Presentation To
NORTH DAKOTA LEGISLATIVE MANAGEMENT
BUDGET SECTION
by
Colonel Jim Prochniak, Superintendent, NDHP
June 22, 2010

CVISN (Commercial Vehicle Information Systems and Networks) Update

Good afternoon, Mr. Chairman and members of the Budget Section. I'm Colonel Jim Prochniak, Superintendent of the NDHP. I will be giving an update this afternoon regarding the CVISN implementation study.

- ✓ SB 2011 appropriated $100,000 to develop a report on the possibility of CVISN deployment.
- ✓ McFarland Management in association with Iteris has submitted their findings as required by an RFP in the document titled North Dakota CVISN Deployment Planning.

The North Dakota Core CVISN planning process has been a success. This process has yielded the following important accomplishments:

1. The ND CVISN team (as defined in Chapter 1.4) has reunited and gained consensus on how to move forward to deploy Core CVISN components.
2. An approach to obtain a CVIEW (commercial vehicle information exchange window) product was determined.
3. An approach to conduct E-Screening consistent with North Dakota's enforcement paradigm was determined.
4. Input from ND motor carriers was obtained indicating a strong support for the state to deploy systems to meet core CVISN compliance. Additionally, the industry supports moving beyond Core into Expanded CVISN to deploy systems such as E-Permitting enhanced with automated routing.
5. North Dakota's Core CVISN Program Plan and Top-Level Design document was re-written in the new FMCSA format and provides a roadmap for how North Dakota plans to meet Core CVISN compliance. This document will soon be submitted to FMCSA for approval.

Near term activities to move toward Core CVISN deployment include:

- ♦ Obtain FMCSA approval of ND Core CVISN Program Plan and Top-Level Design.
- ♦ Prepare a CVISN grant application to obtain FMCSA funds to implement the projects defined in the ND Core CVISN Program Plan and Top-Level Design and obtain Core CVISN compliance. As part of this planning activity, determine a funds matching strategy and obtain approval from North Dakota executive leadership to execute the strategy.
- ♦ Seek funding for and prepare an Expanded CVISN Program Plan and Top-Level Design. This document will allow North Dakota to secure funding for projects such as an Enhanced E-Permitting system with automated routing and additional E-Screening sites.

- Define CVIEW requirements and prepare Request for Proposal to acquire a hosted solution.
- Work with PrePass to install their equipment and systems at the West Fargo fixed facility.
- Define the E-Screening and Enforcement System requirements and prepare Request for Proposal to acquire and install mobile VWS equipment and systems at the West Fargo fixed facility.

Longer-term activities to continue to deploy and operate CVISN in North Dakota include:

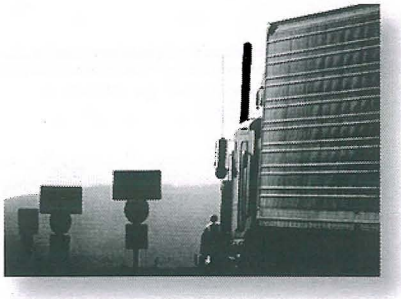
- Implement CVIEW
- Implement Hybrid approach to E-Screening at the West Fargo fixed facility.
- Complete the Core CVISN certification checklist, as soon as practical.
- Obtain certification from FMCSA of North Dakota's Core CVISN compliance.
- Apply to FMCSA for Expanded CVISN grant funds.
- Begin implementing Expanded CVISN projects as defined in North Dakota's Expanded CVISN Plan. This would include, at a minimum, the ND Enhanced E-Permitting system with automated routing and additional E-Screening facilities throughout North Dakota.

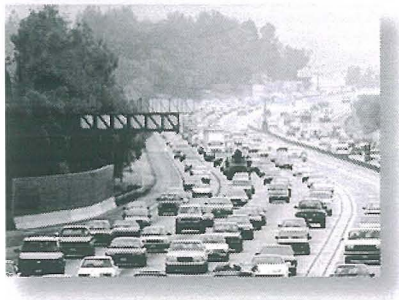
It is recommended that North Dakota pursue a vendor customized and hosted COTS (custom off-the-shelf) solution implementation of the North Dakota CVIEW. This approach will allow North Dakota to rapidly deploy a CVIEW capability which will meet Core CVISN requirements while leveraging North Dakota's investment in the new Motor Carrier System. CVIEW cost estimates range from $317,000 low end, to $639,000 high end (page 20 of CVISN Deployment Planning). The ND CVIEW project has been defined in the North Dakota CVISN Program Plan and Top Level Design. When completed, this project, along with E-screening, will help North Dakota attain CVISN Core Compliance and position North Dakota for an additional $1.0 million in CVISN funding.

The study also recommends from a CVISN standpoint that North Dakota pursue an E-screening solution utilizing Pre-Pass and their contributions towards installation of the site. In order for PrePass to be profitable, they rely on a certain level of truck traffic counts. The location of truck counts to meet the required level would be the West Fargo scale site. Utilizing this option opens up the potential for future funding in what would ultimately be the goal of automated routing and E-Screening facilities throughout North Dakota. Cost estimates for an e-screening site are $695,000 (page 29 of CVISN Deployment Planning).

Of the allocated $100,000, $80,595 was used to prepare CVISN Deployment Plan and Top Level Design, $6,092 was used for advertising, $11,755 to pay for CVISN grant application planning leaving a remaining balance of $1,158.

Mr. Chairman, members of the Budget Section, this concludes my comments. I'd be happy to answer your questions.





North Dakota CVISN Deployment Planning

Final Project Report

Submitted by:

McFarland Management, LLC

In association with:

ITERIS Innovation for better mobility

May 2010

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DEFINITION OF ACRONYMS

Acronym	Definition
AAMVA	American Association of Motor Vehicle Administrators
ADABAS	Adaptable Database System – A relational database developed by Software, AG. Typically deployed within a mainframe environment.
ASPEN	Not an acronym. PC-based system for capturing commercial vehicle inspection information at the roadside.
ASTM	American Society for Testing and Materials
AVI	Automatic Vehicle Identification – One of any number of systems capable of identifying a vehicle without human interaction. May be transponder or camera based.
CDL	Commercial Driver License
CDLIS	Commercial Driver's License Information System – Inter-jurisdictional data exchange system to query CDL information from individual state CDL databases.
CICS	Customer Information Control System – Transaction processing system typically deployed on an IBM mainframe for processing on-line transactions.
COACH	CVISN Operational and Architectural Compatibility Handbook – Series of handbooks used by states to test CVISN systems for compatibility and interoperability based upon accepted standards.
COMPASS	Not an acronym. FMCSA's single sign-on portal for public and agency users to access FMCSA systems.
CR	Compliance Review. FMCSA process for reviewing a carrier's procedures and systems.
CSA2010	Comprehensive Safety Analysis – FMCSA safety initiative which uses a set of Behavior Analysis Safety Improvement Categories (BASICs) to drive a series of progressive interventions to identify motor carriers exhibiting unsafe behavior.
CV	Commercial Vehicle
CVIEW	Commercial Vehicle Information Exchange Window – See NDCVIEW.
CVISN	Commercial Vehicle Information Systems and Networks – Federal program administered by FMCSA.
CVO	Commercial Vehicle Operations – All administrative and enforcement activities associated with motor carriers and commercial vehicles.
CVSA	Commercial Vehicle Safety Alliance – An association of state, provincial, and federal officials responsible for the administration and enforcement of motor carrier safety laws in the United States, Canada and Mexico.
EFT	Electronic Funds Transfer – A set of industry accepted standards for the secure, electronic exchange of funds between financial institutions.
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration

Acronym	Definition
FMCSR	Federal Motor Carrier Safety Regulations – Regulations enforced by FMCSA which are embodied with Chapter 49 of the Code of Federal Regulations.
FTP	File Transfer Protocol – A standard network protocol used to exchange and manipulate files over the Internet.
HAZMAT	Hazardous Material – Hazardous materials as defined in 49 CFR Parts 100-180 for FMCSA purposes.
HPCMS	Highway Patrol Case Management System – System utilized by NDHP for monitoring and tracking all activities related to cases.
IFTA	International Fuel Tax Agreement – Fuel taxation plan allowing for payment of fuel taxes to multiple states.
IRP	International Registration Plan – Commercial vehicle registration plan that allow for carriers to register vehicles in their home state and pay fees for all states over which they will travel.
ISS-2	Inspection Selection System, Version 2 – A data-driven decision-aid for commercial vehicle roadside driver/vehicle safety inspections, which guides safety inspectors in selecting vehicles for inspection, maintained by FMCSA.
ITS	Intelligent Transportation Systems – Wide range of technologies applied toward surface transportation systems in order to increase system efficiencies, capture performance data and disseminate information.
L & I	Licensing and Insurance – FMCSA system to track insurance status of motor carriers meeting federal registration and insurance criteria.
LAN	Local Area Network – A local computer network for communication between computers
LCV	Longer Combination Vehicle – Tractor and, typically, three trailers.
LPR	License Plate Reader – A machine vision system capable of scanning images of license plates and extracting character strings matching the plate, then comparing against a database.
MCMIS	Motor Carrier Management Information System – A computerized system whereby the Federal Motor Carrier Safety Administration (FMCSA) maintains a comprehensive record of the safety performance of the motor carriers (truck and bus) and hazardous materials shippers who are subject to the Federal Motor Carrier Safety Regulations (FMCSR) or Hazardous Materials Regulations (HMR).
MCS	North Dakota Motor Carrier System – System for processing IRP and IFTA transactions for the state.
MCSAP	Motor Carrier Safety Assistance Program – FMCSA program supporting roadside safety enforcement and inspection activities implemented by states.
MDC	Mobile Data Client – Software resident on a laptop providing functionality in a server client environment.
NCIC	National Crime Information Center – A computerized index of criminal justice information (i.e. - criminal record history information, fugitives, stolen properties, missing persons). It is available to Federal, state, and local law enforcement and other criminal justice agencies and is operational 24 hours a day, 365 days a year.

Acronym	Definition
NDCVIEW	North Dakota Commercial Vehicle Information Exchange Window – Customized SAFER-type database and query windows.
NDDOT	North Dakota Department of Transportation
NDHP	North Dakota Highway Patrol
NDMCA	North Dakota Motor Carriers Association
Nlets	Not and acronym. The International Justice and Public Safety Network – A secure information sharing system for state and local law enforcement agencies. It provides electronic messaging to allow information exchange between state, local, and federal agencies and support services to justice-related computer programs.
NMVTIS	National Motor Vehicle Title Information System – A system that allows the titling agency to instantly and reliably verify the information on the paper title with the electronic data from the state that issued the title.
OCR	Optical Character Recognition – A machine vision system capable of scanning images and extracting character, then comparing against a database.
OOSO	Out-of-Service-Order – Federal designation for carriers and/or vehicles which are precluded from operating.
OS/OW	OS/OW – Oversize and Overweight permits.
PIQ	Past Inspection Query – Database query administered by FMCSA for accessing past commercial vehicle inspections.
PrePass	Electronic, transponder-based, bypass system. Carriers enroll transponders and are allowed to by-pass fixed inspection facilities based upon PrePass screening algorithms.
PRISM	Performance Registration Information Systems Management – FMCSA program to promote safety-based registration and roadside targeting of at-risk carriers.
SAFER	Safety and Fitness Electronic Records – Database of commercial carrier and vehicle safety and census information.
SAFETYNET	Not an acronym. PC based system allowing entry access, analysis and reporting of data from driver/vehicle inspections, crashes, compliance reviews, assignments and complaints.
SSL	Secure Socket Layer – A set of security protocols which provide for secure transmission of information across the Internet.
TraCS	Traffic and Citation System – Laptop-based system utilized by law enforcement agencies for crash reporting and citations.
UCR	Unified Carrier Registration – Regulation that requires carriers to register and pay fees supporting state safety and credentialing activities.
USDOT	United States Department of Transportation
VIN	Vehicle Identification Number – Unique number assigned to a motor vehicle by the manufacturer.
VPN	Virtual Private Network – A network that provides secure, remote access into an enterprise network.

Acronym	Definition
VRTS	Vehicle Registration and Titling System – North Dakota's registration and title system for all vehicles.
WAN	Wide Area Network – A network of linked computers covering a multi site, national or even global area.
WASHTO	Western Association of State Highway and Transportation Officials
WIFI	A brand name developed by the Wi-Fi Alliance to ensure compatibility among products which communicate data wirelessly via the IEEE 802.11.
WIM	Weigh-In-Motion – Scaled designed to weigh vehicles while the vehicle is moving.
XML	Extensible Markup Language – A widely accepted way of sharing information over the Internet in a standard, generic way.

1 INTRODUCTION

1.1 Commercial Vehicle Information Systems and Networks (CVISN)

CVISN is a national program sponsored by the Federal Motor Carrier Safety Administration (FMCSA) and designed to:

- ✓ Improve safety and productivity of motor carriers, commercial vehicles and their drivers
- ✓ Improve efficiency and effectiveness of commercial vehicle safety programs through targeted enforcement
- ✓ Improve commercial vehicle data sharing within states and between states and FMCSA
- ✓ Reduce Federal/State and industry regulatory and administrative costs

Through CVISN, FMCSA provides grant funding to states wishing to deploy projects which fit within the scope of the CVISN program. FMCSA recognizes two levels of CVISN deployment. Core CVISN requires states to implement a fundamental set of capabilities which align each state to national CVISN requirements. FMCSA provides up to $2.5M in grant funding for Core CVISN. Table 1-1 provides an overview of the capabilities required for states to be Core CVISN compliant.

Table 1-1 Core CVISN Requirements

Capability Area	Capability
Safety Information Exchange	Aspen Deployed
	SAFER Snapshot Exchange
	CVIEW Deployed
Credentials Administration	Automated IRP Credentials
	Automated IFTA Credentials
	Ready To Extend To Permits
	IRP Clearinghouse Connection
	IFTA Clearinghouse Connection
	10% Transaction Volume Electronic
Electronic Screening	At Least One Fixed Or Mobile Implementation
	Ready To Replicate

The second level of CVISN deployment is Expanded CVISN. Under Expanded CVISN, once states obtain Core CVISN certification, they are eligible to receive up to $1.0M in additional grant funding annually for deployment and maintenance of a variety of projects and systems related to CVISN. To date, North Dakota is compliant in most elements of the Credentials Administration portion of Core CVISN capabilities.

The North Dakota Highway Patrol (NDHP) and North Dakota Department of Transportation (NDDOT) are working together to conduct the necessary steps to obtain CVISN core compliance.

