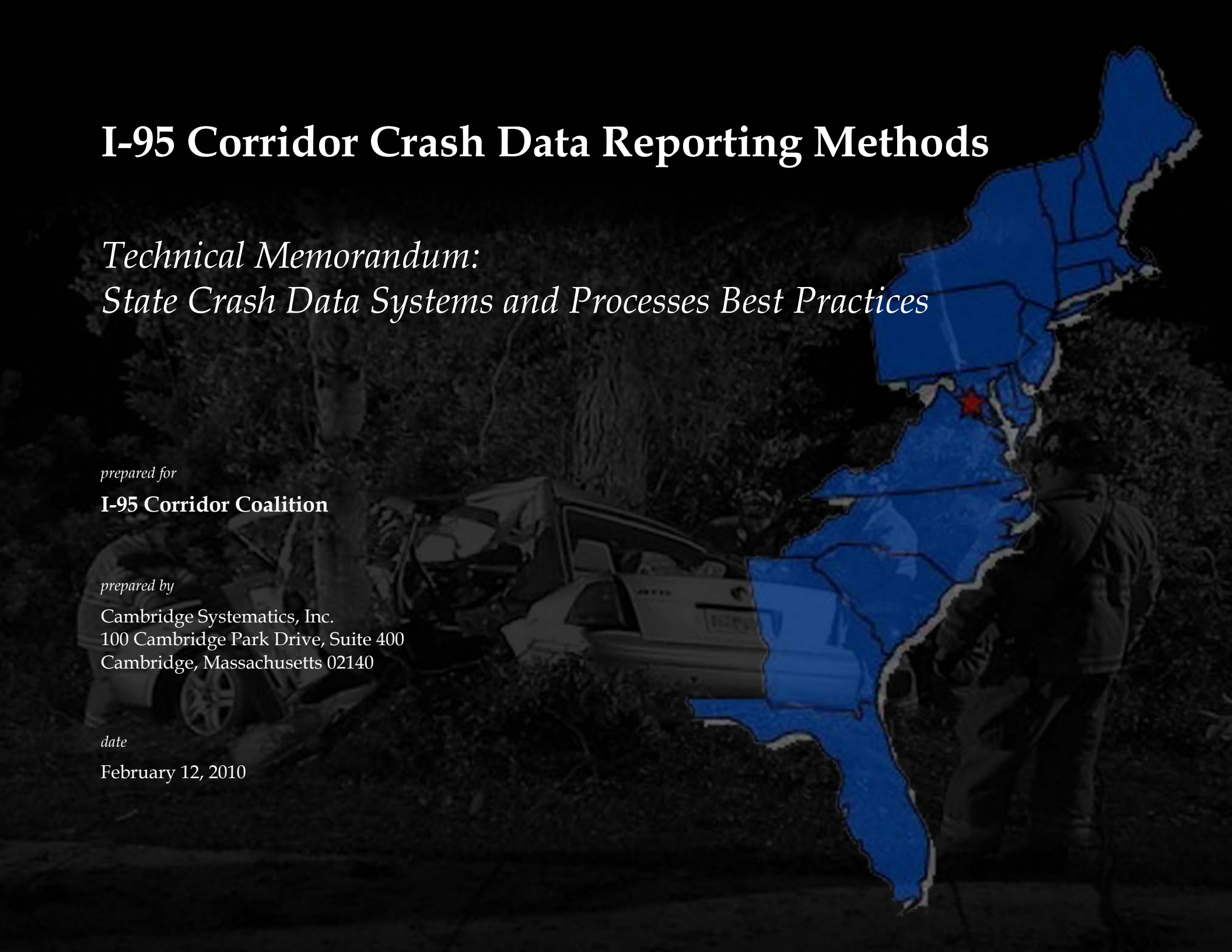
I-95 Corridor Crash Data Reporting Methods

Technical Memorandum: State Crash Data Systems and Processes Best Practices



prepared for

I-95 Corridor Coalition

prepared by

Cambridge Systematics, Inc.
100 Cambridge Park Drive, Suite 400
Cambridge, Massachusetts 02140

date

February 12, 2010

I-95 Corridor Crash Data Reporting Methods

Technical Memorandum:
State Crash Data Systems and Processes Best Practices

prepared for

I-95 Corridor Coalition
Project 2-2-16-7C

prepared by

Cambridge Systematics, Inc.
100 Cambridge Park Drive, Suite 400
Cambridge, Massachusetts 02140

date

February 12, 2010

Table of Contents

1.0 Introduction 1
- 1.1 Data Quality Measures 1
- 1.2 Report Overview 2

2.0 Crash Data Systems and Processes Best Practices 3
- 2.1 Evaluation of I-95 Corridor States' Crash Data Collection and Reporting Processes 3
- 2.2 Evaluation of National Crash Data Collection and Reporting Processes 13
- 2.3 Funding for Crash Data System Improvements 16
- 2.4 Next Steps 19

List of Tables

2.1 I-95 Corridor States Best Practices and Efficiencies by Impacted Data Quality Measure.....5

2.2 Projected Costs for Planned Crash Data Improvement Projects 10

2.3 National Best Practices and Efficiencies by Impacted Data Quality Measure..... 14

1.0 Introduction

Crash data is essential to improving safety and efficiency on the I-95 Corridor's transportation network. Crash data can be analyzed to identify safety hot spots along the corridor and factors contributing to crashes. The results can be used to identify areas in need of specific safety applications, technologies, programs, practices, and enforcement. The timely transmission of crash data is critical for identifying areas and situations prone to incidents and their causes, particularly with respect to commercial vehicles. Frequently, however, this data is not accessible in a timely manner to law enforcement, Departments of Transportation (DOTs), and other entities which utilize the crash data. Often there is a significant lag time in the available data, and the crash reports are frequently inaccurate or incomplete.

