers, and vehicles from service** and will be designed and administered to accomplish this in a manner that does not unduly hinder motor carrier productivity and efficiency.
- Jurisdictions will support CVO roadside operations programs with **timely and accurate electronic information**.
- North American CVO roadside operations programs will function under **compatible policies** and **employ interoperable technologies**.
- CVO roadside operations will focus evenhandedly on all roads and all types of carriers.
- Due care must be taken to preserve the confidentiality of proprietary information and other sensitive motor carrier data employed in CVO roadside operations programs.
- The ITS system architecture will allow government and industry a broad range of options in CVO roadside

Safety Assurance

- **Carriers and drivers will be responsible** for the safe and legal operation of commercial vehicles.
- Governments will develop and implement **uniform standards, practices, procedures, and education programs** to improve safety. These activities will leverage market forces that encourage safety.
- Governments **will focus** safety **enforcement** resources **on high risk** carriers and drivers. They will remove chronic poor performers from operation and help cooperative marginal performers to improve.
- Governments will conduct **inspections** and **audits** to provide **incentives** to improve poor performance and to collect information for **assessing** carrier and driver performance.
- Governments will develop a **safety risk rating** for every carrier and driver based on timely and accurate performance data.
- Safety program **benefits will exceed costs**. Benefits and costs are determined using accepted measures of effectiveness that include economic and non-economic factors.

CVISN Architecture

- The CVO information systems architecture will be **open**, modular, and adaptable.
- The architecture will enable **data exchange** among systems, a key to reaching CVO objectives.
- Data exchange will be achieved primarily via **common data definitions**, message formats, and communication protocols. These enable development of interoperable systems by independent parties.
- The architecture will primarily use **existing** and near-term **communications technologies** being deployed for non-CVO purposes.
- The architecture will build on **proven technologies and legacy systems** when possible.

CVISN Architecture Deployment

- The feasibility of the **architecture will be demonstrated incrementally** and quickly in simulations, prototypes, and operational tests. There will be heavy stakeholder involvement in each step of the process.
- After feasibility has been demonstrated, key architectural elements will be incorporated into appropriate national and international **standards**.
- The architecture **deployment will evolve incrementally**, starting with legacy systems and proceeding in manageable steps.
- **Strong national leadership** will be provided to foster cooperative efforts within states and among groups of states to develop systems compliant with the architecture.
- The **competitive forces of the marketplace will** provide the best environment for the development of most CVO software applications to be used by carriers & states.
- Each carrier, state, and other stakeholder will deploy ITS technology at a **pace which fits** its **needs**.

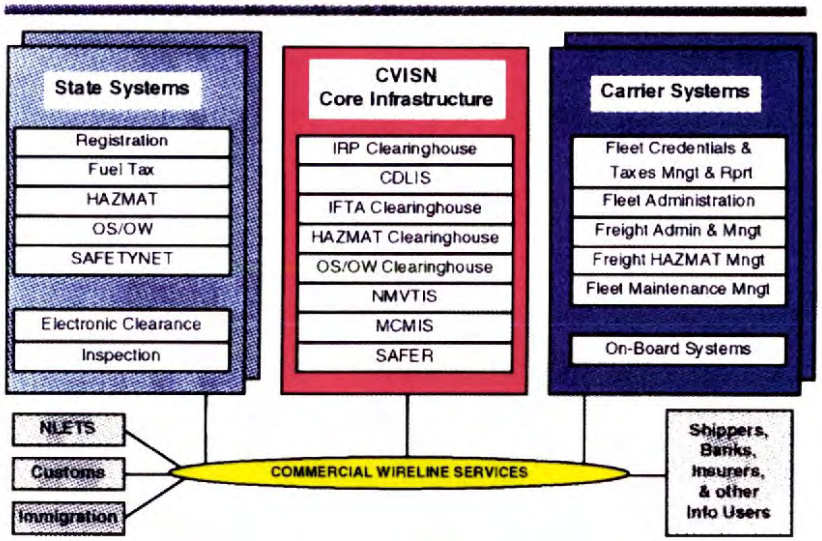
CVISN Architecture Support

- Systems will be designed to be operated by **non-technical staff**.
- Systems will be located in general **office, weigh station, & vehicle environments**.
- Maintenance will be available from **third parties**.
- Systems will include **self-diagnostics** sufficient to allow non-technical staff to recognize that a problem has occurred and call the appropriate maintenance personnel.
- **Remote diagnostics will be** provided whenever possible.
- **Redundant systems** will provided for critical tasks.

Status of CVISN Guiding Principles

These principles are still under review by the ITSA CVO Program Subcommittee. They will be updated as required to reflect the consensus of the CVO community.

CVISN Pilot Scope



The CVISN Pilot Project is being initiated by FHWA to move ITS/CVO user services beyond the concept phase and into operation. It is intended to be a cooperative effort of the FHWA, states, government and industry associations (e.g., ITSA, AAMVA, IRP, IFTA.), and carriers. The CVISN Pilot Project will provide funding to supplement funds currently being provided by other federal, state, and private sources as required to enhance or modify existing projects and legacy systems to meet the objectives of the CVISN Pilot.

Build the CVISN Core Infrastructure

There are several multi-state data sharing projects currently planned, under development, or operational that are required to support the CVISN pilot. These are collectively referred to as the CVISN Core Infrastructure. The CVISN Pilot will expedite their development.

Establish 2-8 Pilot States

FHWA will select up to 8 states to participate in the pilot project. Each pilot will commit to enhancing its state information systems in order to implement ITS/CVO user services over a 3 year period in a manner compliant with the CVISN architecture.

Involve Carriers in Pilot States

Each pilot state will establish cooperative agreements with representative carriers based in their state to participate in the pilot. The carriers will participate in all phases of the pilot, from planning through implementation and operation. They must commit to enhancing their information systems to implement ITS/CVO user services in a manner compliant with the CVISN architecture.

Prototype & Establish Formal Standards

The pilot effort will be used to prototype EDI and VRC standards in its early stages. As the pilot proceeds, the project will work through standard development organizations (SDO's) to get formal, open standards developed that incorporate lessons learned from the prototype and are incorporated into the final releases of the pilot systems.

Demonstrate all ITS/CVO User Services

An important purpose of the pilot is to demonstrate the synergistic effects of providing all user services in an integrated way. Although some states may emphasize some services by having earlier or more extensive deployment, the goal is to have at least some deployment of all ITS/CVO user services by the end of the pilot.

Prepare for Full Scale Deployment

The CVISN Pilot will help prepare for the full deployment of CVISN in three ways. First, it will establish the CVISN Core Infrastructure as an operational set of systems. Future states that wish to implement ITS/CVO services will be able to connect to this infrastructure using documented and proven techniques. Second, the pilot will support the definition of open VRC and EDI standards. Third, the pilot effort will produce a *CVISN Deployment Tool Kit*. This will be a set of work products and lessons learned organized into a personal computer based set of tools that can easily be distributed to and used by other states.

END SOD

11/03/95