1.2 Project Purpose/Objectives

The purpose of this project was to position North Dakota to become CVISN core compliant through conducting a CVISN Deployment Planning process. The three key objectives of the project were to:

- Determine approach to deploy a CVIEW system in North Dakota
- Determine approach to deploy an E-Screening system in North Dakota
- Update North Dakota's CVISN Program Plan and Top-Level Design document and submit to FMCSA for approval

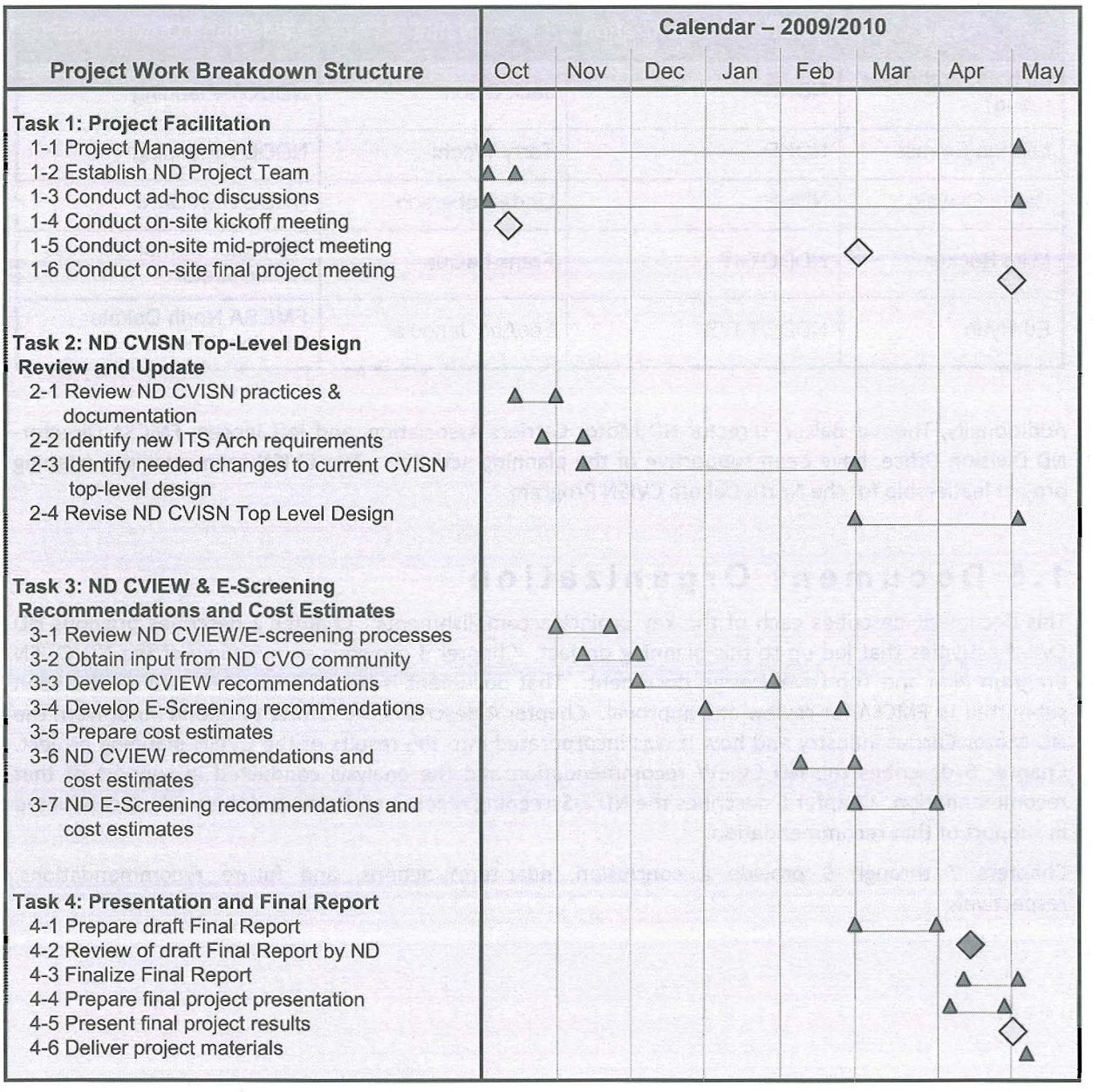
1.3 Task/Schedule Overview

The NDHP and NDDOT initiated a CVISN planning project to achieve the stated purpose and objectives. The following tasks were completed by the ND CVISN Team, with assistance from the consultant team of McFarland Management, LLC and Iteris, Inc.:

1. Conduct Project Facilitation
    a. Project management
    b. Conduct three on-site meetings and ad-hoc discussions as necessary
2. Update ND CVISN Program Plan and Top-Level Design Document
    a. Review current ND CVISN practices
    b. Identify needed changes and update document
3. Recommend ND CVIEW and E-Screening Approaches
    a. Review ND Practices
    b. Obtain input from ND motor carriers
    c. Develop CVIEW recommendation, including cost estimates
    d. Develop E-Screening recommendation, including cost estimates
4. Prepare Final Report and Present Final Project
    a. Prepare project Final Report (this document)
    b. Prepare Final Presentation and present to Executive Management

The project schedule and detailed task breakdown is shown in Figure 1-1 below.

Figure 1-1 ND CVISN Deployment Planning Project Schedule



1.4 North Dakota CVISN Team

North Dakota stakeholders in the CVISN program have worked together to successfully accomplish this ND CVISN planning process. Direct responsibility for motor carrier regulation is shared by two North Dakota agencies. These agencies are the North Dakota Highway Patrol and the North Dakota Department of Transportation. In addition, the Federal Motor Carrier Safety Association (FMCSA) and the Federal Highway Administration (FHWA) continue to provide valuable assistance regarding CVISN program requirements, benefits, and potential funding options. Specific members of the ND CVISN Team include the following table 1-2.

Table 1-2 ND CVISN Team Members

Name	Position / Organization	Name	Position / Organization
Lt. Kyle Kirchmeier (Lead)	NDHP	Jack Olson	NDDOT-Planning
Leanna Emmer	NDHP	Terry Woehl	NDDOT-Planning
Carrie Oswald	NDHP	Linda Roberson	NDDOT-MVD/IRP
Mike Becker	NDDOT-IT	Frank LaQua	ND Motor Carrier Services Administrator
Ed Ryen	NDDOT-ITS	LeeAnn Jangula	FMCSA North Dakota Division Office

Additionally, Thomas Balzer, Director-ND Motor Carriers Association, and Jeff Jensen, FMCSA Director-ND Division Office, have been supportive of the planning activities. The CVISN team provides ongoing project leadership for the North Dakota CVISN Program.

1.5 Document Organization

This document describes each of the key project accomplishments. Chapter 2 describes previous ND CVISN activities that led up to this planning project. Chapter 3 provides an overview of the ND CVISN Program Plan and Top-Level Design document. That document is bound separately and will be soon submitted to FMCSA for review and approval. Chapter 4 describes the efforts to obtain input from the ND Motor Carrier industry and how it was incorporated into the results of the CVISN planning project. Chapter 5 describes the ND CVIEW recommendation and the analysis conducted in support of that recommendation. Chapter 6 describes the ND E-Screening recommendation and the analysis conducted in support of that recommendation.

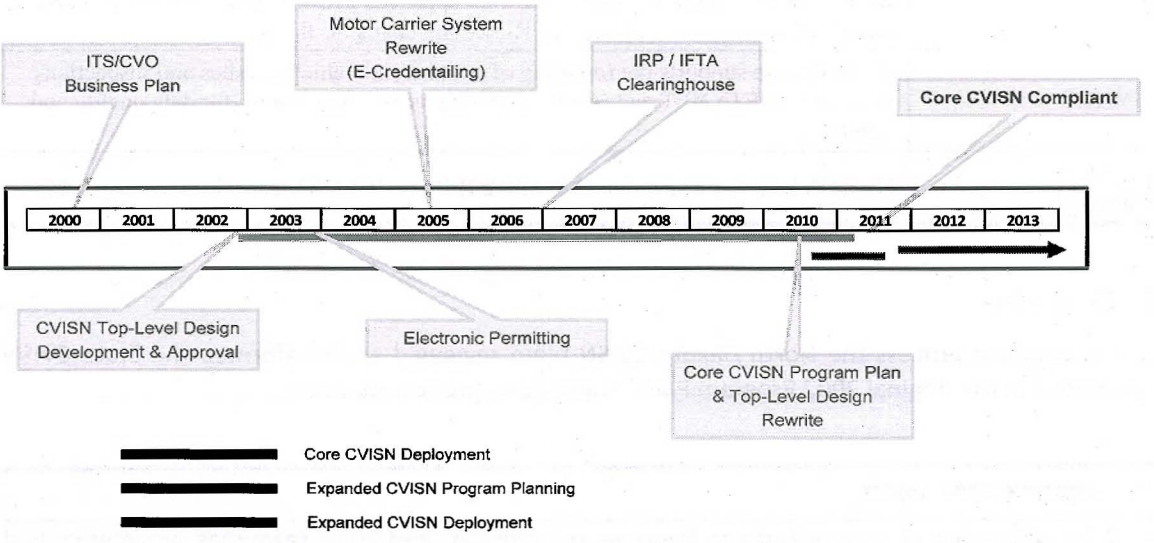
Chapters 7 through 9 provide a conclusion, near-term actions, and future recommendations, respectively.

2 CVISN IN NORTH DAKOTA

2.1 History

In the late 1990's North Dakota participated in a series of regional workshops sponsored by FMCSA. These workshops formed the basis for North Dakota's involvement in the Commercial Vehicle Information Systems and Networks (CVISN) program.

North Dakota's commitment to CVISN was formalized by the development and approval of the North Dakota CVISN Top-Level Design in 2003. Since that time, North Dakota has developed and deployed several CVISN-related projects. The following timeline provides a snapshot of major milestones, accomplished and planned, associated with North Dakota CVISN:



This Core CVISN Program Plan & Top-Level Design rewrite represents a key milestone for the state. The plan forms the basis for completing Core CVISN capabilities and, when certified by FMCSA, will allow North Dakota to access an additional $1.0M annually for deployment of other, expanded CVISN projects and maintain deployed Core CVISN projects.

In developing this plan, the CVISN team reviewed the current status of CVISN deployment throughout the state and contrasted current conditions against strategies, goals and plans for future projects. The following, table 2-1, provides a snapshot of ongoing North Dakota CVISN activities.

Table 2-1 On Going ND CVISN Activities

CVISN Activities	Description
E-Credentialing	**IRP & IFTA** North Dakota rewrote and modernized North Dakota IRP and IFTA systems. This activity was completed with state funds and provides on-line tools for motor carriers to conduct interstate registration and fuel tax business. **E-Permitting** Beginning in 2003, North Dakota has moved the application and issuance of several permits into an on-line environment. This provides North Dakota motor carriers with additional tools to make their operations more efficient. Future enhancements to this system will be included in North Dakota Expanded CVISN Planning.

CVISN Activities	Description
ASPEN	North Dakota has deployed approximately 110 ASPEN roadside systems to NDHP troopers and civilian commercial vehicle inspectors throughout the state. North Dakota has been using ASPEN for all commercial vehicle inspections since the late 1990's.
Mobile Client	NDHP is helping FMCSA pilot test the Mobile Client system. This client / server system is currently being deployed in a limited mode with NDHP utilizing functionality for New Entrant requirements.
CVISN Planning	North Dakota has reconstituted their CVISN team, completed initial Core CVISN planning and will move toward Expanded CVISN planning. This initial activity has been funded by North Dakota and demonstrates the state's commitment to CVISN.
PRISM	North Dakota is currently deploying their approved PRISM plan. The two projects described in this plan support the PRISM objectives for the state.
SAFETYNET	North Dakota supports the reporting of commercial vehicle crashes and inspections through SAFETYNET and regularly maintains a "Good" rating for data quality and timeliness.
IRP & IFTA Clearinghouses	North Dakota has been a member of the IRP and IFTA Clearinghouses since 2006.

2.2 Goals

During this planning process the North Dakota CVISN team reviewed and re-affirmed the State CVISN goals described in the original 2002 Program Plan. These goals are restated here:

Goal #1 - Improve CMV Safety
a. Take advantage of new systems to improve enforcement and focus resources on vehicles and locations with higher risks. b. Develop systems and processes that will provide timely access to data to better allocate program resources to critical problem areas.

Goal #2 - Improve Administrative Processes
a. Update and maintain existing systems to allow compatibility with ITS/CVO. b. Maintain and improve customer service given reduced staffing levels and increased activity.

Goal #3 - Support and Participate in Regional and International Motor Carrier Operations Activities
Regional coalitions such as the I90 / I94 Northwest Passage and national activities such as FMCSA, IRP, IFTA, UCR, CVSA, AAMVA and WASHTO workshops and meetings.

The activities that have lead to development of the North Dakota Core CVISN Program Plan and Top-Level Design have followed a logical progression starting with reconstitution of the North Dakota CVISN team. The team, with assistance from the FMCSA North Dakota Division Office, was tasked with

assessing the current status of CVISN deployment and developing a plan to achieve core deployment in a fashion that met FMCSA requirements and North Dakota operational and budgetary constraints.

The team subsequently created a RFP and contracted for consultant services to assist in development and execution of the CVISN process.

A detailed assessment of current CVISN status led to a snapshot of multiple systems involved in CVISN activities the state. Project descriptions for the E-Screening and Enforcement Solution and CVIEW projects were developed. The project descriptions formed the basis of the program plan including updates to the systems and networks diagrams needed to support the projects. High level project plans, including tasks, schedules and budgetary estimates were developed and combined with design elements to develop the draft and finalized North Dakota CVISN Program Plan and Top-Level Design. Ultimately the FMCSA approved document will lead to refinement of the high-level project plans, grant submittals and deployment activities.

2.3 Current CVISN Deployment Status

North Dakota is currently in CVISN Core Deployment mode. An internal assessment of North Dakota's CVISN deployment has been accomplished and this verifies the core deployment status. Table 2-2, details the current North Dakota status.