1.1 Data Quality Measures

While the data collection systems and practices vary amongst the Coalition states, there are common measures which can be used to evaluate data quality. The National Highway Traffic Safety Administration (NHTSA) established the following six data quality measures commonly referenced as the "six pack":

- **Timeliness** is a measure of how quickly an event is available within a data system;
- **Accuracy** is a measure of how reliable the data are, and if the data correctly represent an occurrence;
- **Completeness** is a measure of missing information, including missing variables on the individual crash forms, as well as underreporting of crashes;
- **Uniformity** is a measure of how consistent information is coded in the data system, and/or how well it meets accepted data standards;
- **Data integration** is a measure of how well various data systems (e.g., roadway inventory, driver licensing, EMS, etc.) are connected or linked; and
- **Accessibility** is a measure of how easy it is to retrieve and manipulate data in a system, in particular by those entities that are not the data system owner.

The overall objective of this project is to identify the current state of practice and best practices in I-95 Corridor Coalition States' crash data collection and reporting systems to improve the timeliness, accuracy, and accessibility of crash data among the Corridor states. The objective of this task is to compare key elements of the states' crash data systems and related processes to identify best practices and efficiencies.

1.2 Report Overview

This technical memorandum serves as the final deliverable for Task 3 of Project 2-2-16-7C, *Study Crash Data Reporting Methods*, and summarizes the findings and conclusions regarding best practices and efficiencies in crash data collection and reporting processes. This memorandum provides a compilation of the following:

- Evaluation of Coalition states' crash data collection and reporting processes – effects on timeliness, accuracy, completeness, uniformity, integration, and accessibility will be compared to identify best practices and efficiencies among the Coalition states;

- Review of national crash data collection and reporting processes – additional states' crash data collection and reporting best practices will be provided to identify additional strategies that have been successful in improving the crash data collection and reporting process; and

- Potential funding sources – Federal programs and other funding sources available to implement planned data improvements will be presented.

2.0 Crash Data Systems and Processes Best Practices

This chapter provides findings of the crash data systems and processes best practices and efficiencies conducted for Task 3. This chapter also identifies some national best practices and the funding sources available for improvements in crash data collection and reporting systems.

2.1 Evaluation of I-95 Corridor States' Crash Data Collection and Reporting Processes

The Coalition states are continuing to evolve their crash data collection and reporting processes through the use of new or improved software and technology, training, and other process efficiencies. This section identifies notable or best practices implemented in the Coalition states to improve the timeliness, accuracy, completeness, uniformity, integration, and accessibility of their crash data collection and reporting systems.

While any process improvements or implemented technology can improve the data collection and reporting processes, best practices are identified as successfully implementing electronic crash data collection statewide or identifying and utilizing methods for overcoming challenges in implementing electronic data collection systems as identified in Task 2. Some of the challenges include:

- Law enforcement agencies may not be required to submit crash reports electronically, making it necessary for the state to identify ways to encourage use of the electronic system;
- Various electronic collections systems, which are not compatible with the existing crash database, are used by agencies throughout the state;
- Law enforcement agencies in the state use different paper-based crash forms with various data elements collected, and disagreements can arise when determining which crash data elements will become standard for electronic capture;
- Some existing systems are difficult to upgrade or update (e.g., add new data fields);

- Wireless network coverage is not universally available, which hinders a law enforcement officer's ability to transmit crash data directly from the field;
- Law enforcement agencies do not have the necessary equipment or funding available to purchase the equipment;
- Electronic systems often require upgrades, which require additional funding and support staff;
- Although GPS systems are intended to provide accurate location data, several agencies have reported inaccurate data (e.g., when officers fail to complete the crash report at the crash scene); and
- Law enforcement agencies need additional technical support and training to implement an electronic system.

Best practices and efficiencies are not limited to overcoming challenges related to implementation of an electronic system; they also include methods utilized in overcoming challenges related to data integration and accessibility. In addition, process improvements for states with paper-based reporting systems, which resulted in significant improvements in the timeliness of crash data entry, are also identified.

Best Practices and Efficiencies in the I-95 Corridor States

Best practices and efficiencies in I-95 Corridor Coalition States' crash data collection and reporting processes were identified through interviews with crash data collection managers and law enforcement agencies; a review of the state traffic records strategic plans and NHTSA Section 408 State Traffic Safety Information System Improvement Grants applications; the NHTSA State Data Improvement Projects Clearinghouse; and Association of Transportation Safety Information Professionals (ATSIP) Best Practices Challenge winning projects.

