

# Massachusetts Statewide e-Citation and Traffic Records System Business Plan

## final report

*prepared for*

**Executive Office of Public Safety and Security**

*prepared by*

**Cambridge Systematics, Inc.**



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

*date*

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# Executive Summary

In recent years, the safety practitioners throughout the Commonwealth of Massachusetts have made significant progress toward improving highway safety: legislative measures have been enacted; extensive research has been conducted; Federal, state, and local agencies are working together to resolve tough issues; and location-specific mitigation strategies have been implemented in high crash locations. To build on these success stories, however, the Commonwealth must address a significant issue: the accuracy, completeness, availability, and timeliness of its traffic records information. Having timely access to accurate and complete traffic records information is imperative if the objective is to direct resources and funding in the appropriate areas.

Based on the recommendations of the Massachusetts Traffic Records Coordinating Committee (TRCC), the Executive Office of Public Safety and Security's Highway Safety Division (HSD) and Criminal History Systems Board (CHSB) agreed to fund a study to examine all of the issues and barriers related to advancing the Commonwealth's traffic records program and to identify actions that would address these issues and barriers. The EOPSS/CHSB issued a Request for Response (RFR) in December 2008 and selected Cambridge Systematics, Inc. to assist them with executing the study to develop a Statewide e-Citation and Traffic Records Business Plan. The goal of this project is to *develop a statewide traffic records information system business plan that would position the Commonwealth to advance coordination and integration among traffic record information systems and their owners*. The project objectives included:

- Identifying statewide goals and objectives for IT projects;
- Developing specific strategies for advancing the plan;
- Identifying action steps and assigning responsibility for implementation; and
- Including a process for evaluating how progress is being made toward the plan goal.

Developing a Statewide e-Citation and Traffic Records System Business Plan that could be adopted by multiple agencies and incorporated with their existing plans, programs, and business process, required a collaborative planning process. The project team, therefore, relied upon existing documentation, such as the Draft Traffic Records Assessment report and minutes of recent TRCC meetings, participated in the Assessment interviews, and conducted more than 30 interviews with numerous stakeholders. The project team also conducted a review of national best practices for collecting, storing, and managing crash, citation, and racial profiling information and identified technologies that may be applicable for Massachusetts. In August, a summary of the research findings and preliminary recommendations was presented to an executive level steering committee to solicit upper-level agency input and support for implementation of a strategic plan.

Some of the major findings of the project planning process include:

- For every traffic records data type (crash, citation/adjudication, vehicle registration, driver history, injury surveillance, and road inventory), there are data collectors, owners, and consumers whose needs should be met through an integrated traffic records system.
- There are both institutional and technical obstacles that must be overcome to advance the statewide traffic records system.
- The existing TRCC is not empowered to make funding or program decisions within their own organizations, nor does a strategic direction adopted by all agencies with traffic records responsibilities exist for the TRCC to follow.
- The current crash record file is an unreliable source of information for highway safety planning due to its incompleteness, the timeliness of reporting to the RMV, an over-reliance on operator crash reports, and the accuracy of the data.
- There are gaps in both data and business processes at this time, which prohibit the timely processing of crash records, the sharing of data across agencies, and the ability to conduct statewide trend analysis.
- There are redundancies in current business processes which could be mitigated.

Recommendations based on these and other issues identified through extensive stakeholder outreach include, but are not limited to:

- Establishing an Executive-Level TRCC;
- Establishing a policy regarding the validity of e-citations in Massachusetts;
- Establishing a framework for sharing information;
- Addressing gaps in crash information;
- Identifying standards and data exchange opportunities;
- Leveraging road inventory data to improve crash locations; and
- Designing and implementing an e-crash and e-citation system.

The *Massachusetts Statewide e-Citation and Traffic Records System Business Plan* includes detailed information about the challenges identified to advancing the current traffic records system, recommendations for advancing the program, and provides a detailed action plan which assigns responsibility for implementing key strategies. Implementation of the plan is the responsibility of the various data collectors, owners, and consumers. By improving upon the accuracy, completeness, availability, integration, and timeliness of traffic records system, the Commonwealth will be better able to pursue its vision to:

*Save lives and reduce injuries on Massachusetts roadways by using efficient processes to collect, store, and analyze complete and accurate traffic safety information and by making it freely available to all safety stakeholders.*