Table 2-2 North Dakota Core CVISN Status

Capability Area	Capability	Status (C/I/P/N)[a]
Safety Information Exchange	ASPEN Deployed	C
	SAFER Snapshot Exchange	P
	CVIEW Deployed	N
Credentials Administration	Automated IRP / IFTA Credentialing – Ready to Replicate to Other Credentials	C
	Provide Interstate Credential Updates to SAFER	N
	Provide Credential Updates to CVIEW	N
	IRP & IFTA Clearinghouse Connections	C
	10% Transaction Volume Electronic	C
Electronic Screening	Use Snapshots for Screening	N
	At Least One Fixed Or Mobile Implementation	N
	Ready To Replicate	N

(a) C=Complete, I=In Progress, P=Partial, N=Not Compliant

As can be seen in Table 2-2, North Dakota has successfully implemented ASPEN, electronic exchanges of inspections with SAFER, electronic credentialing, including permits, and connections to the IRP and IFTA Clearinghouses. North Dakota lacks a CVIEW with a SAFER connection and an E-Screening capability. With the successful addition of these two elements, North Dakota will be CVISN Core Compliant. Upon

certification of core compliance, North Dakota intends to initiate Expanded CVISN planning in order to create the North Dakota Expanded CVISN Program Plan and Top-Level Design. Many materials developed for this plan will form the basis for the expanded plan. North Dakota's Expanded CVISN Program Plan and Top-Level Design will include many additional projects including Enhanced Electronic Permitting and Routing capabilities.

2.4 Planned CVISN Deployment Projects

As can be seen in Table 2-2, North Dakota has implemented key electronic credentialing capabilities and ASPEN inspection capabilities. This section defines two high-priority CVISN projects that will lead to North Dakota achieving Core CVISN compliance. These projects are North Dakota CVIEW and E-Screening and Enforcement System. Table 2-3 displays where each of these projects aligns with the Core CVISN capability requirement.

Table 2-3 Project Alignment

Capability	Status (C/I/P/N)[a]	Projects	
		NDCVIEW	E-Screening & Enforcement System
Safety Information Exchange			
SAFER Snapshot Exchange	P	✓	
CVIEW Deployed	N	✓	
Credentials Administration			
Provide Interstate Credential Updates to SAFER	N	✓	
Provide Credential Updates to CVIEW	N	✓	
Electronic Screening			
Use Snapshots for Screening	N	✓	✓
At Least One Fixed Or Mobile Implementation	N		✓
Ready To Replicate	N		✓

(a) C=Complete, I=In Progress, P=Partial, N=Not Compliant

3 PROGRAM PLAN AND TOP-LEVEL DESIGN

As part of this planning project, and utilizing the new FMCSA format, the North Dakota CVISN Program Plan and Top-Level Design was updated. The completed document is bound separately and contains the following sections:

- Section 1 of the ND CVISN Program Plan and Top-Level Design provides background information on CVISN and this program plan.
- Section 2 discusses North Dakota CVISN goals, current deployment status and planned Core CVISN deployment activities.
- Section 3 provides system and network details for each project identified. Project design details include conformity with CVISN architecture, National ITS Architecture and PRISM requirements. In addition, each project design details compliance with North Dakota and third party requirements such as ASTM specifications.
- Section 4 provides an overview of the procurement strategy for acquiring services and products defined within the plan.
- Section 5 defines the high level project schedules in order to convey overall project time and major task dependencies for each CVISN Project.
- Section 6 provides program budget details. FMCSA CVISN grants require a 50% match. This match requirement may be met indirectly by allocating certain qualified state expenditures such as selected labor, maintenance and operation costs associated with CVISN activities.
- Section 7 identifies key design and deployment issues along with associated mitigation strategies.

4 NORTH DAKOTA MOTOR CARRIER INPUT

As part of Task 3, selected ND motor carriers were contacted to determine their awareness, use, and impressions of commercial vehicle industry supportive technologies (CVISN). The technologies discussed with the ND motor carriers included:

- Electronic credentialing – Internet based system to register vehicles (IRP, UCR), pay taxes (IFTA), and purchase permits
- Electronic screening along the highway allowing bypass of check stations – weight, credentials, taxes paid, and safety

A list of potential ND motor carriers that could be contacted was provided by ND Motor Carrier Association, NDHP and NDDOT, including large and small carriers providing service in a variety of markets. This list, and the contact status, is shown in Table 4-1.

Table 4-1 Potential ND Motor Carrier Contacts

Company	Contact	Phone	Status
Black Hills Trucking	Darrel Dirks	307-266-0273	**Interviewed.**
J&S Heavy Haul	Amy Roberts	701-222-6316	**Interviewed.**
A&L Trucking	Jason Boushey	701-746-8232	Contacted. Number disconnected. Did not interview.
EW Wylie	Rick Antoine	800-437-4132	Contacted. Did not interview.
Wiest Truck Lines	Dave Tuhy	701-252-6451	**Interviewed.**
TMI Transport	Pat Severson	800-456-6716	**Interviewed.**
Farstad Oil	Eric Lawson	701-280-1200	**Interviewed.**
Prairie Lines	Carol Schmidt	701-663-2391	**Interviewed.**
8 J's Trucking	Tammy	701-462-8258	**Interviewed.**
Kraft	Regina	701-667-2040	Contacted. Did not interview.
W E Seigel	Wally	701-258-4031	Contacted. Did not interview.

4.1 Approach

An interview guide (see Appendix A) was prepared and used to document the discussions with ND motor carriers. Each motor carrier listed above was contacted and 7 interviews were successfully conducted. The information learned from these discussions is summarized below.

4.2 Summary of Findings

A summary of findings from the ND motor carrier interviews is provided below.

4.2.1 Truck Company Operations

The carriers interviewed included a good cross section of companies (large and small) in a variety of markets. Some companies owned and operated their vehicles, some leased their vehicles, and others

were brokers for multiple owner/operators. The information gathered included a wide range of parameters, including:

- Number of trucks being operated by a particular company ranged from 2 to over 35 (brokers involved with over 200 trucks)
- Most interviewed were Interstate carriers. About half of those interviewed operated throughout the United States and traveled in almost all states; the other half operated regionally in a few adjacent states. None of those interviewed just operated in North Dakota.
- Types of loads included heavy equipment, construction equipment, fuel products, grain and feed products, and finished goods produced by the company.
- Industries supported included general construction, agriculture, oil, and manufactured cabinetry.
- Do they purchase permits in ND? Mostly do in some form. About half currently purchase OS/OW permits – most of which are annual/self-issued permits. A few very large loads require a more extensive permit involving NDDOT engineering staff be involved.

4.2.2 Technology Awareness

The responses to these questions were very dependent on their trucking operations. Generally, the greater the distance they traveled and the more states they operate in the more aware they are of CVISN technologies. Also the responses were dependent on their industry and whether or not they are currently using some of the technologies. Specific responses to each technology included:

- In vehicle responders – 5 out 7 were aware; 2 were not
- Weigh-in-motion at highway speeds – 6 out of 7 were aware; 1 was not
- Electronic Screening along the highway – 5 out of 7 were aware; 2 were not
- Electronic Credentialing – all were aware
- Electronic Permitting – all were aware

4.2.3 Technology Participation/Experience/Impression

In general their experience with and impression of CVISN technologies was positive. Again, their responses were dependent on their type of business and trucking operation. Their participation and experience with these technologies was strongest with Electronic Credentialing and Electronic Permitting. Several companies said they do not participate in or have much experience with Electronic Screening. Two companies said they have PrePass transponders and liked that system. The heavy and construction equipment haulers said that Electronic Screening would not benefit them because the nature of what they are transporting and the fact that they require OS/OW permits requires them to stop at weigh stations and bypassing was not an option.

4.2.4 Technology in North Dakota

All those interviewed had experience with Electronic Credentialing and Electronic Permitting in ND. No one had experience with Electronic Screening in ND (not surprising), and only one company was aware of the ND weigh-in-motion sites.

Everyone interviewed expressed support for CVISN technologies in North Dakota. Many could enumerate the benefits to their companies, as well as the entire traveling public. Even if they were not sure of the direct benefit to them (i.e., many were not sure the Electronic Screening would directly benefit them), they believed the technologies would benefit the entire trucking industry and traveling public, and therefore they were supportive. Benefits mentioned most often included:

- Time savings on the road not having to pull into a designated station or be inspected

- Reduce costs in NDHP and NDDOT, therefore no need to raise taxes or fees
- Efficiency of trucking company office staff in registering vehicles and obtaining permits
- Assisted companies monitor their trucks and drivers
- Increase safety on the highways

Those companies that purchase OS/OW permits were STRONGLY supportive of North Dakota's plans to automate their OS/OW permitting process. They were very glad to hear ND was considering this technology and some had experience in other states with similar systems. They expressed a great need for an automated permitting system in ND. Even those companies that only infrequently purchased OS/OW permits expressed interest in an automated system and were supportive of ND moving forward with these plans.

4.2.5 Limitations or Opportunities

This final question was open-ended and gave them an opportunity to express any other thoughts or concerns. Here are the highlights:

- Need to include CSA 2010 requirements and include drivers in databases and inspections
- Need to find a way to deter thievery of trucks and trailers
- Concerned about there being different processes and rules in each state related to OS/OW loads. It is difficult to plan interstate trips of OS/OW loads when the allowances are different. There is a strong need for consistency. (Note: they did add that ND is the easiest to work with).
- Encourages regional permitting. It is sometimes difficult and time consuming to obtain permits in several states for the same trip and would appreciate a regional permitting system. They noted that other states are participating in a system to issue permits this way.
- There is a need for a common transponder that would be used for CVISN purposes as well as for toll roads. This was mentioned by more than one company, that they have multiple transponders and it is becoming a problem.
- One company had difficulty using the current ND online system for purchasing OW permits and most of the time could not make it work for them. They are now back to calling to get the permit and have given up using the online system.
- The permit systems in each state are different. They would like to see more uniformity. It is difficult to keep office trained on how to use each system. They don't see why it has to be that way. If ND is considering a new permitting system, they encourage them to work with other states and try and accomplish a uniform or common system.

4.3 Conclusions

North Dakota commercial vehicle motor carriers are supportive of CVISN technology in general and specifically encourage NDHP and NDDOT to expand their deployment and use of these technologies. Most of the carriers interviewed were familiar with the technologies mentioned from their use and involvement in other states. They currently use the Electronic Credentialing applications available in North Dakota and are supportive of expanded functionality for online permitting. They were less familiar with North Dakota's weigh-in-motion and mobile inspection activities, but were also supportive of Electronic Screening technologies (believing these technologies help all motorists).

Additionally, the carriers offered other comments related to future technology deployments to enhance the functionality and uniformity. These additional comments were considered during development of the ND CVISN Program Plan.

In conclusion, the results of this research have indicated to NDHP and NDDOT that the North Dakota motor carrier industry is strongly supportive of their efforts to deploy CVISN technologies throughout the state.

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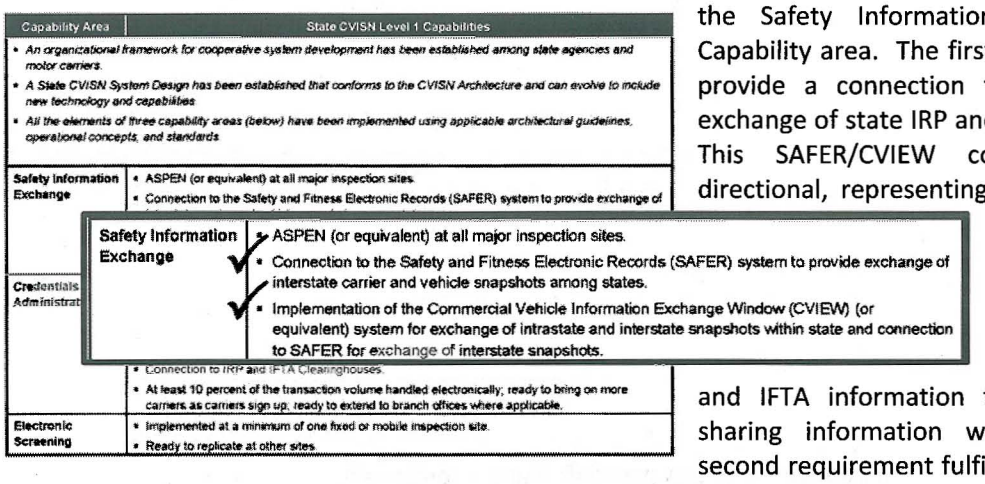
5 CVIEW RECOMMENDATION

5.1 Introduction

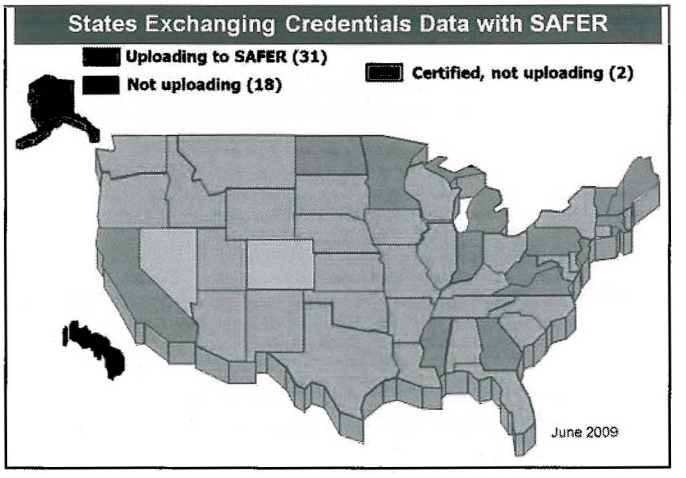
The Commercial Vehicle Information Exchange Window (CVIEW) fulfills two CVISN requirements within the Safety Information Exchange Core Capability area. The first requirement is to provide a connection to SAFER for the exchange of state IRP and IFTA information. This SAFER/CVIEW connection is bi-directional, representing uploads of North Dakota IRP registration with IFTA license data to SAFER, and downloads of IRP and IFTA information from other states sharing information with SAFER. The second requirement fulfilled by CVIEW is to provide a repository of interstate and intrastate commercial carrier and vehicle information which is available to authorized North Dakota roadside and desk side commercial vehicle operations (CVO) users.



North Dakota is currently deploying Core CVISN capabilities but has no CVIEW system. The North Dakota CVISN team has identified the North Dakota CVIEW project as a priority in its Core CVISN Program Plan and Top-Level Design. The purpose of this document is to provide North Dakota with a set of recommendations regarding the deployment of a CVIEW system which both meets FMCSA Core CVISN requirements and also provides a useful tool for North Dakota's CVO users. This document also provides a high-level cost estimate to be used for project planning and development of a grant application.

5.2 Alternative Analysis

Basic CVIEW designs have been utilized for storing and exchanging motor carrier and commercial vehicle information since the late 1990's with the deployment of the John's Hopkins CVIEW system used by CVISN Pilot states. This early version of CVIEW relied upon electronic data interchange (EDI) protocols for the exchange of information between systems. Since these early pilot deployments 31 states are now sharing credential information with SAFER through a variety of CVIEW platforms utilizing XML data exchange protocols and web-services. These various states' CVIEW's constitute both custom state or contractor developed systems and vendor commercial-off-the-shelf (COTS) systems with customizations for state-specific needs.