The best practices and efficiencies identified among the Coalition states are cross-referenced with NHTSA's six data quality performance measures (timeliness, accuracy, completeness, uniformity, integration, and accessibility) in Table 2.1, which is followed by a detailed description of the best practice. In addition to the best practices already implemented in the Coalition states, some promising practices currently being planned or deployed are identified.

Table 2.1 I-95 Corridor States Best Practices and Efficiencies by Impacted Data Quality Measure

State	Accessibility	Accuracy	Completeness	Data Integration	Timeliness	Uniformity
Delaware		E-Crash	E-Crash	E-Crash	E-Crash	E-Crash
Florida	TRIPP	Law enforcement training		Unified roadway base map/TRIPP		
Georgia	Internet query system	Location tool		Internet query system/ location tool		
Maine			MCRS		MCRS	MCRS
Maryland	MSCAN	eMAARS	eMAARS		eMAARS	
New Jersey	EMS data linkage	EMS data linkage	EMS data linkage	EMS data linkage	EMS data linkage	EMS data linkage
North Carolina					TraCS	
South Carolina	SCCATTS	SCCATTS	SCCATTS	SCCATTS	SCCATTS	
Vermont	Web-Crash	Web-Crash	Web-Crash		Web-Crash	WebCrash
Virginia		In-house crash data entry	Commercial vehicle data extraction		In-house crash data entry	

- Delaware's crash data collection is currently 100 percent electronic using TraCS. However, the state has not been able to customize TraCS to meet all their data needs, so they have developed a new electronic crash data system called E-Crash which was tailored to the state's needs and is currently being prepared for deployment. The system has been designed with the flexibility to be updated as necessary, and it is a user friendly system with on-line help. E-Crash will enable law enforcement to enter crash data more efficiently by auto-populating data elements which are not applicable to the crash, reducing the amount of time it takes for a law enforcement officer to complete a crash report. For example, if the crash involved a bus, the officer would input the information on the bus; otherwise, the screen would not appear. The system will also eliminate some of the current reporting errors found with TraCS, which includes the ability to enter crash dates and birthdates occurring in the future, and the system has expanded the data elements to be Model Minimum Uniform Crash Criteria (MMUCC) compliant. The E-Crash system will also be linked to driver license, vehicle registration, and citation information.

- Florida has developed a traffic crash reporting form workshop for law enforcement officers, trainers, community service aides, and city/county traffic planners on how to accurately complete a Florida crash report. The workshop covers common errors made on crash reports which were identified by the Law Enforcement Training Committee of the Traffic Records Coordinating Committee (TRCC). In an effort to provide a foundation for consistent GIS data exchange, Florida is currently establishing a unified roadway base map to include all roads for all public entities. The unified base map will facilitate data collection of lengths and point items, establish methods for data sharing, and establish partnerships and cooperative agreements with various agencies to ensure data accuracy and consistency. Florida is also currently developing a Traffic Records Information Repository and Analysis System (TRIPP) to integrate crash data from multiple agencies in a secure, scalable data warehouse, and developing a web-based integrated crash data system to provide analytical, mapping, and statistical reporting tools to all interested end-users.
- Georgia is utilizing a map-based location tool that references Georgia Department of Transportation (GDOT) base maps to provide a more accurate location of each crash as referenced by the officer. This tool ensures GDOT engineers are able to link to data within the Department's Roadway Characteristics file which is critical to safety analyses. Georgia is currently developing an internet query system for the state's crash data available over the Division of Public Health's publicly accessible health data query system to enhance crash and injury surveillance capacity.
- All of Maine's crash reports are submitted to the state electronically through the Maine Crash Reporting System (MCRS), which is provided at no cost to local agencies. MCRS was designed to minimize the data collection burden on the officer through careful design of the interface, and provides keyboard shortcuts for all major functions. Diagramming functionality, which is deemed crucial to crash analysis by many transportation safety stakeholders, is built-in and audit checks are performed to ensure complete reporting of crash data. The system is currently being upgraded to increase MMUCC compliance.
- Maryland is beginning to implement a new crash reporting system called Enhanced Maryland Automated Accident Reporting System (eMAARS), which will allow law enforcement agencies to submit electronic crash reports for the first time. The system uses scanners instead of microfilm processing and uses a streamlined web entry tool with database driven validation to process the paper submitted crash reports. The system will improve the timeliness, accuracy, and completeness of the state crash database. Once eMAARS has been successfully implemented, the state is planning to develop the Maryland Safety Collection and Analysis Network (MSCAN), which will provide analytical tools for engineers and State Highway business partners at the local level.
- New Jersey is currently working to integrate Emergency Medical Services (EMS) field data from vehicular crashes with crash data. This project will improve the completeness, accuracy, timeliness, and uniformity of electronically transmitted crash data available in the state repositories. The project will also enable the Office of Emergency Medical Services, Department of Transportation, Department of Health and Senior Services and the Motor Vehicle Commission to download

data in a uniform format as well as compile various standard summaries for use in local safety programs which will improve accessibility