# 1.0 Background and Problem Statement

## 1.1 PROBLEM STATEMENT

Motor vehicle crashes are the cause of more than 425 deaths and 4,500 serious injuries in Massachusetts each year. These crashes cost the Commonwealth approximately \$6.3 billion annually.<sup>1</sup> These crashes are unacceptable, unaffordable, and largely avoidable. Fortunately, there are numerous public and private sector organizations trying to reduce the number of motor vehicle crashes and mitigate the severity of crashes throughout the Commonwealth. By working together, these organizations and concerned individuals have made significant progress to improve traffic safety, such as through the:

- Increase in the Commonwealth's seat belt usage rate (to 74 percent in 2009);
- Development and implementation of the statewide Strategic Plan for Highway Safety (SHSP);
- Passage of the Junior Operator Bill in 2007;
- Strengthening of the child passenger safety act in 2008;
- Deployment of the Breath Alcohol Testing (B.A.T.) mobiles that provide the safety and technology needed by officers operating sobriety checkpoints; and
- Increase in public outreach and media related to traffic safety.

Despite this progress, people are still dying unnecessarily on Massachusetts roadways. Transportation safety planning requires the analysis of traffic records data for problem identification, countermeasure selection, project evaluation, and performance measurement. Safety practitioners rely upon data from the six core traffic records information systems: crash, citation/adjudication, injury surveillance, driver history, vehicle registration, and the road inventory file. In Massachusetts, these systems are managed by multiple agencies: the Registry of Motor Vehicles (RMV); the Merit Rating Board (MRB); the Executive Office of Transportation and Public Works (EOTPW); and the departments of Health (DPH) and Health Care Finance and Policy (DHCFP) manage injury surveillance-related information systems. Data stored in these systems are collected by numerous entities such as state and local police officers and emergency

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<sup>1</sup> Executive Office of Public Safety and Security, *Enacting A Primary Safety Belt Law in Massachusetts*, January 2009, page 3.

responders. Many other agencies, such as the Executive Office of Public Safety and Security's Highway Safety Division (EOPSS/HSD), Massachusetts Highway Department (MHD), and regional planning agencies (RPA), rely upon this data to make business decisions. Coordination among these agencies, therefore, is essential to reducing crashes and improving safety on the Commonwealth's roadways.

The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) raised the visibility of safety in the transportation planning process and acknowledged the importance of accurate, reliable traffic records information systems. This Act, through the Section 408 State Traffic Safety Information System Improvement Grants program, provides funding to states that maintain an active TRCC, a current Traffic Records Assessment, and an updated Strategic Plan for Traffic Records. It also requires states to show measurable progress toward improving at least one of the core traffic record information systems in the areas of accessibility, accuracy, completeness, integration, timeliness, and uniformity to qualify for subsequent year funding under Section 408. Massachusetts, through the efforts of its TRCC, has successfully submitted Section 408 grant applications and received more than \$2.2 million for the Commonwealth during the past four years.

The Massachusetts TRCC along with the Traffic Records Coordinator selects and prioritizes projects for funding under the Section 408 grant process. Over the past year, however, members of the TRCC have expressed concern that this funding is being applied to individual agency projects that, while potentially addressing the needs of these subgrantee agencies, may not necessarily be positioning the Commonwealth to achieve the broader goal of establishing an integrated statewide system or ensuring accessibility to accurate data for all member agencies. TRCC members have expressed frustration that there does not appear to be a coordinated, statewide approach to advancing or integrating traffic records information systems or using Section 408 funding.

Another area of concern for TRCC members is data quality. In recent years, little has been done in Massachusetts to advance the use of readily available technology for electronically capturing data. Currently, law enforcement officers enter data onto three different forms to capture crash, citation, and racial profiling information. This information is often then entered into a system after the event (desk side) or rekeyed by clerks depending on how it is stored or used. The timeliness of reporting to the RMV and the MRB continues to be a challenge as well. The RMV is unable to "close" or share a complete year of crash data for more than 12 months following the end of that year, due in part, to the delay in reporting by law enforcement agencies. Historically, the MRB has not received timely notification

"The current condition of the crash file renders it very unreliable as a source of data to drive decisions in program planning and policy-setting by the State's highway safety managers."

-NHTSA, *Draft Traffic Records Assessment Report*

of dispositions on criminal citations from the courts, causing delays in license revocations and suspensions. Although a working group has been formed to mitigate this problem, additional coordination with the court system is needed.