The level of CVIEW deployment which states adopt depends upon the intended use of the CVIEW. Appendix B provides an analysis for the technical capabilities and relative costs of various CVIEW deployment options. Upon review of the information in Appendix B, it was apparent that North Dakota would prefer a database-driven CVIEW deployment option. This option provides several advantages to the state including:

1. A rapid deployment scenario when coupled with North Dakota's rewritten Motor Carrier System.
2. A local copy of SAFER date to be coupled with future system interfaces to provide advanced query/screening/reporting tools for state users.
3. A database engine through which additional web-based tools and services may be deployed.

The following sections describe various alternatives available to North Dakota when deploying a database-driven CVIEW and an assessment of these alternatives in terms of criteria which is pertinent to North Dakota.

5.2.1 Alternatives

The alternative analysis employed for North Dakota looks at four different CVIEW alternatives as described below:

1. Develop In-House – Maintain In-House

This alternative entails "in-house" design, development and deployment of a CVIEW system which is compliant with SAFER architecture requirements and provides functionality to roadside and desk side users. The system would be maintained by North Dakota IT personnel and reside within the North Dakota state wide area network (WAN). Maintenance would include managing network connections, database administration, SAFER compliance, maintaining CVIEW system interfaces and bi-annual hardware refresh.

2. Contract Custom Build – Maintain In-House

With this alternative, North Dakota would be responsible for designing a CVIEW system and then contract with a software company or utilize a master service agreement for development of the CVIEW system. The system would be maintained by North Dakota IT personnel and reside within the North Dakota state WAN. Maintenance would include managing network connections, database administration, SAFER compliance, maintaining CVIEW system interfaces and bi-annual hardware refresh.

3. Customized COTS – North Dakota Host

Under this alternative, North Dakota would purchase a commercial-off-the-shelf (COTS) solution from a pool of vendors who sell CVIEW products. The COTS CVIEW would be customized to include North Dakota-specific interfaces requiring work by North Dakota IT and vendor personnel. The system would reside within the North Dakota state WAN, with North Dakota personnel responsible for managing network connections and the bi-annual hardware refresh. The vendor would perform database administrator functions; maintain compliance with the SAFER design requirements and maintaining the CVIEW-side system interfaces.

4. Customized COTS – Vendor Hosted

As with alternative 3 North Dakota would purchase a COTS solution from a pool of vendors who sell CVIEW products. The COTS CVIEW would be customized to include North Dakota-specific interfaces. The vendor would host the system and be responsible for managing network connections, database administration functions, maintaining compliance with the SAFER design requirements, maintaining

CVIEW system interfaces and the bi-annual hardware refresh. Table 5-1 provides a summary view of responsibilities for each of the four alternatives.

Table 5-1 CVIEW Responsibility Summary

Function	Alternative 1	Alternative 2	Alternative 3	Alternative 4
System Design	North Dakota	North Dakota	Vendor	Vendor
System Development	North Dakota	Contractor	Vendor	Vendor
Network Management	North Dakota	North Dakota	North Dakota	Vendor
Database Administration	North Dakota	North Dakota	Vendor	Vendor
Hardware Refresh	North Dakota	North Dakota	North Dakota	Vendor
SAFER Compliance	North Dakota	North Dakota	Vendor	Vendor
Interface Management (CVIEW-Side)	North Dakota	North Dakota	Vendor	Vendor

5.2.2 Assessment Criteria

Each of the four alternatives was evaluated using a set of four criteria designed to provide a relative comparison and contrast of each alternative to the other. These criteria are:

1. **Initial Cost**

   This criterion measures the initial cost of deploying a CVIEW system. This would include vendor costs and internal development costs depending upon the option selected.

2. **Life-Cycle Cost**

   This criterion provides an assessment of the overall cost of maintaining and upgrading the system. This includes such items as maintaining alignment with FMCSA standards, database administration, hardware refreshes and maintenance of software.

3. **Deployment Time**

   This measure includes lead time for development, testing and deployment of a SAFER compliant CVIEW system.

4. **Change Control**

   This criterion considers the degree of control over the system, including requests for system maintenance, modifications and enhancements.

Each criterion is given a qualitative measure in the form of a graphic representing a position along a scale from "less" to "more". The purpose of this qualitative measure is to provide a visual means of comparing the various CVIEW alternatives. The example shows how this approach assesses an option using the Initial Cost assessment criterion. Table 5-2 displays each of the alternatives with an assessment of the associated evaluation criteria.

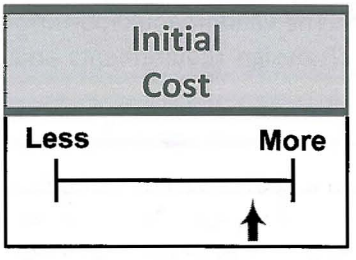
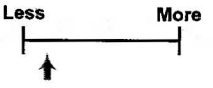
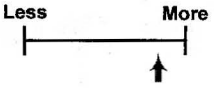
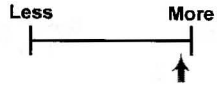
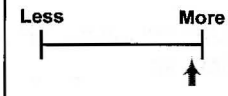
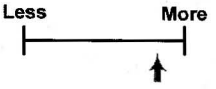
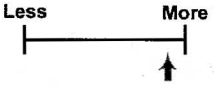
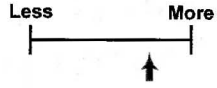
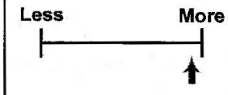
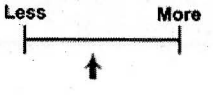
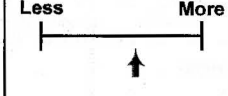
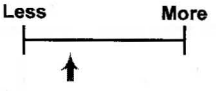
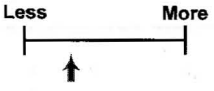
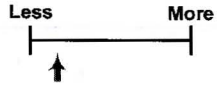
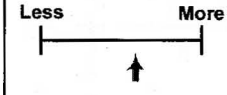


Table 5-2 CVIEW Alternative Analysis

Alternative	Initial Cost	Life-Cycle Cost	Deployment Time	Change Control
#1 Develop In-House / Maintain In-House				
#2 Contract Custom Build / Maintain In-House				
#3 Customized COTS / North Dakota Host				
#4 Customized COTS / Vendor Host				

5.2.3 Analysis

Least Initial Cost to State = #1 Develop In-House

Alternative 1 represents least initial cost to the state however the cost differential between an in-house development project and acquiring a license for a COTS vendor product would be small. Alternatives 3 and 4 take advantage of the fact that a vendor community has developed COTS CVIEW systems and have sold such systems to a number of state clients, thus amortizing design and development costs across a large number of systems. Alternative 2 trends toward "more" initial cost as the state will bear the cost of design and development of a CVIEW system.

Least Life-Cycle Cost = #4 Customized COTS/Vendor Host

Alternative 4 represents the least life-cycle cost because of the efficiencies gained through managing and refreshing multiple CVIEW systems within the vendor's data center. Vendors have deployed and maintain a number of installations, both hosted by the vendor and within state networks, and have developed systems and procedures allowing them to be efficient with system administration and maintenance tasks. As with the initial cost, life-cycle costs trend toward "more" for Alternatives 1 and 2 for much the same reason as initial cost. These alternatives require dedicated state IT resources which, many times, are non-existent or deployed in support of existing systems.

Least Deployment Time = #4 Customized COTS/Vendor Host

In the case of Alternative 4, the vendor will not have to rely on scarce state network support for installation and configuration of the CVIEW server, this Alternative 4 has the shortest deployment time estimate. Alternatives 1 and 2 trend towards longer deployment times because the CVIEW project will be competing for state IT resources from development through deployment.

Most Control Over Changes = #1 Develop In-House/Maintain In-House & #2 Contract Custom Build/Maintain In-House

Alternatives 1 and 2 provide the greatest degree of change control over the CVIEW system. With Alternatives 3 and 4, the state may need to negotiate change orders with the vendor or work with a multi-state user group to propose changes. Maintenance would be dictated by contract.

5.3 Recommendation

Table 5-3 summarizes the results of the alternative analysis.

Table 5-3 Recommendation Summary

Criteria	#1 Develop In-House / Maintain In-House	#2 Contract Custom Build / Maintain In-House	#3 Customized COTS / North Dakota Host	#4 Customized COTS / Vendor Host
Least Initial Cost to State	✓			
Least Life-Cycle Cost to State				✓
Least Deployment Time				✓
Most Control Over Changes	✓	✓		

It is recommended that North Dakota pursue a vendor customized and hosted COTS solution for implementation of the North Dakota CVIEW. This approach will allow North Dakota to rapidly deploy a CVIEW capability which will meet Core CVISN requirements while leveraging North Dakota's investment in the new Motor Carrier System. Modernization of the Motor Carrier System provides a system which can easily interface with current CVIEW COTS products. Deployment of a vendor COTS solution will minimize the technical risk for the CVIEW project while maximizing speed to full deployment. A high-level operational scenario of this recommendation can be found in Appendix C of this document.

This recommendation includes the following considerations:

Requirements Gathering – It is recommended that a working group be established to gather requirements for a CVIEW. Activities could include "fly-bys" from various vendors and examination of other state's RFPs, specifications and requirements. The purpose of this activity will be to both inform the working group of CVIEW capabilities and also form the basis for a procurement action.

Procurement – It is recommended that North Dakota procure a CVIEW system through a competitive RFP process. This process will provide for a solution that meets North Dakota technical requirements and be cost effective. The RFP should include options for various system interfaces in addition to those required for Core CVISN compliance. The RFP should request various hosting options including having a

vendor host the system or have the system maintained within the NDDOT network. The RFP should also request various multi-year maintenance and support options.

Phased Approach – It is recommended that the North Dakota CVIEW be deployed in a phased approach with a focus on establishing Core CVIEW compliance very near the beginning of the project. The phased approach will help meter the scope of the project and provide milestones during which accomplishments can be integrated into the base CVIEW system.

System Interfaces – In addition to the required interface between CVIEW and the Motor Carrier System (MCS) for IRP and IFTA information, it is recommended that additional "non-core" interfaces be added as part of the CVIEW acquisition. Previous CVIEW installation experience has indicated that these additional interfaces will provide enhanced functionality for desk side users and roadside enforcement. These interfaces are:

- An interface to the Vehicle Registration and Titling System (VRTS)[1] to obtain intrastate commercial vehicles and title information. This information will greatly enhance the effectiveness of the CVIEW querying functions as well as E-Screening. NDHP enforcement personnel probably encounter more intrastate vehicles than interstate during daily activities.
- An interface to the E-Permitting system will allow for enforcement officers to have access to timely permit data through a web-based CVIEW querying function. Permit information could also be integrated into E-Screening activities. The design of the interface will be dependent upon the nature of future changes to the E-Permitting system.
- An interface to the E-Screening function to allow for automated pass/fail messaging based upon plates/jurisdictions and USDOT numbers coming from the roadside License Plate Reader (LPR) and USDOT Number Reader (USDOTR) capture sub-systems.

5.4 Cost Estimate

Table 5-4 shows key CVIEW cost elements rolled-up for a total estimated project cost. The cost display reflects a low-end and high-end estimate based upon previous vendor COTS system installations.

[1] North Dakota does not currently require intrastate motor carriers to obtain a USDOT number or use identifiers of any kind. North Dakota will need to adopt rules requiring intrastate carriers to obtain a USDOT number prior to design of this system interface. This interface is described here for planning purposes only.

Table 5-4 CVIEW Cost Estimate

Description	COTS	
	Low End	High End
Requirements Gathering - Development of Sope of Work	$ 25,000	$ 60,000
Base CVIEW System	$ 100,000	$ 300,000
Customization for Intrastate Carriers / Vehicles Interface	$ 12,000	$ 24,000
Customization for Permits Interface	$ 10,000	$ 24,000
Customization for E-Screening Interface	$ 10,000	$ 24,000
System Sub-Total	$ 157,000	$ 432,000
System Maintenance (5 Years)	$ 100,000	$ 132,000
Hosting Cost (5 Years)	$ 60,000	$ 75,000
Maintenance & Hosting Sub-Total	$ 160,000	$ 207,000
System Total	$ 317,000	$ 639,000

For purposes of this document, the CVIEW cost estimate described below does not include the 50% required CVISN match. The CVISN grant application must reflect this cost plus the state match.

5.4.1 Cost Element Definitions

Requirements Gathering – Development of Scope of Work – This activity would cover costs associated with gathering CVIEW requirements and developing a Scope of Work to be inserted into a RFP.

Base CVIEW System – This includes any one time license fees, installation of the base CVIEW system, automated data exchange processing, establishment of a North Dakota SAFER account, SAFER download and upload certification, IRP data exchange specifications, IFTA data exchange specifications, IRP and IFTA interface testing, web-based query windows, ad-hoc reporting, administrator functions and all required SAFER certifications. North Dakota will be compliant with the FMCSA Core CVISN CVIEW requirement upon completion of the base system installation.

Customization for Intrastate Carriers / Vehicles Interface – This includes vendor costs associated with creating and testing a system interface between VRTS and CVIEW for the exchange of intrastate commercial carrier and vehicle information. Note: North Dakota does not currently require USDOT numbers, or any identifiers, for intrastate commercial carriers. Without a unique carrier identifier, tying the vehicle to carrier is problematic. The issue of intrastate USDOT numbers must be addressed prior to planning the implementation of this interface.

Customization for Permits Interface – This includes vendor costs associated with creating and testing a system interface between the E-Permitting system and CVIEW for the exchange of permits information.

Customization for E-Screening Interface – This includes vendor costs associated with creating and testing a web-services function between the E-Screening system and CVIEW for automated pass/fail determination and tagging observation data with screening criteria results.

System Maintenance (5 Years) – Represents vendor supplied maintenance functions for the CVIEW including interface management, SAFER compliance, database administration, and system upgrades. A five year maintenance period is used in the estimate.

Hosting Cost (5 Years) – This includes server hardware, bi-annual server hardware refresh, network maintenance, network security, bandwidth maintenance, back-ups, patches, updates and upgrades. A five year hosting period is used in the estimate.

5.4.2 Key Assumptions & Considerations

For project planning purposes, several key assumptions are made to arrive at the cost estimate. These assumptions are:

1. The displayed cost estimate reflects a vendor hosted solution. A non-vendor hosted solution estimate would be less the "Hosting Cost (5 Years)" line item; however internal costs for hardware and labor would need to be estimated.
2. Certain internal North Dakota costs will be borne by the state and are not included in the estimate. These costs include time for project management, procurement support, North Dakota-side interface support and training. It is assumed that these costs will be captured as part of North Dakota's match strategy.