- The North Carolina Department of Motor Vehicles (DMV) supplies TraCS software, training, and tier support free to any interested law enforcement agency in the state. Encouraging law enforcement agencies to use TraCS will improve the timeliness of crash data into the system.
- South Carolina has developed an electronic system called South Carolina Collision and Automated Traffic Ticketing System (SCCATTS). SCCATTS is currently being field deployed with the Highway Patrol and Transport Police, including: field testing, software implementation, hardware deployment, and training. The deployment of the SCCATTS system will improve the timeliness, accuracy, and completeness of the state's crash data. Bar coding of South Carolina vehicle registration also is being planned for 2010 deployment. Bar coding will reduce the amount of time it takes for officers to fill out a report and improve the accuracy and completeness of the reports. A second future phase of the SCCATTS project will include interfaces with related databases which will improve the accessibility of the data.
- In Vermont, law enforcement is not required to use the electronic crash data collection system. In order for the state to build a system that would be attractive for law enforcement agencies to use, the state worked with law enforcement from all levels (local/county/State) to determine the best look and feel for a web application/user interface. The law enforcement feedback was incorporated into the development of the web-Crash system which allows law enforcement to submit reports electronically. Currently all Vermont State Police and 50 of the 65 local agencies are electronically submitting crash reports. The state has realized improvements in the timelines, accuracy, completeness, and uniformity of the collected data in the crash file. The web-Crash system also provides participating law enforcement agencies with query abilities to run "canned" or ad hoc reports, providing increased accessibility.
- Virginia was the Association of Transportation Safety Information Professionals (ATSIP) 2008 Best Practices Challenge winner for their *DMV Advanced CMV Data Extraction* project. Prior to this project, commercial motor vehicle data was only captured on a Virginia State Police commercial supplemental report (SP 50), which is separate from the statewide FR300 crash report form. While the state police were submitting these reports to the Federal Motor Carrier Safety Administration (FMCSA) via the SafetyNet database, no commercial vehicle crash data was being collected by local law enforcement agencies resulting in an underreporting of commercial motor vehicle and bus crashes of 40 to 50 percent. The project team improved the quantity and quality of the data by extracting and analyzing the missing and incomplete commercial motor vehicle data from Virginia's crash/highway safety information systems. The project has resulted in a 166 percent increase of fatal and non-fatal large truck and bus crash records added to SafetyNet and the Motor Carrier Management Information System (MCMIS), improving the completeness of large truck and bus related fatal and non-fatal crash data. In 2007, Virginia developed a new uniform crash form that merged the SP 50 and the FR300 to enable both local and state law enforcement to collect uniform commercial motor vehicle crash data; the new form also increased MMUCC compliance.

Although Virginia is currently using a paper-based system, the state has made significant improvements in the timeliness and accuracy of the manual crash form data entry process by having the DMV staff perform the manual data entry instead of the external private vendor. The private vendor staff had an average error rate of 10 percent when entering CSS data, which had to be corrected by DMV staff. DMV staff has direct access to the mainframe system and can instantly correct errors as they are notified. This change has increased the DMV workload by 33 percent but has eliminated errors and error listings. Elimination of the private vendor has produced an annual cost savings estimated at $54,000 for the DMV.

System Costs

Crash data collection and reporting systems are complex and may have multiple "owners" of different components within the system. These systems are typically developed, implemented, and upgraded in phases, through multiple projects and funding sources, over several years. The majority of Corridor states were unable to provide specific expenditures for development and implementation improvements to their current crash data systems.

Georgia reported implementing a "zero-cost solution" for the state. This was achieved by allowing a vendor limited exclusive rights to the sale of crash data on behalf of GDOT. Two states reported current contract amounts over multiple years (e.g., eight year/$8 million contract for Connecticut, and $3 million to $5 million in New York for the state crash repository's contract with amendments). Planning documents reviewed by the team, and information provided by the states, yielded only two specific examples of expended project costs.

Vermont reported the following costs were expended through September 28, 2009:

- $675,000 in vendor contracts to build their Web Crash electronic crash data collection system;
- $400,000 for agreements with law enforcement agencies for staff time, vendor staff time, cost to upgrade or modify their CAD/RMS application, etc.; and
- $30,000 for hardware and software for the Vermont Agency of Transportation and stakeholders.

Virginia's Section 408 grant application detailed funding expended on crash data collection and reporting systems projects in 2008, including:

- $2,000,000 (estimated 2006-to-date) for a consulting team to plan, design, develop and implement the new Traffic Records Electronic Data System (TREDS) system.

- $116,462.36 for TREDS software, system maintenance, and training to begin the design of the comprehensive, traffic records automated system.
- $66,000 for the project to reduce the backlog of crash reports in the TREDS crash database and subsequently, its roadway database.
- $37,000 to change, reprint, and distribute the MMUCC compliant, scannable police crash form.
- $20,000 to provide statewide train-the-trainer training on the new FR300 Police Crash Report to over 400 local and state law enforcement trainers.
- $26,737 for staff to perform database programming modifications in the state's crash database, Centralized Accident Processing System (CAP), to enable collection of new fields and attributes from the new FR300P.

While not as precise, additional insight may be gained from funding budgeted for projects. Several states identified project costs in their most recent Section 408 grant applications or Traffic Records Strategic Plans. Project descriptions and costs are provided in Table 2.2. It should be noted that the yearly costs provided in Table 2.2 are not necessarily cumulative. Projects may have been put on hold and funding may have been requested for an additional year to proceed with the project.