In March of 2009, the EOPSS/HSD invited the National Highway Traffic Safety Administration (NHTSA) to conduct an assessment of the traffic records program in Massachusetts. A panel of traffic records experts from around the country conducted surveys and more than 50 interviews to develop their findings and recommendations. Their overall assessment of the current traffic records program was not good. Their primary observation was that the current crash data system (CDS) was unreliable, noting:

*The CDS cannot be considered to meaningfully represent the crash experience in Massachusetts for several reasons. Several large agencies (in particular Boston and Springfield) do not send reports for a vast majority of their crashes. For example, according to crash statistics Boston only submitted 92 crash reports in 2007. Although there is a statutory requirement for all agencies to report crashes to RMV, there is no penalty for noncompliance. Many agencies across the State send in reports with many blank data fields. Compounding the problem further is the lack of edits being applied at RMV during data entry. Even those agencies sending reports electronically do not apply edits prior to submission. Although about 88 agencies are sending reports electronically, they are being generated from their own Records Management Systems (RMS) but are not being collected via field data collection applications on laptops in the police vehicles. If used, such applications could provide for editing at time of entry. Another practice that further diminishes the quality of the entire crash file is the reliance on operator reports. In the absence of a police report for a crash, information from an operator report is entered into the system time permitting.<sup>2</sup>*

While the assessment commended the Commonwealth in some areas, including the comprehensiveness of the current citation information system and recent progress made between the MRB and the courts to share information, many recommendations were made relating to the overall management of the traffic records program, improving data quality and data capture, and promoting users' access to and use of the traffic records system.

## 1.2 PROJECT GOALS AND OBJECTIVES

Based on the recommendations of the Traffic Records Assessment and at the suggestion of the Massachusetts TRCC, EOPSS/HSD and the EOPSS Criminal History Systems Board (CHSB) agreed to fund a study to examine all of the issues and barriers related to advancing the Commonwealth's traffic records

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<sup>2</sup> NHTSA, *Draft Commonwealth of Massachusetts Traffic Records Assessment Report*, March 2009.

program and identify activities to advance the program. The EOPSS/CHSB issued a Request for Response (RFR) in December 2008 and selected Cambridge Systematics, Inc. (CS) to assist them with executing the study to develop a Statewide e-Citation and Traffic Records System Business Plan. The goal of this project was to *develop a statewide traffic records information system business plan that would position the Commonwealth to advance coordination and integration among traffic record information systems and their owners*. The project objectives included:

- Identifying statewide goals and objectives for IT projects;
- Developing specific strategies for advancing the plan;
- Identifying action steps and assigning responsibility for implementation; and
- Including a process for evaluating how progress is being made toward the plan goal.

## 1.3 PROJECT METHODOLOGY

Developing a Statewide e-Citation and Traffic Records System Business Plan that could be adopted by multiple agencies and incorporated with their existing plans, programs, and business process, required a collaborative planning process. The project team, therefore, relied upon existing documentation, such as the Draft Traffic Records Assessment report and minutes of recent TRCC meetings, participated in the Assessment interviews, and conducted more than 30 interviews with numerous stakeholders. The project team also conducted a review of national best practices for collecting, storing, and managing crash, citation, and racial profiling information as well as examined what potential technologies may be applicable for Massachusetts. In August, a summary of the research findings and preliminary recommendations was presented to an executive level steering committee to solicit upper-level agency input and support. The framework of the plan, including a vision, project prioritization criteria, performance measurement, and preliminary action plan was vetted with the group. This process is illustrated below as Figure 1.1.

Figure 1.1 Project Methodology

Tasks	Output
Stakeholder Outreach	<ul style="list-style-type: none"> <li>Summarize issues/limitations</li> <li>Solicit answers to the question "what do agencies need?"</li> </ul>
Inventory Existing Systems	<ul style="list-style-type: none"> <li>Establish baseline – what's in place today</li> </ul>
Best Practices Review	<ul style="list-style-type: none"> <li>Identify what works in other places and is consistent with Commonwealth's needs/interests</li> </ul>
Traffic Records Assessment	<ul style="list-style-type: none"> <li>NHTSA's assessment of traffic records deficiencies and recommendations</li> </ul>
Develop Statement of Need	<ul style="list-style-type: none"> <li>Summarize challenges; develop vision, goals, and objectives; suggest recommendations</li> </ul>
Develop Framework for Plan	<ul style="list-style-type: none"> <li>Solicit executive-level input on the process and plan framework</li> </ul>
Action Plan	<ul style="list-style-type: none"> <li>Develop action plan for meeting deficiencies</li> <li>Assign responsibility</li> </ul>
Business Plan	<ul style="list-style-type: none"> <li>Develop consolidated draft and final statewide e-citation and Traffic Records System Business Plan</li> </ul>
Identify Technologies	<ul style="list-style-type: none"> <li>Identify potential technology solutions</li> <li>Make recommendations for the Commonwealth</li> </ul>



## 2.0 Findings

### 2.1 CURRENT SYSTEMS AND LINKAGES

Transportation safety planning requires the analysis of traffic records data for problem identification, strategic planning, policy-making, countermeasure selection, project evaluation, and performance measurement. Safety practitioners rely upon data from the six core traffic records information systems: crash, citation/adjudication, injury surveillance, driver history, vehicle registration, and the road inventory file. In Massachusetts, these systems are managed by multiple agencies:

- The RMV manages the crash, driver history, and vehicle registration systems;
- The MRB manages the citation system;
- The AOTC manages adjudication information (MassCOURTS);
- The EOTPW manages the road inventory file; and
- The DPH and DHCFP manage injury surveillance-related information systems.