   Alternatively, if North Dakota believes that internal resources will not be available to provide timely support to stand-up the CVIEW project, costs for consultant support should be estimated and added to the cost estimate above.
3. Project overhead will be kept to a minimum by treating the CVIEW project as more of a COTS installation versus a custom software development project.
4. A contingency factor of 20% is used in the costs. Bids may come in below this cost estimate, depending upon the contents of the RFP and Scope of Work. It should be noted that any grant funds remaining may be redirected towards other CVISN projects upon amendment to the CVISN Program Plan and approval by FMCSA.

5.5 Conclusion & Next Steps

The North Dakota CVIEW project has been defined in the North Dakota CVISN Program Plan and Top-Level Design. When completed, this project, along with E-Screening, will help North Dakota attain CVISN Core Compliance and position North Dakota for an additional $1.0M in Expanded CVISN funding. The recommendations in this document center on North Dakota pursuing a customized COTS CVIEW vendor solution through a competitive RFP process.

Next steps for the project include development of a CVISN grant application. FMCSA requires a 50% state match on all CVISN grant funds provided. The FMCSA match requirement, however, provides many opportunities for the state to leverage existing expenditures as "in-kind" match contributions. Examples include the costs associated with maintenance and enhancement of the IRP and IFTA system as part of North Dakota's Core CVISN Electronic Credentialing capabilities. The grant planning process should include identification of the source of any match required during the project period. FMCSA is extremely responsive in responding to any questions regarding sources of grants.

This grant application can be made on a "provisional" basis. In this case an award may be made by FMCSA with a restriction on actual expenditures until such time that the North Dakota CVISN Program Plan and Top-Level Design is approved and in place. Additionally, a CVIEW working group could be established to begin the process of requirements gathering and development of the scope of work for a RFP.

6 E-SCREENING RECOMMENDATION

6.1 Introduction

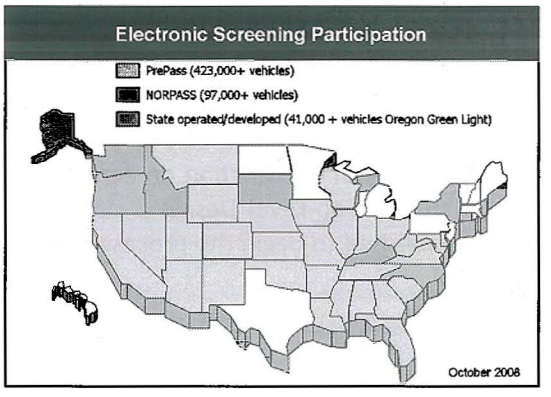
Electronic Screening (E-Screening) comprises roadside technologies that both increase freight mobility while optimizing safety enforcement resources. E-Screening systems are designed to allow trucks which meet selected screening criteria to by-pass fixed or mobile inspection facilities. Trucks which fail the criteria are pulled in for further investigation. E-Screening technologies and capabilities have evolved as states deal with budget cuts impacting the construction and operation of fixed scale houses and ports-of-entry. Typical E-Screening scenarios would have entailed use of transponder-based automatic vehicle identification (AVI) systems coupled with at least one weigh-in-motion (WIM) and a fixed scale house / weigh station. Recent implementations in other states utilize the concept of a Virtual Weigh Station (VWS) to supplement a mobile enforcement presence. A VWS typically employs roadside technologies which attempt to replicate information assembled by a traditional E-Screening system and fixed scale house. This includes the use of cameras to create a human-readable image of the truck. The change to the VWS deployment approach was recently recognized by FMCSA as a viable solution ("augmenting existing CVISN E-Screening") through the issuance of official FMCSA guidance to states wishing to utilize CVISN funding to implement a VWS concept as part of their CVISN program[2].

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.

North Dakota is currently deploying Core CVISN capabilities and has studied various options for implementing an E-Screening capability which is both CVISN Core Compliant and is compatible with North Dakota's mobile commercial vehicle enforcement regime. The North Dakota CVISN team has identified the North Dakota E-Screening project as a priority in its Core CVISN Program Plan and Top-Level Design. The purpose of this document is to provide North Dakota with a set of recommendations regarding the deployment of an E-Screening capability for the state. This document also provides a high-level cost estimate to be used for project planning and development of a grant application.

6.2 Alternative Analysis

Early deployment of electronic screening systems began by jurisdictions in the 1980's. These deployments focused upon equipping existing state-run scale houses or ports-of-entry with automatic vehicle identification (AVI), roadside operations computers (ROC) and mainline weigh-in-motion (WIM) scales. These systems utilized state, national and private transponder programs to encourage carriers to place transponders in the cabs of their vehicles. It is through the transponder that bypass (green light) or pull-in (red light) communications are made. This map shows the relative penetration of E-Screening



[2] See Appendix D. FMCSA Commercial Vehicle Information Systems and Networks (CVISN) Virtual Weigh Station Guidance

programs across the nation.

The following sections describe various E-Screening alternatives available to North Dakota and an assessment of these alternatives in terms of criteria which is pertinent to North Dakota.

6.2.1 Alternatives

The alternative analysis employed for North Dakota looked at five E-Screening alternatives as described below:

1. **Fixed Site – Transponder Based – PrePass**[3]

   This alternative entails deployment of a transponder based AVI system with associated roadside operations computer equipment at an existing fixed inspection site. In this case, the site would be a PrePass site. PrePass is a nationally deployed freight mobility system operated by Help Inc., which is a "not-for-profit, public-private partnership called Heavy Vehicle Electronic License Plate (HELP) established to deploy intelligent transportation systems that benefit the government and motor carrier industry."

2. **Fixed Site – Transponder Based – NorPass**[4]

   This alternative entails deployment of a transponder based AVI system with associated roadside operations computer equipment at an existing fixed inspection site. In this case, the site would be a NorPass site. NorPass is the North American Preclearance and Safety System, which is a partnership of state and provincial agencies and trucking industry representatives who are committed to promoting safe and efficient trucking throughout North America.

3. **Fixed Site – Virtual Weigh Station Based**

   With this alternative, an existing fixed inspection site is configured with VWS equipment. This equipment would include machine vision sub-systems capable of capturing license plate numbers and optionally USDOT numbers from passing vehicles and transmitting that information for screening purposes. In addition, the equipment includes communications capabilities allowing for remote access to real-time site data. Appendix D provides recent FMCSA guidance on the use of Virtual Weigh Stations. The FMCSA guidance states that VMS technology can be used to "augment existing CVISN E-Screening." Further discussions with FMCSA confirmed that in order to achieve Core CVISN compliance, an E-Screening facility must be transponder based.

4. **Mobile – Transponder Based – Mobile PrePass**

   The alternative is the Mobile PrePass model utilizing portable, transponder-based AVI equipment and trailers (roadside operations computers) for monitoring a remote, instrumented WIM site.

5. **Mobile – Virtual Weigh Station Based**

   With this alternative a mobile virtual weigh station would be paired with a mobile enforcement vehicle for monitoring a remote, instrumented WIM. The equipment would include machine vision sub-systems capable of capturing USDOT number and license plate number from passing vehicles and transmitting that information for screening purposes. In addition, the equipment

[3] For comparison purposes, this option assumes that North Dakota would qualify for a PrePass installation.

[4] For comparison purposes, this option assumes that North Dakota would join NorPass.

includes communications capabilities allowing for remote access to site information.

6.2.2 Assessment Criteria

Each of the five alternatives was evaluated using a set of seven criteria designed to provide a relative comparison and contrast of each alternative to the other. These criteria are:

1. **Cost to State**[5]
   This criterion represents the relative initial cost of designing, procuring and installing each alternative. This includes an estimate of the overall cost of maintaining and upgrading the system over its useful life. (Assume a useful life of 10 years.)
2. **Cost to Motor Carriers**
   This criterion represents the relative cost for carriers to enroll and participate in the e-screening program in North Dakota.
3. **Participation**
   This represents a relative measure of the level of participation in the E-Screening system by both states and carriers.
4. **Accuracy**
   This relative measure assesses the degree to which the e-screening system accurately identifies / screens vehicles and carriers.
5. **Control / Access to Data**
   This measure is used to compare North Dakota agency accessibility to both real-time and historical data from each e-screening system. This includes the degree to which each system allows for control of screening criteria. (Screening criteria represents both the data elements upon which a vehicle/carrier may be screened, and any associated algorithm.)
6. **Operational Compatibility**
   This criterion provides a relative measure of how well the system matches NHP enforcement resources and operational philosophy.
7. **Technical Challenge**
   This factor compares the relative technical complexity of operating[6] each system.

Each criterion is given a qualitative measure in the form of a graphic representing a position along a scale from "less" to "more". The purpose of this qualitative measure is to provide a visual means of comparing the various e-screening alternatives. The example assesses an option using the Control/Access to Data assessment criterion.

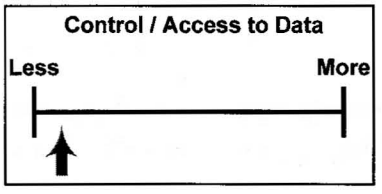
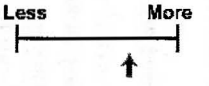
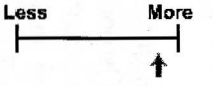
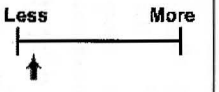
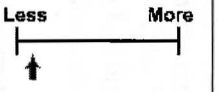
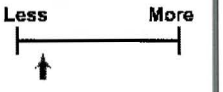
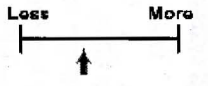
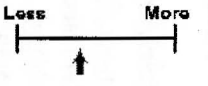
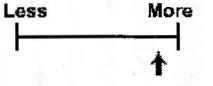
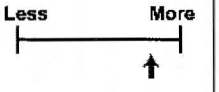
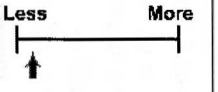
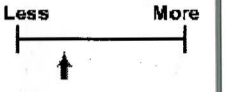
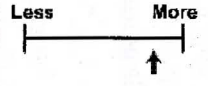
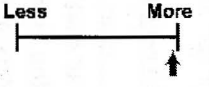
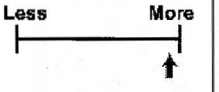
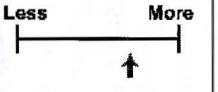
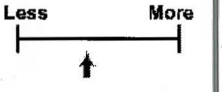
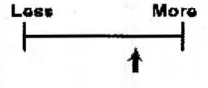
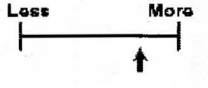
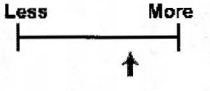
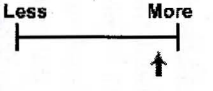
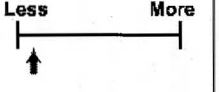
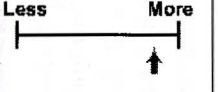
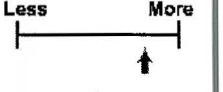
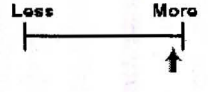
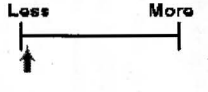
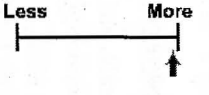
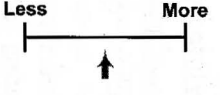
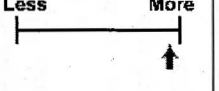
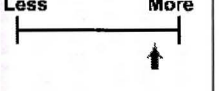
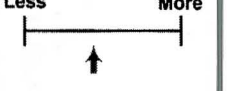


Table 6-1 displays each of the alternatives with an assessment of the associated evaluation criteria.

[5] Note: For purposes of comparison, the cost of installing new WIMs or upgrading existing WIMS is excluded from this analysis, as this cost will be required for each alternative.

[6] For purposes of this discussion, maintenance is assumed to be handled by vendors.

Table 6-1 E-Screening Alternative Analysis

Alternative	Cost to State	Cost to Motor Carriers	Participation	Accuracy	Control / Access to Data	Operational Compatibility	Technical Complexity
#1 Fixed Site – Transponder Based – PrePass							
#2 Fixed Site – Transponder Based – NorPass							
#3 Fixed Site – Virtual Weigh Station							
#4 Mobile – Transponder Based – Mobile PrePass							
#5 Mobile – Virtual Weigh Station							

6.2.3 Analysis

Lowest Cost to State = #1 Fixed Site – Transponder Based – PrePass

Alternative 1 represents the lowest cost for the state. With typical PrePass sites, installation and maintenance costs associated with AVI antennae, electronics and communications are borne by PrePass. In addition, PrePass installs a proprietary roadside operations computer (ROC) with required software and interfaces to control by-pass and pull-in decisions. With Alternatives 2 and 3 the state would be required to purchase all components of each system. Alternatives 4 and 5 include some additional costs to support the mobile aspects of the deployment. (Vans, Trailers, etc.)

Least Cost to Motor Carriers = #3 & #5 Fixed Site & Mobile – Virtual Weigh Station

Alternatives 3 and 5 represent the lowest cost to motor carriers as these alternatives rely upon observing the license plate and USDOT number to identify the vehicle and carrier. There are no enrollment or participation fees. With Alternatives 1 and 5 there is no initial fee, however a monthly fee per vehicle is charged for participation in the program. Alternative 2 typically requires an initial investment by the motor carrier in transponders for each vehicle, however there is no ongoing fee within participating states.

Most Participation = #3 & #5 Fixed Site & Mobile – Virtual Weigh Station

Alternatives 3 and 5 represent the most participation as the system relies upon the presence of a valid license plate and a USDOT number for identification purposes. Participation is non-voluntary and is mandated by state and federal regulations. Alternatives 1 and 4 have a large participation base of states and carriers throughout the country, including North Dakota carriers. The numbers include 29 participating states, over 88,000 carriers and over 400,000 vehicles. Alternative 2 has the least amount of participation in terms of states, carriers and vehicles.

Most Accuracy = #1, #2 & #4 Fixed & Mobile Transponder-Based PrePass and NorPass

Transponder-based systems offer the most accuracy in identifying moving commercial vehicles either on the mainline or intake ramp. The caveat is that the system accuracy applies only to participating vehicles with a transponder on board. Non transponder-based systems utilizing optical character recognition technologies to extract license plate and USDOT number identifiers can have accuracy rates which are less, especially under certain lighting conditions and system configurations.