Table 2.2 Projected Costs for Planned Crash Data Improvement Projects

State	Projected Project Cost	Project Description
Connecticut (June 2009 Traffic Records Strategic Plan)	$188,000 in 2009, with $450,000 budgeted from 2006-2008	E-Crash Reporting to DOT/GPS-GIS/Crash-Roadway-ADT File Integration - The first phase of this three-phase project included developing and implementing an electronic version of the PR-1, and a crash data processing system to provide for receipt of PR-1 crash data in an electronic data format from the Connecticut State Police. Phase II focused on ensuring that ConnDOT had a reliable and easy-to-use means of manually entering and editing records); and making use of the latitude/longitude information to simplify and speed the data entry/validation process and to support future map-based reporting and query capabilities to supplement the current tabular reports. Presently the coders have easy access to high-resolution on-line maps which they can use to reconcile the police diagrams and narrative with the mile point data from the Roadway Inventory System (RIS), accurate to 0.01 miles. In Phase III a PC database system will be developed which will have the ability to input crash data from hardcopy, edit entered data, generate reports and complete ad hoc queries, and integrate data from other data files such as roadway and ADT files with the crash file.
Delaware (FY 2009 408 grant application)	$50,000 in 2007, $10,000 in 2008, $2,500 in 2009, and $2,500 projected for 2010 and 2011	TraCS Users Manual/Data Dictionary/Training - Develop a training manual and data dictionary for TraCS software. Develop training materials for TraCS software for police officers to improve accuracy of crash data collection.
	$330,000 in 2007 and $100,100 annually from 2008-2011	CHAMPS - Develop a GIS-based tool to enable highway safety and law enforcement personnel to analyze, plot, and export crash data for accurate problem identification and resource allocation.
	$15,000 in 2008 and $1,000 in 2009 and 2010	TraCS/SDM Data Transfer - Develop a system/procedure for electronically transferring TraCS data from the Delaware Department of Transportation (DelDOT) to the Delaware State Police (DSP) on a regular basis.
Florida (June 2009 Traffic Records Strategic Plan)	$149,050 in 2009, and $169,950 in 2010	Florida Web-Based Crash Data Collection, Reporting, and Analysis - Develop a web-based integrated crash data system that will provide web-based analytical, mapping, and statistical reporting tools to all the interested end-users. It will also provide a web-based electronic crash data collection system for law enforcement agencies that currently don't use electronic data collection.
	$156,000 in 2009, and $100,000 in 2010	Local Agency Support - Department of Highway Safety and Motor Vehicles to hire staff to continue working with local law enforcement agencies to develop methods for electronically submitting crash reports. Staff will also work to enhance access to the crash database by local and state agencies and to implement the changes to the Florida crash form that have been recommended by the Crash Form Revision Committee to make it more MMUCC compliant

State	Projected Project Cost	Project Description
Florida (June 2009 Traffic Records Strategic Plan) *(continued)*	$19,810 in 2009	Provide tuition funding for up to 100 law enforcement officers, trainers, community service aides, and city/county traffic planners to attend an eight-hour Traffic Crash Reporting Form Workshops on how to accurately complete a Florida crash report.
	$550,000 in 2009	Off State Road Crash Location and Roadway Characteristic Information – Consultant services to enhance previously developed applications for use in the geolocation of crashes on local roads, for projecting local roadways characteristic data where is not otherwise available, and for developing reporting tools.
	$50,850 in 2010	Fund tuition for up to 250 law enforcement officers, non-sworn crash investigators, local traffic records personnel, and agency/academy trainers will be reimbursed so that they can attend an eight-hour Traffic Crash Reporting Form Workshop on how to accurately complete the new Florida traffic crash report form. The new report form, which includes additional MMUCC elements, is scheduled to be implemented on January 1, 2010. The workshop will cover the changes to the report form and common errors that are made on crash reports.
	$174,000 in 2010	Florida Automated Traffic Geographical Information System (FATGIS) - Install and setup ESRI software; to provide a data stream for near real-time data from crash database; to normalize data elements; and to create standard queries, standard reports, and custom reports. Software and hardware will be purchased for the activity.
	$334,400 in 2010	Traffic Safety Information System - Deliver a secure solution for querying core traffic records data sets that are common to the six systems that make up the Traffic Safety Information System. A Traffic Records Electronic Data System (TREDS) project manager and a business analyst will be hired to complete the Project Vision document; develop a Project Charter, Data Dictionary, Operational Work Plan, and Project Schedule and Budget; design Business Requirements; and develop Interface models, specifications, and data security and privacy guidelines.
Georgia (2009 408 grant application)	$100,000 per year from 2006-2009	TraCS - Deploy TraCS at interested law enforcement agencies (LEAs), including installing TraCS, training LEA personnel, and providing essential support for those LEAs that wish to use TraCS. TraCS provides powerful analysis tools for LEAs for both crash and citation data, and for comparisons between the two data sets. These tools identify crash hot spots, circumstances and causation factors, and allow LEAs to evaluate the effectiveness of their enforcement activities. The general plan for this project is to complete operational deployment of TraCS in the pilot Cobb County Police Department, and hire additional TraCS Support Team staff.
	$100,000 in 2006 and $50,000 in years 2007-2009	TraCS Upgrades - Continue developing TraCS for more complete, accurate, and efficient LEA reporting, including development of map based location tools, hand-held devices, standard interface between GCIC and crash reporting tools, and incident related reports.