Each data type provides valuable information critical to safety decision-making and strategic planning. Each system is described below.

**Crash Data** are maintained by the RMV in the CDS. Currently, crash data are received either electronically or as paper reports from law enforcement agencies. Operator reports are submitted to the RMV via paper. The RMV is working on a project to develop a web-based reporting tool. The RMV is required to collect crash information to support licensing activities and to report fatalities to the national Fatality Analysis Reporting System (FARS). Crash data are used by law enforcement to help ensure resources are allocated where needed. Massachusetts General Laws (M.G.L.), Chapter 90, Section 29, requires all police departments to notify the Registrar of “any fatal accident or accident involving serious injury.” Furthermore, M.G.L. 90 29 requires the chief officer of the police department supervising the accident investigation to “notify the Registrar within 15 days” with the details of every accident that happens “within the limits of his city, town, or jurisdiction, or on such toll road or bridge, in which a motor vehicle is involved.” Other state and local agencies use crash data as the primary source of information for traffic safety analysis. This data is used to identify crash trends and high crash locations throughout the Commonwealth. Other agencies also use the data to allocate staff and financial resources. In a consolidated traffic records systems, crash data link to citations and injury outcomes to show where and how crashes occur, as well as financial and human costs.

**Citation** and **Adjudication** information are managed by multiple agencies. The RMV and MRB maintain citation data in the Automated License and Registration System (ALARS), and the AOTC manages adjudication information in MassCOURTS. Upon issuance of a civil citation by a law enforcement officer, a copy is sent to the MRB for entry into the driver record. For civil infractions, a final disposition is applied automatically when the fine is paid or when the findings from a hearing are applied to the citation by the MRB. A final disposition also is applied if the violator fails to pay the citation or request a clerk-magistrate hearing. Upon issuance of a criminal citation by a law enforcement officer, two copies are sent to the District Court. The District Court forwards a copy of the criminal citation without disposition data to the MRB. In criminal cases the final dispositions are applied when received from the courts (as of the spring of 2009, 58 of the 62 District Courts send the dispositions electronically via the MassCOURTS case management system). Citation data are created by police using the uniform citation form. Citation data are used by RMV, MRB, AOTC, and the insurance industry to investigate traffic-related incidents. Citation and adjudication information also are used in law enforcement and judicial training. In a consolidated traffic records system, citation data show legal outcomes of crashes (and other violations) and provide details of a specific incident.

The RMV maintains both the **Driver History** and **Vehicle Registration** systems in ALARS. ALARS consists of multiple components, including licensing, registration, title, suspensions, accident records, inspection maintenance, nonrenewal, policy information, and MRB information. The M.G.L. Chapter 175, Section 113A requires that all registered vehicles be insured. Consequently, the RMV must affirm insurance coverage prior to issuing or renewing a registration. Driver and vehicle data are used by police to identify suspended/revoked licenses. In a consolidated traffic records system, driver history and vehicle registration data would be the key components of citation and crash reports.

The **Injury Surveillance System** is made up of multiple information systems and data sets which are managed by the DPH and DHCFP. These systems can provide ambulance trip data, hospital discharge data, trauma injury data, and other types of valuable information. Injury data, however, can come from a variety of sources, are very complex, and are submitted to a number of access restrictions. The MassCHIP system provides access to 36 health status, health outcome, program utilization, and demographic data sets, from which standard or custom reports can be generated, as can charts and maps. In a consolidated Traffic Records system, injury data would be linked to crash data to show medical outcomes and the long-term impact of crashes.

In Massachusetts, the **Road Inventory File** is maintained by the EOTPW's Office of Transportation Planning. Geodatabases and GIS shape files are provided annually to users via a publicly accessible Internet site. Road inventory data are used by police, RMV, and MHD to identify crash locations on a map. Researchers use this information to analyze crashes and crash clusters.