Most Control / Access to Data = #3 & #5 Fixed Site & Mobile – Virtual Weigh Station

Alternatives 3 and 5 provide the most control and access to data. Subject to the accuracy limitations noted above, these alternatives provide the most detailed set of data available for querying and reporting plus control over what data elements are used for screening purposes. These do not rely on transponder participation and data relating transponder to vehicle and then to carrier. Alternatives 1 and 4 provide the least amount of control and access due to the fact that privacy agreements preclude the capture and dissemination of detailed screening information for enforcement purposes and utilize a proprietary algorithm is used for screening purposes.

Most Operationally Compatible = #4 & #5 Mobile Solutions

Mobile systems which can be deployed at various locations offer the most compatibility with North Dakota's mobile enforcement regime. North Dakota enforcement personnel do not man fixed facilities as is typical with many states. Alternative #3 represents slightly less compatibility in that the virtual weigh station is at a fixed location; however the "virtual" nature of the site aligns with North Dakota's desire to periodically provide local staffing while also remotely monitoring the facility for enforcement purposes.

Least Technically Complex = #1 Fixed Site – Transponder Based – PrePass

Alternative 1 is the least technically complex to operate. With PrePass responsible for installation of the facility and for maintaining the functions of the screening system, users simply monitor a "turn-key" system and respond to system generated pull-ins. Alternative 2 is somewhat more complicated in that there is typically a state maintained and operated roadside operations computer which is performing sorting decisions. The most technically complex would be Alternative 4. This is due to the fact that instruments and communications must be set-up each time the system is deployed. Alternatives 3 and 5 are moderately complex in that users must typically respond to pull-in, by-pass screens which may entail multiple data elements, images and other information.

6.3 Recommendation

Table 6-2 summarizes the results of the alternative analysis.

Table 6-2 Recommendation Summary

Criteria	#1 Fixed Site Transponder Based – PrePass	#2 Fixed Site Transponder Based – NorPass	#3 Fixed Site Virtual Weigh Station	#4 Mobile Transponder Based – Mobile PrePass	#5 Mobile Virtual Weigh Station
Least Cost to State	✓				
Least Cost to Motor Carriers			✓		✓
Most Participation			✓		✓
Most Accuracy[7]	✓	✓		✓	
Most Control / Access to Data			✓		✓
Most Operational Compatibility				✓	✓
Least Technical Complexity	✓				

From a CVISN standpoint it is recommended that North Dakota pursue an E-Screening solution which blends Alternative #1 and Alternative #5. This "hybrid" E-Screening approach provides North Dakota with several advantages, including:

1. Deployment of a system which North Dakota motor carriers recognize and participate in[8].
2. Deployment of an E-Screening system which would be compliant with Core CVISN requirements and also provide size and weight enforcement functionality.

[7] Assumes a participating vehicle with transponder.

[8] Approximately 81 North Dakota-based interstate carriers, representing about 978 commercial vehicles, are currently members of PrePass.

3. Leverage of PrePass contributions towards installation of the site. The contributions can be recognized as CVISN match for North Dakota, freeing North Dakota funds to match other CVISN projects.
4. VWS system components in a fixed facility to be used for "secondary" E-Screening of vehicles who receive a red light from the PrePass system and vehicles who do not participate in PrePass.
5. Utilize the initial fixed facility deployment of a VWS system as a "test bed" for assessment of technologies and training of NDHP enforcement personnel. With the VWS experience and lessons learned from the initial installation, North Dakota would have a basis to build-out additional VWS sites in support of NDHP's remote mobile enforcement regime. Deployment of these additional sites would be included in North Dakota's Expanded CVISN Program Plan and Top-Level Design.
6. Access to E-Screening data from the VWS components for planning and enforcement.
7. Control over E-Screening criteria for the "secondary" screening.
8. Compatibility with mandatory truck identifiers to be used with the VWS components.
9. Leverage existing North Dakota WIM infrastructure and institutional knowledge.

An annotated operational scenario displaying the major system components of the "hybrid" approach is included in Appendix E of this document.

6.3.1 Considerations

This recommendation includes the following considerations:

Requirements Gathering – It is recommended that a working group be established to gather requirements for the VWS E-Screening system. Activities could include demonstrations from various vendors and site visits to witness the use and effectiveness of various technologies. Examination of other state's RFP, specifications and requirements will assist in development of requirements. In addition, several state and FMCSA projects should be monitored to provide requirements and lessons learned prior to finalizing requirements.

Phased Approach – It is recommended that the initial project tasks be geared toward deployment of the PrePass site. Once the PrePass site is operational, North Dakota will have met Core CVISN requirements for E-Screening. The VWS system components should be deployed as a prototype site. The intent of a prototype site is to provide a facility that will be used for testing technologies and for training officers. Site characteristics should include access to power and communications and truck traffic characteristics that meet North Dakota enforcement scenarios. With prototype VWS site experience complete the next phase could include a build-out of additional sites, having remote capabilities, along key trucking corridors throughout the state. These additional VWS sites should be detailed in North Dakota's Expanded CVISN Program Plan and Top-Level Design after attaining Core CVISN compliance.

Existing Infrastructure – It is recommended that existing infrastructure such as installed WIMs and fixed inspection sites, where applicable, be leveraged to minimize project deployment costs.

PRISM Funding – Certain license plate reading technologies may be eligible for additional PRISM grant funding. It is recommended that North Dakota investigate this potential opportunity to share deployment costs across two FMCSA programs.

USDOT Number Reader (USDOTR) – It is recommended that North Dakota consider installing an automated USDOTR as a later phase of the project. This is because the USDOTR technology is rapidly evolving and current deployments enjoy less than optimal results, especially at highway speeds. In contrast, license plate readers and associated software are a much more mature technology and have

been marketed by various firms since the 1980s and are currently deployed in a large number of configurations and are used by many police agencies.

Lessons Learned – It is recommended that North Dakota continue to monitor several virtual weigh station deployments and research activities occurring in other states. Two examples are the Kentucky Boone County LPR/USDOTR project and the New York, Schodack E-Screening Demonstration project. Also, recent technologies designed to defeat license plate readers are being marketed to motor carriers. Technical LPR specifications should require vendors to address these issues.

6.4 Cost Estimate

Table 6-3 shows key project cost elements and total estimated project cost for deployment of a hybrid E-Screening site.

Table 6-3 "Hybrid" E-Screening Cost Estimate

Cost Element	Cost Estimate
Requirements Gathering - Development of Sope of Work	$ 50,000
PrePass Site	$ -
WIM Installation	$ 120,000
VWS RPU, Communications & Side-View Camera	$ 56,000
E-Screening Data Set & Screening Algorithm	$ 25,000
LPR Upgrade	$ 150,000
USDOTR Upgrade	$ 130,000
VWS Web-Based Upgrade	$ 35,000
5 Years of Maintenance	$ 129,000
Total	$ 695,000

For purposes of this document, the virtual weigh station-based cost estimate described below does not include the 50% required CVISN match. The CVISN grant application must reflect this cost plus the state match.

6.4.1 Cost Element Definitions

Requirements Gathering – Development of Scope of Work – This activity would cover costs associated with gathering CVIEW requirements and developing a Scope of Work to be inserted into a RFP.

PrePass Site – This includes installation of the PrePass AVI equipment on the mainline along with associated communications to the PrePass roadside operations computer within the North Dakota fixed facility. Note that this has no cost associated with this line item as PrePass will bear the cost of installation based upon payback model assumptions.

WIM Installation – This includes installation of Kistler / Quartz[9] WIM(s) & Electronics for a single lane.

VWS RPU, Communications & Side-View Camera – Roadside equipment installed along the intake ramp housing a roadside processing unit (roadside server), side-view camera, WiFi communications, system interfaces and associated electronics.

System Maintenance (5 Years) – Total for 5 years based upon 5% of purchase price.

[9] Kistler Instrumente, AG Lineas® WIM Sensor

E-Screening Data Set & Screening Algorithm – This includes vendor costs associated with any modifications that may be needed to existing software to allow for development of customized North Dakota E-Screening data sets, including user interface to change the data set as required.

USDOTR Upgrade – This cost represents an estimate of the costs associated with installing a USDOT number reading system on the existing installation. Costs would include the necessary hardware installation and software interfaces.

LPR Upgrade – Addition of license plate reading camera and associated electronics, optics, illumination source and optical character recognition software.

Virtual Weigh Station Web-Based Upgrade – Addition of high-speed internet access, web server and monthly fees for Internet access.

6.4.2 Key Assumptions

For project planning purposes, several key assumptions are made to arrive at the cost estimate. These assumptions are:

5. Certain internal North Dakota costs will be borne by the state and are not included in the estimate. These costs include time for project management, procurement of right-of-way (if required), procurement support, internal training time. It is assumed that these costs will be captured as part of North Dakota's match strategy.
6. A contingency of 20% is used in the costs. Bids may differ from this cost estimate, depending upon the contents of the RFP and Scope of Work. It should be noted that any grant funds remaining may be redirected towards other CVISN projects upon amendment to the CVISN Program Plan and approval by FMCSA.
7. The cost estimate reflects installation of a prototypical system at a fixed inspection location. Costs for additional sites beyond the prototype would be different from this estimate depending upon the technologies specified and access to power and communications.
8. The cost estimate does not reflect any PrePass installation costs which may be payable depending upon the agreement between PrePass and North Dakota. The cost estimate assumes that North Dakota meets all PrePass operational goals at the selected site.

6.5 Conclusion & Next Steps

The North Dakota E-Screening project has been defined in the North Dakota CVISN Program Plan and Top-Level Design. When completed, this project, along with North Dakota CVIEW, will help North Dakota attain CVISN Core Compliance and position North Dakota for an additional $1.0M in Expanded CVISN funding. The recommendations in this document center on North Dakota pursuing a Virtual Weight Station E-Screening solution through a competitive RFP process.

Next steps for the project include development of a CVISN grant application to help fund deployment of the prototype site and additional sites. This grant application can be made on a "provisional" basis. In this case an award may be made by FMCSA with a restriction on actual expenditures until such time that the North Dakota CVISN Program Plan and Top-Level Design is approved and in place. Additionally, an E-Screening working group should be established to begin the process of requirements gathering and development of the scope of work for a RFP.

7 CONCLUSIONS AND NEXT STEPS

The North Dakota Core CVISN planning process has been a success. This process has yielded the following important accomplishments:

1. The ND CVISN team (as defined in Chapter 1.4) has reunited and gained consensus on how to move forward to deploy Core CVISN components.
2. An approach to obtain a CVIEW product was determined.
3. An approach to conduct E-Screening, consistent with North Dakota's enforcement paradigm, was determined.
4. Input from ND motor carriers was obtained indicating a strong support for the state to deploy systems to meet core CVISN compliance. Additionally, the industry supports moving beyond Core into Expanded CVISN to deploy systems such as E-Permitting enhanced with automated routing.
5. North Dakota's Core CVISN Program Plan and Top-Level Design document was re-written, in the new FMCSA format, and provides a roadmap for how ND plans to meet Core CVISN compliance. This document will soon be submitted to FMCSA for approval.

Near term activities to move toward Core CVISN deployment include:

- Obtain FMCSA approval of ND Core CVISN Program Plan and Top-Level Design.
- Prepare a CVISN grant application to obtain FMCSA funds to implement the projects defined in the ND Core CVISN Program Plan and Top-Level Design and obtain Core CVISN compliance. As part of this planning activity, determine a funds matching strategy and obtain approval from ND executive leadership to execute the strategy.
- Seek funding for and prepare an Expanded CVISN Program Plan and Top-Level Design. This document will allow North Dakota to secure funding for projects such as an Enhanced E-Permitting system with automated routing and additional E-Screening sites.
- Define CVIEW requirements and prepare Request for Proposal to acquire a hosted solution.
- Work with PrePass to install their equipment and systems at the West Fargo fixed facility.
- Define the E-Screening and Enforcement System requirements and prepare Request for Proposal to acquire and install mobile VWS equipment and systems at the West Fargo fixed facility.

Longer-term activities to continue to deploy and operate CVISN in North Dakota include:

- Implement CVIEW
- Implement Hybrid approach to E-Screening at the West Fargo fixed facility.
- Complete the Core CVISN certification checklist, as soon as practical.
- Obtain certification from FMCSA of North Dakota's Core CVISN compliance.
- Apply to FMCSA for Expanded CVISN grant funds.
- Begin implementing Expanded CVISN projects, as defined in North Dakota's Expanded CVISN Plan. This would include, at a minimum, the ND Enhanced E-Permitting system with automated routing and additional E-Screening facilities throughout North Dakota.

APPENDIX A: MOTOR CARRIER INTERVIEW GUIDE

North Dakota CVISN Deployment Planning

Motor Carriers Interview Guide

Company _____

Representative _____

Contact information _____

INTRODUCTION

My name is Fred Kitchener, from McFarland Management. I am currently under contract to the North Dakota Highway Patrol and Department of Transportation to develop a plan for deploying commercial vehicle industry supportive technologies. I got your name from Tom Balzer, of the ND Motor Carrier Association as a person who would be willing to talk to me about your experience and impressions of these technologies. Do you have 15 minutes to discuss this topic?

The commercial vehicle industry supportive technologies that I am talking about include:

- Electronic credentialing – Internet based system to register vehicles (IRP, UCR), pay taxes (IFTA), and purchase permits
- Electronic screening along the highway allowing bypass of check stations – weight, credentials, taxes paid, and safety

1. Please explain your operations:
    a. Number of trucks
    b. Intra-State or Inter-State?
    c. Types of loads
    d. Support which industries
    e. Do you currently purchase permits in North Dakota? What types?