State	Projected Project Cost	Project Description
Maine (2009 408 grant application)	$245,000 in 2009 and $397,978 in 2010	Maine Crash Reporting System (MCRS) Upgrade - Phase I of the project will update the technical foundation of the system, increase MMUCC compliance of the data collected; and incorporate a common data schema for ease of data transfer between the variety of software programs and agencies.
	$345,000 in 2010	MCRS Upgrade Phase II - Enhance and/or upgrade the existing crash reporting system with agency interfaces and reporting and analysis capabilities.
	$14,110 in 2010	BMV XML Data Exchange Standard Update - Update to reflect changes made to the State of Maine Crash Report Form which is in the process of being updated to improve MMUCC compliance. The project will also update the BMV's processing of crash data using new standard to accommodate any changes in the BMV's business rules due to data changes.
	$160,000 in 2010	MCRS Upgrade Phase III - Create a BMV query (operator and vehicle registration) auto fill function that will backfill operator and vehicle data entry fields using a remote query to a BMV database, and create a Crash Data Warehouse that will provide Maine crash data analysts with dynamic drill-down, data mining, decision support functionality, and pivot table analysis capabilities.
Maryland (2009 408 grant application)	$475,310 in 2009 and $275,330 in 2010	Automated Crash Reporting System (CRS) – Develop an automated CRS which will be made available to laws enforcement agencies. Development will begin with a partnership of Maryland State Police and Capital Wireless Integrated Network (CapWIN).
	$1,650,000 in 2007	Enhanced Maryland Automated Accident Reporting System (eMAARS) - eMAARS makes use of scanners in place of microfilm processing and uses a streamline web entry tool with database driven validation to process the crash reports submitted on paper and enables for the first time electronic submission of crash reports upgrade the State Police Central Records crash reporting system.
	$214,300 in 2008, $315,000 in 2009 and $340,000 in 2010	Maryland Safety Collection and Analysis Network (MSCAN) – MSCAN is a future backend tool to the eMAARS product. The primary focus of MSCAN is to provide analytical tools for engineers and State Highway business partners at the local level.
South Carolina (June 2009 Traffic Records Strategic Plan)	$8,000,000	South Carolina Collision and Ticket Tracking System (SCCATTS) - The South Carolina Department of Public Safety maintains the SCCATTS which houses citation data, violation data, and crash data. SCCATTS serves as the statewide repository for collision and citation data and also employs a GIS component. This multi-year project involves completion of implementation of SCCATTS in the Highway Patrol and Transport Police, including field testing, software implementation, hardware deployment, and training.
	$68,000	Implementation of bar coded documents for the South Carolina DMV - Implementation of bar coding will have a major impact on data quality for crash and citation because information will be captured automatically.

2.2 Evaluation of National Crash Data Collection and Reporting Processes

To provide a better perspective of the current state of the practice in crash data systems, additional documentation was reviewed to identify best practices and efficiencies at the national level. The majority of the identified best practices are techniques for overcoming the challenges of implementing an electronic system but also include some unique methods for improving the data quality measures.

National Best Practices in Crash Data Systems

National best practices and efficiencies have been identified through the ATSIP best practices challenge, the national TRCC, Governors Highway Safety Association (GHSA), and the NHTSA State Data Improvement Projects Clearinghouse. Table 2.3 cross-references the identified best practices and efficiencies with NHTSA's six data quality performance measures and is followed by a detailed description of the best practices.

Table 2.3 National Best Practices and Efficiencies by Impacted Data Quality Measure

State	Accessibility	Accuracy	Completeness	Data Integration	Timeliness	Uniformity
Arizona		Returned report tracking system	Returned report tracking system			
Illinois		MCR			MCR	
Indiana		eCVRS	eCVRS		eCVRS	eCVRS
Iowa	CMAT	TraCS	TraCS		TraCS	
Kansas		LEL FARS analyst coordination	LEL FARS analyst coordination			
Kentucky		E-CRASH	E-CRASH		E-CRASH	E-CRASH
Louisiana		Law enforcement funding	Law enforcement funding		Law enforcement funding	
Michigan		TCRS	TCRS			
Minnesota		Crash data standards	Crash data standards	Crash data standards		Crash data standards
Ohio		Vendor coordination	Vendor coordination		Vendor coordination	

- Arizona is currently developing a tracking system to ensure reports returned to law enforcement for correction are returned for re-entry into the crash database. The tracking system will help ensure accurate and complete crash reports.
- To entice local agencies to submit their crash reports electronically, Illinois is offering grants to local law enforcement agencies interested in adopting their Mobile Capture and Reporting System (MCR) to subsidize the purchase of printers for squad cars (MCR-P) and for agencies with an existing crash reporting system to offset the costs of creating an electronic submittal process utilizing the XML format (MCR-XML) published by the state. The state is also expanding the marketing, training, and support programs for MCR to reach additional law enforcement agencies. As more agencies shift to electronic

reporting the timeliness and accuracy of the crash data will improve, and the workload of the DOT will be reduced since it does not require the manual data entry.