In addition to the six core systems, Massachusetts safety practitioners and researchers rely upon **FARS**. At the national level, FARS contains data on all fatal traffic crashes within the 50 states, the District of Columbia, and Puerto Rico. FARS was conceived, designed, and developed by the National Center for Statistics and Analysis (NCSA) to assist the traffic safety community in identifying traffic safety problems, developing and implementing vehicle and driver countermeasures, and evaluating motor vehicle safety standards and highway safety initiatives. At the state level, the RMV enters detailed information about Massachusetts’ fatalities into the system. Currently, there is no link between FARS and the CDS, so this information is separately keyed into each system.

Data for these two systems are collected by numerous entities such as state and local police officers and emergency responders. Many other agencies, such as the EOPSS/HSD, MHD, state and local law enforcement, and regional planning agencies (RPA), rely upon these data to make business decisions and program safety funding. Traffic records data, therefore, is touched by multiple data collectors, system owners, and data consumers. Table 2.1 describes these relationships.

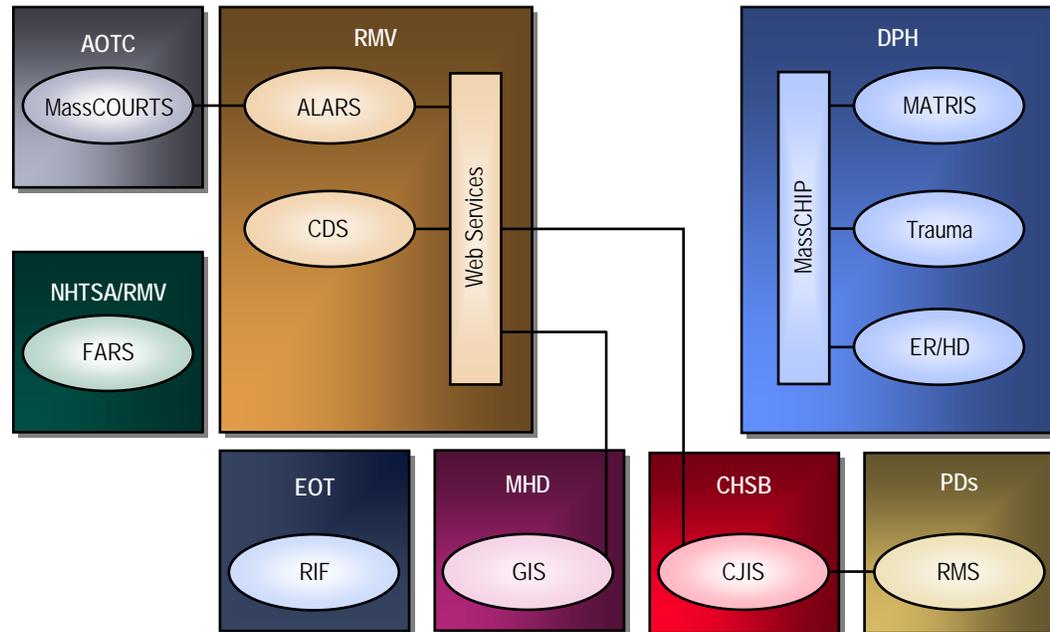
**Table 2.1 Massachusetts Data Collectors, Owners, and Consumers**

Data	Collectors	Owners	Consumers
Crash	<ul style="list-style-type: none"> <li>• State and local law enforcement</li> <li>• Operator reports</li> </ul>	<ul style="list-style-type: none"> <li>• RMV</li> </ul>	<ul style="list-style-type: none"> <li>• RMV</li> <li>• EOT</li> <li>• EOPSS</li> <li>• RPAs</li> <li>• Public health</li> <li>• Law enforcement</li> <li>• Insurance industry</li> </ul>
Citation/Adjudication	<ul style="list-style-type: none"> <li>• State/local law enforcement</li> <li>• District Courts</li> </ul>	<ul style="list-style-type: none"> <li>• RMV/MRB AOTC</li> </ul>	<ul style="list-style-type: none"> <li>• RMV</li> <li>• EOPSS</li> <li>• Law enforcement</li> <li>• Insurance industry</li> </ul>
Driver History	<ul style="list-style-type: none"> <li>• RMV</li> </ul>	<ul style="list-style-type: none"> <li>• RMV</li> </ul>	<ul style="list-style-type: none"> <li>• RMV</li> <li>• EOPSS</li> <li>• FMCSA</li> <li>• Law enforcement</li> </ul>