2. Are you aware of CVISN technologies?
    a. In vehicle transponders
    b. Weigh-in-motion at highway speeds
    c. Electronic Screening along the highway
    d. Electronic Credentialing
    e. Electronic Permitting (self issuance and payment)

3. Do you participate in any systems currently?
    a. Electronic Screening along the highway
    b. Electronic Credentialing
    c. Electronic Permitting (self issuance and payment)

4. What is your experience with these technologies in other states?
    a. Electronic Screening along the highway
    b. Electronic Credentialing
    c. Electronic Permitting (self issuance and payment)

5. What is your experience with these technologies in North Dakota?
    a. Electronic Screening along the highway
    b. Electronic Credentialing
    c. Electronic Permitting (self issuance and payment)

6. What is your impression of these technologies in general?
    a. Electronic Screening along the highway
    b. Electronic Credentialing
    c. Electronic Permitting (self issuance and payment)

7. Would you like to see these technologies deployed in North Dakota? Which ones and why?
    a. Electronic Screening along the highway
    b. Electronic Credentialing
    c. Electronic Permitting (self issuance and payment)

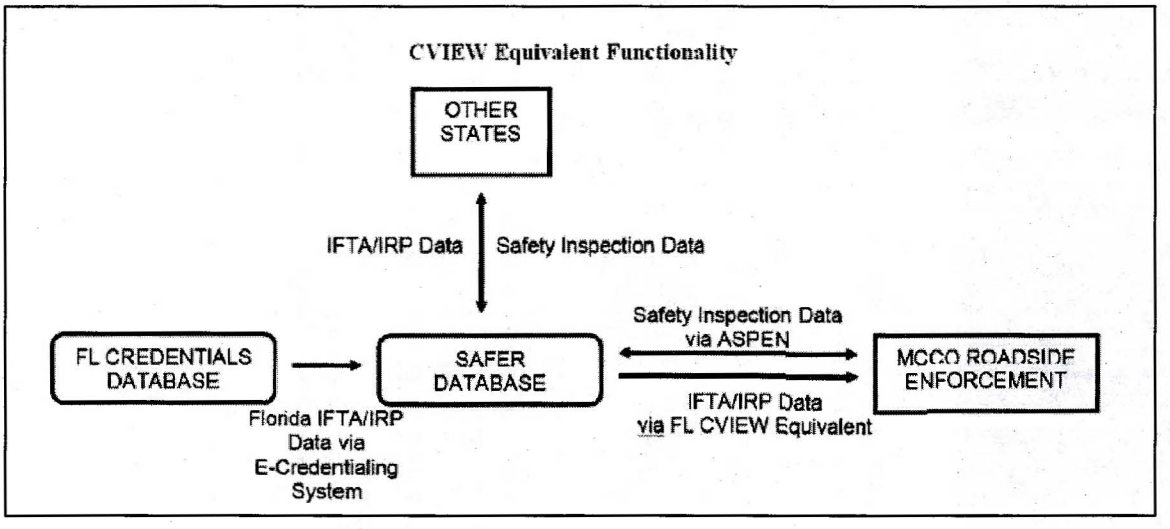
8. What limitations or opportunities do you envision in a ND implementation of these technologies?

APPENDIX B: CVIEW INFORMATION DETAILS

Introduction

The purpose of this document is to provide an overview of the capabilities required for a CVIEW in terms of a very basic system versus the capabilities of a more enhanced system. For example, a basic system may simply just deliver IRP and IFTA data to SAFER, while a more enhanced system would include a CVIEW database with capabilities for advanced querying, ad-hoc reporting and administrative functions.

A basic CVIEW or CVIEW Equivalent system represents an alternative to standard CVIEW systems. This alternative was recognized by FMCSA for states wishing to not deploy full CVIEW functionality, but still comply with Core CVISN requirements. To date only Florida has deployed and certified a CVIEW equivalent. Development of the Florida CVIEW was accomplished in-house. In Florida's case, the IRP/IFTA credentialing system provides the IRP/IFTA upload information to SAFER. Roadside querying functions return SAFER information and FL IRP/IFTA data through the Florida roadside enforcement client, SmartCop. The following graphic provides a high-level overview of the system.



At its basic level, the CVIEW equivalent takes advantage of SAFER web services functions to accomplish the required upload of IRP and IFTA data to SAFER, along with some basic querying capabilities for enforcement purposes. With a CVIEW Equivalent system there is no "local" database housing CVIEW data.

For discussion purposes the table on the following page lists capabilities of CVIEW systems and provides a comparison between a CVIEW Equivalent system (a basic CVIEW) and a commercial-off-the-shelf (COTS) CVIEW system (a standard CVIEW).

CVIEW Capabilities

<table>
<tr><th>CVIEW Capability</th><th>CVIEW Equivalent
(Italized Text Represents Required ND or Contractor Development Activities)</th><th>COTS CVIEW System
(Italized Text Represents Required ND or Contractor Development Activities)</th></tr>
<tr><td>1. SAFER Upload
Upload SAFER Compliant IRP and IFTA Data (Input Transaction Sets) Creation of five transaction sets. One IFTA, three IRP. Note: ND won't be sending the T0024V2 transponder ID transactions.
<table>
<tr><th>Transaction ID</th><th>Type</th><th>Transaction</th><th>FTP</th><th>Web Services</th></tr>
<tr><td>T0019</td><td>Input</td><td>International Fuel Tax Agreement (IFTA)</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0020</td><td>Input</td><td>IRP Account</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0021</td><td>Input</td><td>IRP Fleet</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0022V3</td><td>Input</td><td>IRP Registration (Cab Card)</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0022D</td><td>Delete</td><td>IRP Registration (Cab Card)</td><td>Implemented</td><td>To be implemented</td></tr>
<tr><td>T0024V2</td><td>Input</td><td>Vehicle Transponder ID</td><td>Implemented</td><td>To be implemented</td></tr>
</table>
</td><td>Asynchronous web services interface using SAFERXMLUploadDeferred method.

Would require development of processes to create the baseline, update and log file interpretation routines.</td><td>XML/FTP interface utilizing persistent VPN connection.

Option to use web-services to update the CVIEW and SAFER.

Would require development of state-side processes to create the baseline and update XML files per specification. May be XML, Flat File or web services.</td></tr>
<tr><td>2. "Local" Database
Database created for state access to data. Database would house all SAFER data, including License and Insurance data, ASPEN inspection data, vehicle credential data, PRISM data and optionally any additional state data from other systems or as might be input.</td><td>No database.</td><td>Vendor hosted, state housed, Oracle or SQL Server, depending upon state preference and vendor.</td></tr>
<tr><td>3. Data Exchange Schedule Functionality
Routine for scheduling and upload or download of data.</td><td>Would require development of update logic. Baseline routines would be manual.</td><td>Built-in scheduler for all processes.</td></tr>
</table>

<table>
<tr><th>CVIEW Capability</th><th>CVIEW Equivalent
(Italized Text Represents Required ND or Contractor Development Activities)</th><th>COTS CVIEW System
(Italized Text Represents Required ND or Contractor Development Activities)</th></tr>
<tr><td>4. SAFER Download (Output Transaction Sets)

Download and process ten transaction sets including IRP and IFTA data from other states. Note: There is no need for ND to download T0029V2 Vehicle Transponder ID transactions.

<table>
<tr><th>Transaction ID</th><th>Type</th><th>Transaction</th><th>FTP</th><th>Web Services</th></tr>
<tr><td>T0025</td><td>Output</td><td>International Fuel Tax Agreement (IFTA)</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0026</td><td>Output</td><td>IRP Account</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0027</td><td>Output</td><td>IRP Fleet</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0028V3</td><td>Output</td><td>IRP Registration (Cab Card)</td><td>Implemented</td><td>Implemented but need to be updated</td></tr>
<tr><td>T0028D</td><td>Delete</td><td>IRP Registration (Cab Card)</td><td>Implemented</td><td>To be implemented</td></tr>
<tr><td>T0029V2</td><td>Output</td><td>Vehicle Transponder ID</td><td>Implemented</td><td>To be implemented</td></tr>
<tr><td>T0030</td><td>Output</td><td>Vehicle Inspection Summary</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0031</td><td>Output</td><td>MCMIS Safety and Census</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0031V2</td><td>Output</td><td>MCMIS Safety and Census</td><td>Implemented</td><td>Implemented</td></tr>
<tr><td>T0032</td><td>Output</td><td>Licensing and Insurance</td><td>Implemented</td><td>Implemented</td></tr>
</table>
</td><td>Not applicable. There is no database.</td><td>XML/FTP interface utilizing persistent VPN connection.

Option to use web-services to update the CVIEW and SAFER.</td></tr>
<tr><td>5. Web-Based Querying
This would be for authorized state users to query information about carriers and vehicles.</td><td>Limited to one of the defined output transaction sets. Query inputs would conform to SAFER SOAP message requirements including UAS credentials with each message. If a persistent VPN is used then authentication does not need to occur with each message.

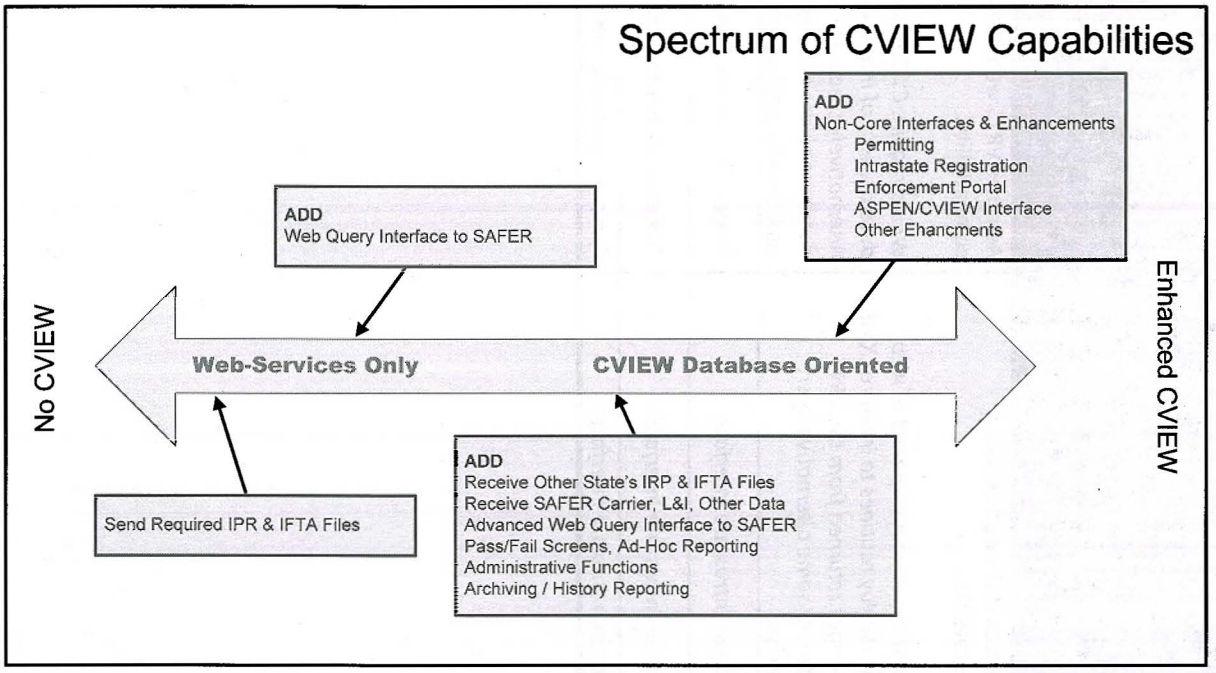
Would require development of web page display routines to interpret XML messages returned from the SAFER system.</td><td>Direct to database queries utilizing embedded procedures and using multiple query inputs.</td></tr>
</table>

CVIEW Capability	CVIEW Equivalent *(Italized Text Represents Required ND or Contractor Development Activities)*	COTS CVIEW System *(Italized Text Represents Required ND or Contractor Development Activities)*
6. Advanced Web-Based Features Pass-Fail Tests / Ad-Hoc Reporting Functions / User History This would be for authorized state users.	*Would require development of specific queries, calculations and web page display routines to interpret multiple XML messages returned.*	Built-in functionality o set up pass-fail tests, and ad hoc reporting on data available in CVIEW. These are high-level queries including utilizing calculations to perform pass/fail analysis on vehicles or carriers, custom reports and histories of user activities.
7. Administrator / User Group / Management Functions	*Would require development.*	Built-in functionality for administrative functions including setting-up user group, passwords, configuring system parameters, etc.
8. Access to PRISM Data Access to PRISM carrier and vehicle information. (Out-of-Service and MCSIP steps.)	*Would require development of web page display routines to interpret XML messages returned from the SAFER system.* *If desired for query purposes, access to PRISM Target File via web services would require development of web page display routines to interpret XML messages returned from the PRISM system utilizing PRISM web services specification.*	Built-in functionality for accessing both SAFER and PRISM data through carrier or vehicle queries.
9. Access to CDLIS Query CDL information using CDLIS interface.	Access through Query Central.	Built-in functionality with other querying functions.
10. Archiving of SAFER Data & ND Data	*Would require development.*	Built-in functionality.

CVIEW Capability	CVIEW Equivalent *(Italized Text Represents Required ND or Contractor Development Activities)*	COTS CVIEW System *(Italized Text Represents Required ND or Contractor Development Activities)*
11. Interface to Intrastate Data Data exchange to CVIEW via XML, flat file or Web Services. Alternatively have queries simply consume web service to return data from the Intrastate database.	Assumes VRTS web-services compatibility. *Would require development of web page display routines to interpret XML messages returned from the VRTS system or some alternative query function.*	Assumes VRTS web-services compatibility. *Would require CVIEW-side development of interface to VRTS. Alternatively create custom database tables to house VRTS data sent via XML or flat file.*
12. Interface to Permitting Data Same options as Intrastate Data.	*Same as Intrastate Interface.*	*Same as Intrastate Interface.*
13. E-Screening Data Set Creation Same options as Intrastate Data.	*Same as Intrastate Interface.*	*Same as Intrastate Interface.*
14. Additional Future Custom Interfaces / Features	*Same as Intrastate Interface.*	*Same as Intrastate Interface.*

CVIEW Considerations

Options regarding CVIEW deployments extend along a spectrum as displayed by the following graphic.



When considering CVIEW deployment a state must first consider the purpose of the CVIEW. Specifically, does the state desire to just deploy capabilities that would allow the state to be CVISN core certified or does the state envision the CVIEW to be a system that would house all commercial carrier and vehicle information and provide enhanced functions beyond those required for Core compliance?

If the former is true, than a simple system to create the required IRP and IFTA data files can be developed with establishment and maintenance of a SAFER interface for uploading data to SAFER. This deployment scenario would most probably utilize the SAFER web services.

If the later is true, than a "local" CVIEW database would be recommended to capture, house and provide data to roadside and desk side users. The database would provide the engine through which various enhanced capabilities such as Pass/Fail queries, E-Screening interfaces, ad-hoc reporting and other features would be implemented.

Cost Estimate

In addition to the purpose of the CVIEW, cost is also a consideration. Cost in terms of development or procurement and maintenance must be considered. The following table provides an estimate of costs for development of a CVIEW Equivalent system and procurement of a commercial-off-the-shelf (COTS) system. The estimates are provided as a range from low cost to high cost. The following table, B-1 displays estimate vendor / contractor costs for each of the capabilities noted above.