- Indiana has become a leader in electronic crash reporting with their Electronic Vehicle Crash Records System (eVCRS). Initially the system was challenged by the lack of computers in police units and reluctance to change to a computer based report. The state provided eCVRS, configuration assistance, regular upgrades, and help desk to agencies free of charge. To encourage local agencies to enroll in eVCRS, they were provided with surplus laptops from the State Police and urged to enroll by law enforcement liaisons (LELs). From the end of December 2005 till 2008, the electronic submission rate has increased from 32 percent to 98 percent. The system also improved submission times with seven percent of reports submitted in five days or less in 2004 to 77 percent in 2008. The data quality has also improved from a 40 percent error rate to three percent. The system includes an electronic bar code scanning capability that allows officers auto load driver and vehicle information into the crash report, reducing the amount of time it takes to fill out a report and improving accuracy and completeness of reports. The system also includes an Easy Street draw program that eliminates hand drawing of crash diagrams and improves the uniformity of collision diagrams. Electronic reporting has also reduced operating costs for participating agencies due to reduced mailing cost and staff time.
- Iowa has been a national leader in developing and implementing collaborative crash data tools to gather, integrate, and analyze data. Iowa DOT led the development of the TraCS electronic crash data collection system, which is in use in many states. The state has also developed the Crash Mapping Analysis Tool (CMAT) to provide law enforcement and other local agencies access to their own data. The DOT provides free analysis software and training to all state crash data users.
- Kansas has been able to improve the accuracy and completeness of blood alcohol content (BAC) reporting by having the LELs coordinate with the state Fatality Analysis Reporting System (FARS) Analyst. Annually in June, the FARS Analyst provides the LELs with a list of all of the previous years fatal crash reports with missing BAC data. The LELs separate them by geographic coverage, and then when they are traveling throughout the state, they visit with local law enforcement agencies with incomplete records to attempt to obtain the BAC data from supplemental reports (not forwarded to the FARS Analyst) or coroner's reports. If neither is available, the LEL follows up with the reporting officer and will request a supplemental report be submitted as soon as possible. For incomplete data submitted by the Kansas Highway Patrol (KHP), the LEL meets with command staff to discuss the issue, and KHP headquarters sends a memo to all KHP troops with a list of incomplete reports directing them to obtain and submit the supplemental reports. In late September, early October, the FARS Analyst provides the LEL with an updated list of missing reports for follow up by the LEL. While Kansas still does not have a 100% submission rate, the number of unknowns has been drastically reduced due to failure to submit reports, and the LELs have enhanced relationships with law enforcement agencies.
- Kentucky's *Open Portal Solution (KyOPS) Mapping* project was identified as a runner up in the ATSIP 2008 Best Practices Challenge. Kentucky State Police's KyOPS software suite provides officers throughout the state with a tool to electronically

submit reports including an E-CRASH application for collision reports. The application provides quality control edits to ensure the accuracy of the reports. The E-CRASH reports are automatically processed, stored, managed, and maintained in the CRASH data and document repositories. At project submittal, over 40 percent of the crash reports were submitted using the E-CRASH application. KyOPS also includes an application that allows officers to collect driver, passenger, and witness information by scanning a driver's license with a 2-D barcode from 37 states. This feature is embedded in the E-CRASH application.

- Louisiana is providing funding to law enforcement agencies to purchase new computer hardware and/or software to assist with the accuracy, completeness, and timeliness of submission.
- Michigan developed and integrated an automated crash locating tool into their Traffic Crash Reporting System (TCRS). The tool utilizes a geographical interface that allows officers to select a crash location which is validated with real-time data. A quality assessment check was run after deployment of the locator tool, and it was found that approximately 98 percent of the reported crashes were being located into the TCRS.
- Minnesota developed and published crash data standards for law enforcement agencies to adhere to when creating crash reporting modules within their records management system (RMS). The standards were the foundation for implementing a crash database interface for law enforcement to electronically submit reports from their RMS and provided uniform reporting standards.
- In Ohio, several different vendors provide law enforcement agencies with electronic crash data collection systems, many of which do not currently enable electronic submission of crash reports to the Ohio Department of Public Safety (ODPS). ODPS is currently providing funding and working with vendors and large law enforcement agencies to provide the capability to submit crash data electronically to the state. Electronically submitting reports will improve the timeliness of the crash data, and since electronically submitted reports are subject to edit checks, the accuracy and completeness of the crash records will also improve.

2.3 Funding for Crash Data System Improvements

The Corridor states have identified many crash data system improvement projects in their traffic records strategic plans and Section 408 grant applications. The most commonly cited funding sources for crash data system improvement projects are the Section 402 State and Community Highway Safety grant program, the Section 408 Traffic System Information System Improvement grant program, state, county, and local funds.

Funding Sources Commonly Used for Crash Data System Improvements

The following are funding sources the Corridor states have used:

23 U.S.C. 402: State and Community Highway Safety Grants – Supports a full range of highway safety behavioral programs, including alcohol countermeasures, occupant protection, police traffic services (e.g., enforcement), emergency medical services, traffic records, motorcycle safety pedestrian and bicycle safety, non-construction aspects of road safety, and speed enforcement and management programs. A minimum of 40 percent of a state's Section 402 funds must be expended by local governments, or be used for the benefit of local governments. To receive Federal highway safety grant funds, State Highway Safety Offices must submit an annual Highway Safety Performance Plan (HSPP) and Highway Safety Annual Report to the NHTSA.