Data	Collectors	Owners	Consumers
Vehicle Registration	<ul style="list-style-type: none"> <li>• RMV</li> </ul>	<ul style="list-style-type: none"> <li>• RMV</li> </ul>	<ul style="list-style-type: none"> <li>• RMV</li> <li>• EOPSS</li> <li>• FMCSA</li> <li>• Law enforcement</li> </ul>
Injury Surveillance	<ul style="list-style-type: none"> <li>• EMTs</li> <li>• Hospitals</li> </ul>	<ul style="list-style-type: none"> <li>• DPH</li> <li>• DHCFP</li> </ul>	<ul style="list-style-type: none"> <li>• Public health community</li> <li>• EOT</li> <li>• EOPSS</li> <li>• Law enforcement</li> <li>• First responders</li> </ul>
Roadway Inventory File	<ul style="list-style-type: none"> <li>• EOT</li> </ul>	<ul style="list-style-type: none"> <li>• EOT</li> </ul>	<ul style="list-style-type: none"> <li>• EOT</li> <li>• RMV</li> <li>• EOPSS</li> <li>• Law enforcement</li> <li>• RPAs</li> <li>• First responders</li> </ul>

The Massachusetts traffic records system is made up of many individual systems. There are, however, some linkages between traffic records systems, as illustrated in Figure 2.1. Some crash report information is sent via a law enforcement agency’s record management system (RMS) through the Criminal Justice Information Services (CJIS) network, managed by the CHSB, to the CDS. The MHD uses the roadway inventory file to locate crashes and update the crash records in the CDS. The RMV, MRB, and AOTC have developed a link to share disposition information between MassCOURTS and ALARS which notifies the RMV when a license suspension or revocation should occur. The MassCHIP system allows users access to summarized ambulance trip, trauma, and emergency room and hospital data. There are additional opportunities for linking data sets and sharing data across state agencies, as described in Section 3.0.

Figure 2.1 Current Traffic Records System Diagram



## 2.2 FINDINGS AND RESULTS

### Traffic Records Assessment Findings

The NHTSA defines a traffic records system as, “a virtual set of independent real systems (e.g., driver conviction records, crash records, roadway data, etc.) which collectively form the information base for the management of the highway and traffic safety activities of a state and its local subdivisions.”

The NHTSA encourages states to work toward a global approach which allows integrated access to data without bringing all the data into a single database. The purpose to the collective “system” approach is to ensure that the majority of users’ needs are met. The NHTSA oversees the Federal traffic records program and assists states with their individual programs. In February 2006, Federal Register/Vol. 71, No. 22 was published which described the U.S. DOT’s State Traffic Safety Information System Improvement Grants (Section 408). The Register outlines the requirements of the grant program which are tied to an active TRCC made up of representatives from multiple disciplines and the development of a multiyear highway safety data and traffic records system strategic plan. In November 2006, the NCSA issued *the Traffic Records Program Assessment Advisory*.<sup>3</sup> The Advisory provides states with guidance on the

<sup>3</sup> NCSA, Traffic Records Program Assessment Advisory, November 20, 2006.

necessary contents, capabilities, and quality of data in a traffic record system. It addresses ideal traffic record system management and system components. Also, NHTSA publishes uniform guidelines for traffic safety program areas, including traffic records (Highway Safety Program Guideline No. 10 Traffic Records).<sup>4</sup> These documents provide guidance on the ideal traffic records system. Specifically, they recommend that a state traffic records system be composed of the six core systems referenced previously and that states consider the following:

- Organizing the program around a two-tiered TRCC (executive-level and working-level) representing all traffic record data users and system owners and be overseen by an administrator or manager (a state Traffic Records Coordinator). Guidance recommends that the TRCC meets regularly, oversees data quality control through performance measurement, members be authorized by their agency to participate, and the roles and powers of the TRCC be made clear in its charter. The Advisory notes, “despite challenges stemming from collective decision-making by members from different agencies with competing priorities, TRCC members should speak with ‘one voice.’”<sup>5</sup>
- A traffic records system should be guided by a traffic safety information system strategic plan. The strategic plan should address the adoption and integration of new technologies, promote data sharing and linking, consider both statewide and local data needs, coordinate with Federal initiatives, consider adoption of uniform data standards, include elements to facilitate strategic traffic safety planning and program management, address short- and long-term budget needs, and be updated by the TRCC on a regular basis.
- The traffic record system should support data integration. This can be addressed through maintaining a traffic records system inventory; allowing users access to major information systems through a single portal; supporting electronic data sharing; and complying with Federal reporting, privacy, and security standards.
- The traffic records system should provide accurate, comprehensive, and timely data to support decision-making entities at the state and local levels.