Table B-1 Vendor / Contractor Costs for Capabilities

	Description	CVIEW Equivalent		COTS	
		Low End	High End	Low End	High End
Basic	1. SAFER Upload	$ 70,000	$ 180,000	$ 100,000	$ 300,000
	2. "Local" Database	inc.	inc.	inc.	inc.
	3. Data Exchange Schedule Functionality	inc.	inc.	inc.	inc.
	4. SAFER Download	inc.	inc.	inc.	inc.
	5. Web-Based Querying	inc.	inc.	inc.	inc.
	6. Advanced Web-Based Features	inc.	inc.	inc.	inc.
	7. Administrator / User Group / Management Functions	inc.	inc.	inc.	inc.
	8. Access to PRISM Data	inc.	inc.	inc.	inc.
	9. Access to CDLIS	inc.	inc.	inc.	inc.
	10. Archiving of SAFER Data & ND Data	inc.	inc.	inc.	inc.
	Base System Total	$ 70,000	$ 180,000	$ 100,000	$ 300,000
Enhanced	11. Interface to Intrastate Data	$ 5,000	$ 15,000	$ 12,000	$ 24,000
	12. Interface to Permitting Data	$ 5,000	$ 15,000	$ 10,000	$ 24,000
	13. E-Screening Data Set Creation	$ 5,000	$ 15,000	$ 10,000	$ 24,000
	14. Additional Future Custom Interfaces / Features	TBD	TBD	TBD	TBD
	Enhanced System Total	$ 15,000	$ 45,000	$ 32,000	$ 72,000
	Grand Total	$ 85,000	$ 225,000	$ 132,000	$ 372,000

The costs for the CVIEW Equivalent were based upon contractor developed. The costs for the COTS are based upon award from a competitive RFP by a CVIEW Vendor. The COTS estimates do not include development of the "North Dakota" side of the IRP/IFTA, Intrastate and Permitting interface.

Annual Maintenance Estimates:

CVIEW Equivalent: $10k - $20k

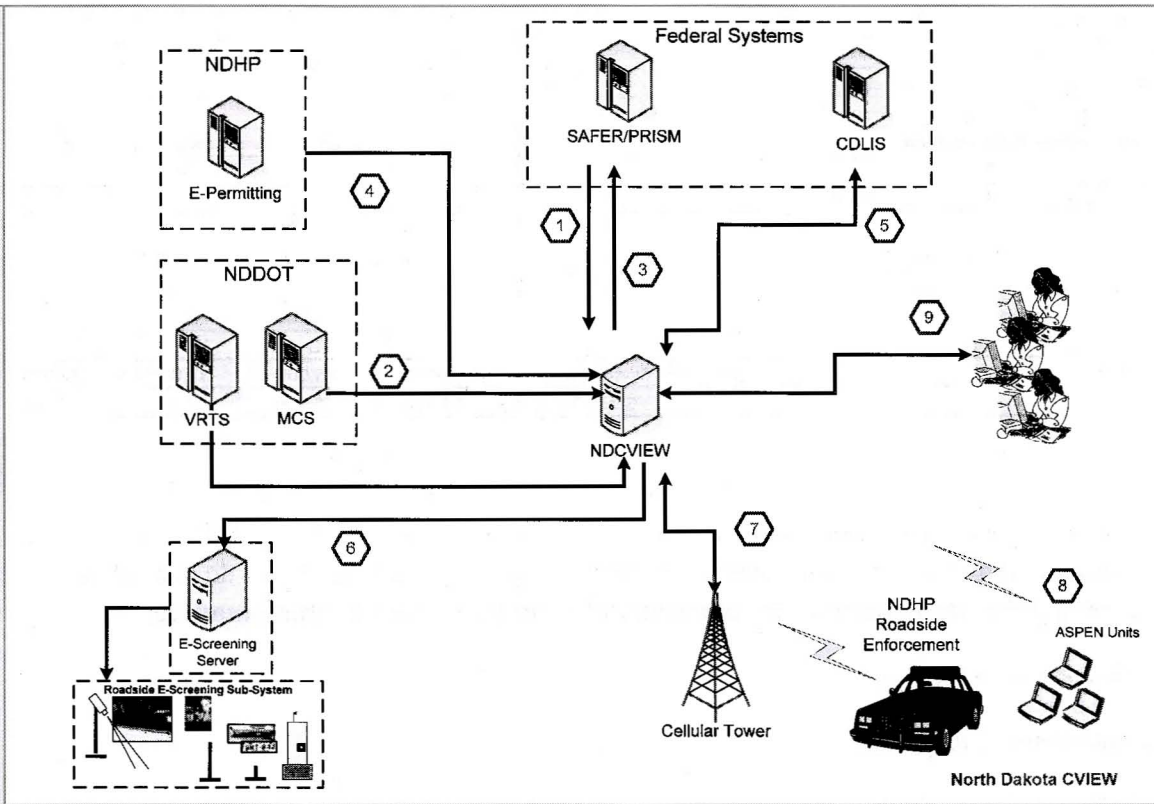
COTS CVIEW (Doesn't include 3rd party hosting.): $20k - $30k

Conclusion

This background paper was prepared to assist North Dakota in determining the best CVIEW approach for the state. North Dakota will need to make fundamental decisions regarding the purpose for the CVIEW and what future plans may be for the system prior to completing the Program Plan & Top-Level Design. The conclusion is that North Dakota would like to pursue a database-driven COTS solution for a CVIEW deployment.

APPENDIX C: CVIEW OPERATIONAL SCENARIO

ND CVIEW High Level Operational Scenario:



1	NDCVIEW will be certified to download information from SAFER. This information includes: • IFTA License Data (Other Jurisdictions) • IRP Account (Other Jurisdictions) • IRP Fleet (Other Jurisdictions) • IRP Registration (Cab Card, Other Jurisdictions) • Vehicle Inspection Summary • MCMIS Safety & Census • Licensing & Insurance
2	System interface will be established between NDCVIEW and the MCS system for exchange of IRP/IFTA information.
3	NDCVIEW will be certified to upload North Dakota information to SAFER. This information will include: • IFTA License Data • IRP Account • IRP Fleet • IRP Registration (Cab Card) • Vehicle Inspection Reports

4	System interface between the NDHP E-Permitting system provides current permit information to NDCVIEW.
5	NDCVIEW provides interface to CDLIS for authorized users to perform CDL queries.
6	NDCVIEW provides the E-Screening dataset to the E-Screening Server for use by the E-Screening Sub-System.
7	NDHP users access NDCVIEW over secure Internet connection utilizing broadband connectivity. NDHP users accomplish queries, pass/fail screens and ad-hoc reporting.
8	NDHP ASPEN units utilize the NDCVIEW connection to upload inspection reports to SAFER via the T0018 Inspection Report transaction set.
9	Authorized North Dakota desk side users access NDCVIEW over secure Internet connection to accomplish queries, pass/fail screens and ad-hoc reporting.

APPENDIX D: VIRTUAL WEIGH STATION GUIDANCE

COMMERCIAL VEHICLE INFORMATION SYSTEMS AND NETWORKS (CVISN) VIRTUAL WEIGH STATION GUIDANCE

The COACH (CVISN Operational and Architectural Compatibility Handbook) Part 1[1] provides general operational concepts and requirements that states should consider when implementing any capabilities using CVISN funds. This paper provides specific guidance to states planning to implement a virtual weigh station (VWS) using CVISN grant funds and explains how a VWS can be integrated with the CVISN architecture. Note that the FHWA (Federal Highway Administration) Office of Freight Management and Operations, under the Vehicle Size & Weight program, sponsored the development of a series of documents about virtual weigh stations.[2-7] Those documents focus on the deployment of a VWS to address commercial vehicle size and weight enforcement issues; the documents also describe opportunities for and benefits that result from utilizing a VWS for safety and credentials enforcement. FMCSA (Federal Motor Carrier Safety Administration) focuses on the use of a VWS for safety enforcement rather than for weight enforcement. Therefore, this guidance de-emphasizes weight enforcement and emphasizes how VWS facilities can be used for safety enforcement.

WHAT IS A VIRTUAL WEIGH STATION?

A virtual weigh station is a roadside facility that typically identifies, classifies, and weighs commercial vehicles on a particular stretch of road. A VWS does not require continuous staffing. A VWS may be fixed or mobile, permanent or temporary. Data collected at a VWS may be used for enforcement, electronic screening, generating statistics useful for planning, deciding where to place enforcement resources, or for other activities unique to a state.

Equipment that might be deployed at a VWS includes:

- Weigh in motion – to measure the vehicle's weight (per axle) while in motion and to classify the vehicle
- Camera system – to capture images of the vehicle
- License plate and USDOT (US Department of Transportation) number readers – to identify the vehicle and carrier
- High-speed communications – to share the data collected with remote enforcement staff and systems
- Transceiver for DSRC (dedicated short range communications) – to identify the vehicle and carrier
- Sensors – to collect additional data to meet the state's needs

HOW SHOULD A VWS BE INTEGRATED WITH CVISN?

To qualify as an eligible CVISN expense, a VWS deployment must be used for safety enforcement applications. The most common safety application is to use the VWS to direct

enforcement resources towards high-risk motor carriers or commercial vehicles. To support that application, a VWS could:

- Act as an additional automated e-screening location using the same processes a staffed site would use [identify the vehicle and carrier, check vehicle measurements, look up identifiers in CVIEW (Commercial Vehicle Information Exchange Window), determine whether further scrutiny is appropriate]. If the screening decision is "pull in" for further inspection, the system could notify nearby mobile officers or enforcement personnel at downstream staffed sites.
- Augment existing CVISN e-screening and inspection sites by transmitting vehicle images to downstream staffed sites or mobile units to facilitate possible enforcement action.
- Transmit carrier and vehicle identifiers to enforcement personnel for manual handling (e.g., query via CVIEW or Query Central) and processing.
- Transmit carrier and vehicle identifiers to automated processes that query CVIEW or Query Central, identify potential violators, and notify enforcement personnel of the results.
- Supply data to an automated process that monitors the information collected at the VWS and aggregates the data. This process could then identify days/times to dispatch mobile resources to the area.

A VWS that is not integrated with the CVISN architecture and processes for safety enforcement purposes (e.g., is strictly used for weight enforcement purposes) is not eligible for CVISN grant funds.

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4. Wright, Brad and Cathy Krupa, *Truck Size and Weight Enforcement Technology Task 5 Deliverables – Determine the Feasibility of Private Sector Use of Data from Roadside Enforcement Systems*, Cambridge Systematics, Inc., Cambridge, MA, April 2009.
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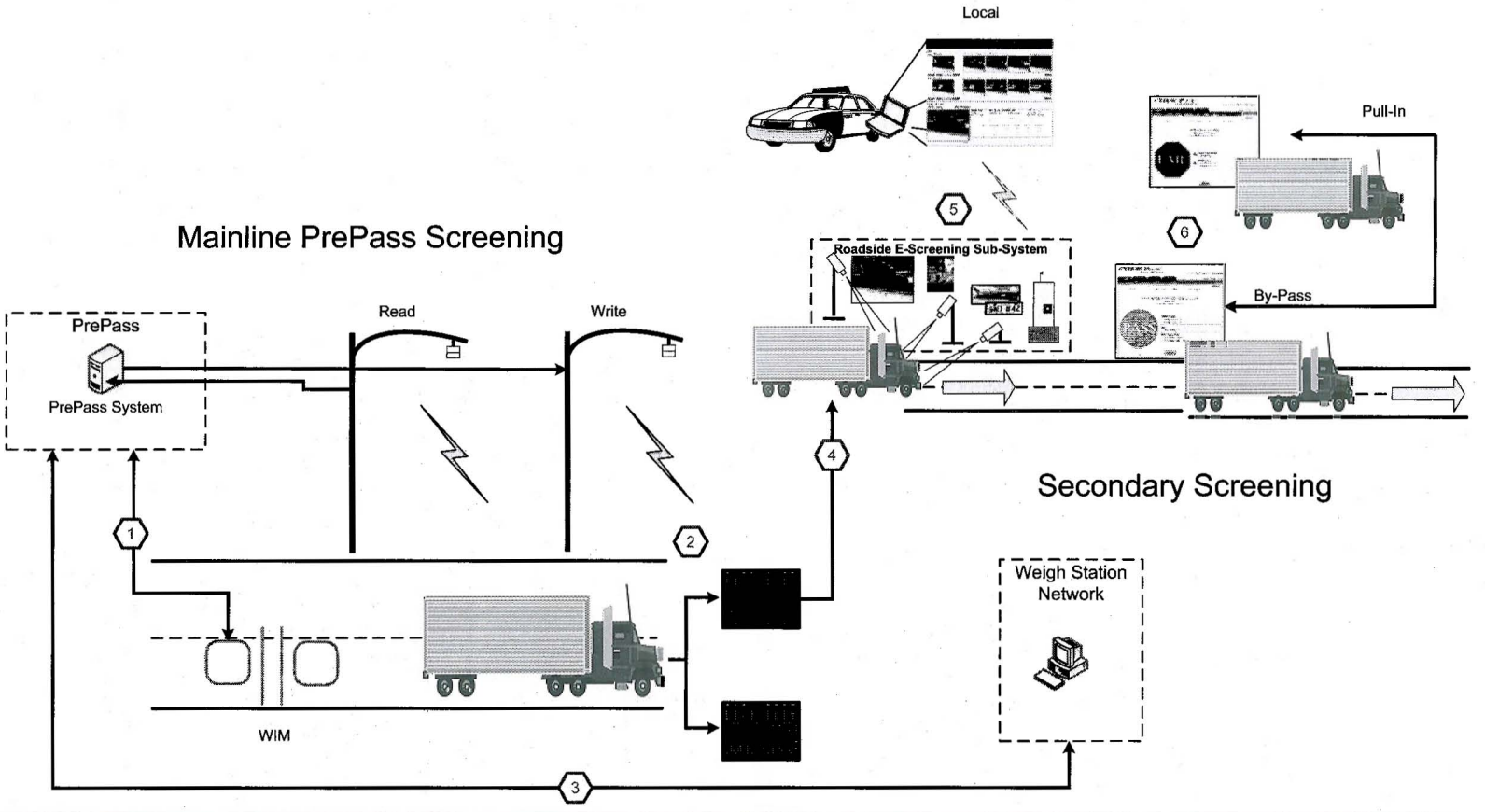
7. Cambridge Systematics, Inc., *Concept of Operations for Virtual Weigh Station, Final Report,* Cambridge, MA, June 2009.

APPENDIX E E-SCREENING OPERATIONAL SCENARIO



1	Truck is weighed on mainline WIM. WIM record is passed to PrePass System.
2	PrePass system reads in-cab transponder and screens truck based on PrePass screening algorithm and transmits by-pass or pull-in.
3	Scale record and PrePass decision is communicated to monitor within the weigh station network.
4	Trucks messaged to pull-in, plus all non-PrePass trucks enter the fixed facility.
5	The secondary screening system obtains an overview image, license plate read and USDOT read from trucks moving along the intake ramp.
6	The secondary E-Screening system automatically determines if the truck should be stopped based upon customized safety screening rules.