23 U.S.C. 408: State Traffic Safety Information System Improvement Grants – Encourages states to adopt and implement effective programs to improve the timeliness, accuracy, completeness, uniformity, integration, and accessibility of state data needed to identify priorities for national, state, and local highway and traffic safety programs; to evaluate the effectiveness of efforts to make such improvements; to link the state's data systems, including traffic records, with other data systems within the state; and to improve the compatibility of the state's data system with national data systems and data systems of other states.

23 U.S.C. 154 and 164 Transfer Funds – States in which Federal-aid highway funds are transferred based on noncompliance with 23 U.S.C. 154 Open Container Requirements or 23 U.S.C. 164 Minimum Penalties for Repeat Offenders for Driving While Intoxicated or Under the Influence can transfer certain Federal Aid highway construction funds into the Section 402 program for use in alcohol countermeasure programs or into Section 148, Highway Safety Improvement Program (HSIP). Funds specified for alcohol countermeasures may be used for data improvements relevant to alcohol programs only. If a state transfers funds into the HSIP, funds can be used for highway safety data activities.

23 U.S.C. 406: Safety Belt Performance Grants – Encourages states to enact and enforce primary safety belt laws. A state may use these grant funds for any behavioral or infrastructure safety purpose under Title 23, for any project which corrects or improves a hazardous road location or feature, or proactively addresses highway safety problems. At least $1 million of each state's allocation must be obligated to behavioral highway safety activities.

Commercial Vehicle Analysis Reporting System (CVARS) – CVARS is a cooperative effort between NHTSA and FMCSA to provide grant funding to states in order to improve the collection and reporting of all truck and bus crash-related data into the motor carrier management information system. This project will enter into agreements with state agencies to train state employees and Motor Carrier Safety officials to develop an improved national data system of all crashes involving commercial

motor vehicles containing carrier and driver identifiers, and citation and conviction data for the purposes of carrying out enforcement programs, and a new national analytical data system similar to FARS for the purpose of traffic safety problem identification, program evaluation, planning, and other safety related issues.

Motor Carrier Safety Assistance Program (MCSAP) - States are authorized and encouraged to use a portion of their MCSAP funds for data collection and analysis as well as improvements to existing systems. A portion of MCSAP funds are available for High Priority Projects (Section 4107) that can include commercial motor vehicle safety data improvement initiatives. Periodically, reallocated funding becomes available, and it also may be spent on data improvements.

Additional Funding Sources for Crash Data System Improvements

Reviewing the funding sources associated with the Corridor states' planned data improvements revealed additional funding sources which have been untapped. These identified gaps may provide states with additional funding to expedite planned projects or expand projects to address data quality deficiencies identified in their planning documents. The funding resources identified below may be used under certain circumstances to improve crash data processes systems.

Crash Data Improvement (CDI) – Discretionary funds intended to support efforts in states to improve the collection and analysis of commercial motor vehicle crash data and maintain a high level of quality data reported to FMCSA's MCMIS crash file.

23 U.S.C. 410: Alcohol-Impaired Driving Countermeasures Incentive Grants – Provides an incentive to states to implement effective programs to reduce traffic safety problems resulting from impaired driving. Funding may be utilized for law enforcement training, which can lead to improvements in data collection timeliness and accuracy.

23 U.S.C. 148: Highway Safety Improvement Program (HSIP) – HSIP funds may be used for planning, development and operation of a system for managing highway safety and for data improvements as they relate to the state HSIP and the state Strategic Highway Safety Plan (SHSP).

23 U.S.C. 505: State Planning and Research Funds – These funds may be used to develop and maintain safety-related data systems needed to conduct studies of the safety of the surface transportation system, as well as to develop and maintain a system for managing highway safety.

Safety Data Improvement Program (SaDIP) - The SaDIP grant provides discretionary grants to States for activities to improve the accuracy, timeliness and completeness of safety data including, but not limited to, large truck and bus crash data, roadside inspection, data enforcement data, driver citation data, and registration data. Funds can be used to purchase equipment, train law enforcement officers in collecting crash data, hire temporary staff to manage data quality improvement programs, revise outdated crash report forms, and code and enter crash data.

National Highway System (NHS) and Surface Transportation Program (STP) – NHS and STP funds may be used for safety data systems as they relate to the planning, development, and operation of a system for managing highway safety.

Edward Byrne Memorial Justice Assistance Grant (JAG) - JAG funds may be used for state and local initiatives, technical assistance, training, personnel, equipment, supplies, contractual support, information systems for criminal justice, and criminal justice-related research and evaluation activities that will improve or enhance law enforcement programs and planning, evaluation, and technology improvement programs.

Guidance on accessing funding sources for crash data system improvement projects may be found through collaboration with the states' NHTSA regional office and/or FHWA division office. These agencies serve as a resource and can provide additional direction on the applicability and restrictions of a potential funding source for a particular project.

2.4 Next Steps

The purpose of the first three tasks in this project was to compile and analyze information on the crash data collection and reporting processes of the coalition states to identify the impact of technology and to identify best practices and efficiencies. The final report will compile the findings and conclusions identified throughout this study and provide recommendations. It will also serve as a reference tool for the Coalition states.