The NHTSA conducts Traffic Records Assessments for the states at their request. The assessment reports are written to include excerpts from the Advisory with a comparison of the State’s progress toward those guidelines. In 2009, Massachusetts invited NHTSA to conduct an assessment of the Massachusetts

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<sup>4</sup> NHTSA, Highway Safety Program Guidelines No. 10, <http://www.nhtsa.dot.gov/nhtsa/whatsup/tea21/tea21programs/pages/TrafficRecords.htm>.

<sup>5</sup> Ibid, pg. 4.

Traffic Records System. Major findings of the *Draft Commonwealth of Massachusetts Traffic Records Assessment* report are described below.<sup>6</sup>

- The current condition of the crash file renders it very unreliable as a source of data to drive decisions in program planning and policy-setting by highway safety managers.
- The CDS does not meaningfully represent the crash experience in Massachusetts, due in part to several large police agencies not reporting to the state system, a lack of edits being applied at the RMV during data entry and by law enforcement prior to submitting the report to the RMV, and an over-reliance upon operator reports.
- Massachusetts has excellent citation data.
- No law enforcement agencies are able to issue citations electronically for transfer to the courts.
- The road inventory file contains “pick lists” for street names, however, the “pick lists” used by local police in their RMSs and that used in the crash file have different names due to the use of different sources for street names.
- The RMV has taken advantage of the electronic interactive applications available for motor vehicle functions, such as the National Motor Vehicle Title Information System and the Electronic Lien and Title system.
- A wealth of traffic safety information for traffic safety research is available in the DHCFFP hospital data and DPH trauma registry, EMS, and death record data; but due to access restrictions and other obstacles the full potential of these systems has not been realized.
- The TRCC is hindered by the absence of an executive level group.

Major recommendations made in the report are summarized in Appendix C. The final report is not available at this time.

## **Best Practices Survey**

### *Survey Methodology*

CS used a variety of techniques to identify and gather information on best practices in traffic records data collection and management used by other states. CS staff members who are experts in this area and have contacts in different states contributed suggestions regarding states that are leaders in this area. These suggestions were supplemented with information obtained from:

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<sup>6</sup> NHTSA, *DRAFT Commonwealth of Massachusetts Traffic Records Assessment*, March 16-20, 2009.

- The NHTSA traffic records systems inventory (<http://www.nhtsa-tsis.net/trsystems/>);
- The Association of Transportation Safety Information Professionals (ATSIP) 2008 Best Practices Challenge; and
- An on-line review of literature and papers on the topic of traffic records data collection and integration.

CS collated the information and identified best practices in the following areas:

- Crash and citation data gathering;
- Racial profiling; and
- Traffic records system integration and management.

To qualify as a best practice, a system or process must meet one or more of the following criteria:

- The business process, system, or strategy had been adopted in several locations;
- Resulted in a measurable and significant improvement in data quality, completeness, or timeliness; and
- Potentially applicable to the traffic records situation in Massachusetts.

Additional information on the leading systems and business practices was obtained through a combination of literature review and telephone surveys.

### *Survey Results*

The best practices survey included a set of case studies describing how other states addressed different facets of traffic records data collection and management. In reviewing these case studies, certain factors stand out as key components of successful traffic records business processes and development projects. These factors are:

- Establish partnerships between law enforcement and state and local agencies;
- Propose statewide systems that minimize cost to local agencies;
- Address data quality at the local level; and
- Adopt Federal and state standards, including the Model Minimum Uniform Crash Criteria (MMUCC), the National Incident-Based Reporting System (NIBRS), and the National Model for the Statewide Application of Data Collection and Management Technology to Improve Highway Safety.

Partnerships were critical to the success of multiple traffic records systems developed by the State of Washington. The Statewide Electronic Collision and Ticket On-Line Records (SECTOR) and Electronic Traffic Information Processing (eTRIP) systems were the result of collaborative efforts by enforcement, state and local agencies. In addition, Indiana conducted an electronic citation pilot

program with significant input from law enforcement. Bringing together all the players helps to ensure that the needs and requirements of each are factored into system design activities.

Cost always is a significant factor in the development and deployment of any system. A lower cost solution is more likely to be accepted, and getting local agencies to use systems is the first step in creating uniform data. Minimizing the cost to local agencies was a key factor in Wisconsin's deployment of Traffic and Criminal Software (TraCS) as well as electronic citation and crash systems in Indiana. These systems all are provided free of charge, except for hardware costs, to law enforcement agencies. It is interesting to note that Indiana also provides configuration assistance, regular upgrades, and free helpdesk services for its systems.

As discussed in Section 1, quality and completeness of Massachusetts crash data are serious issues. Several of the best practice systems report improved timeliness and lower error rates for reports captured electronically by law enforcement. Wisconsin reported that transmittal time and error rate both dropped by approximately 75 percent. In Indiana, electronic systems have improved timeliness and reduced errors by almost 90 percent. If systems are designed and implemented correctly they can improve both the effectiveness of police officers and the quality of traffic records information available for analysis and planning.

In line with the issue of cost, police departments want to ensure that systems they purchase or develop will be compatible with state agency systems. Adopting standards is particularly crucial when statewide applications may not be possible or practical. Most of the systems identified in the best practices survey are used, or least available, statewide.

The situation in Massachusetts is less clear. Because of the large number of systems used by local and state police, the decision of whether to purchase or develop a single electronic crash and/or electronic citation system versus upgrading existing police systems is not clear. In this type of environment, identifying and adopting standards is crucial to ensure that investments in technology are not wasted or rendered obsolete.

CS has incorporated these factors where appropriate in the project recommendations discussed in Section 3.2.

In addition to business processes, CS looked at specific systems to identify potential candidates for use in Massachusetts. CS identified three possible options that the Commonwealth could pursue to capture and transmit more data electronically.

- Enhance existing systems – this would involve supporting the purchase of modules where necessary to add capabilities (i.e., electronic crash and citation collection and reporting) to the RMSs already used by state and local police. CS provided information on some of the most common systems used

by police departments. In this scenario, the state would adopt standards that each RMS vendor would be required to meet.

- Replace existing systems – this would involve the development or purchase of a single statewide system that provides electronic crash and citation collection and reporting capabilities. Use of this system either would be offered to or mandated for police departments. While Massachusetts could develop a custom system, it would be more practical to consider using a system like TraCS, which already has been adopted by 17 jurisdictions.
- Supplement existing systems – this would be a hybrid approach that provides a statewide system, perhaps only for electronic citations, that would coexist with existing RMSs. The specifics of this approach, including what systems would be supported for different activities, would need to be determined through a joint planning exercise.

The full results of the best practices survey were presented in the technical memorandum *Review of National Best Practices in Crash and Citation Data Collection* delivered on July 29, 2009.

## **Interview Findings**

Cambridge Systematics interviewed more than 30 people to solicit feedback from data collectors, owners, and users regarding their current view of traffic records in Massachusetts, their role in the overall process, and whether or not their data needs are being met by the current system. The project interviews focused on agencies' business processes as well as their use of specific crash data types. The needs that were identified during the interview process include:

- Better, more accurate location data;
- Easier access to driver, vehicle, and crash information;
- Capturing driver and vehicle data automatically;
- More timely reporting of crashes to the RMV;
- Expanding data captured to support other business needs; and
- Engaging insurance vendors in the discussion of crash and citation data improvements.

There was widespread support for improving traffic records systems and processes. There are numerous efforts currently underway to improve data systems, linkages, and sharing of data. For example, the RMV is developing web services to enhance access to crash and other data. The MRB and AOTC are enhancing their work to automate the exchange of data regarding hearing requests and dispositions for criminal citations. There also was significant support to automate the data collection processes, particularly for crash, citation, and racial profiling information; although there was some disagreement about how that should be done.

Concerns raised during the interviews included the limited ability to share data among state agencies, whether or not a statutory change would be necessary to issue electronic citations, and the ability of some systems to receive and process data electronically. Law enforcement representatives expressed reservations about whether or not existing state systems could handle new electronic data collection (and reporting) processes. While summary data often is being shared across agencies, direct access to data often is restricted due to concerns about misinterpretation of data sets, lengthy legal agreements that are required, and the lack of established links outside owner agencies. Currently, M.G.L. requires law enforcement officers to provide violators with a copy of the citation at the time it is issued. It also requires the citation be signed by the violator. Any electronic data collection system implemented for citations would need to accommodate these requirements or a change in the law may be necessary. While there was support for automating data collection procedures, a concern was raised about the need for new systems to be more efficient than existing systems or procedures. For example, if it takes a law enforcement officer more time to capture information electronically (rather than manually) at the roadside, it may impact the officer's personal safety.

In addition to the stakeholder interviews, the project team met with EOPSS executive management and a committee of executives from numerous state agencies involved in the traffic records process, including representatives from state and local law enforcement, the RMV, the MRB, the courts, the insurance industry, and many others. These participants are identified in Appendix A. Executives provided overall support for improving data collection, storage, and sharing of data as well as improving coordination among agencies during the planning of large IT projects. Specific comments and questions raised during the strategic planning discussion included:

- Are there national examples of how investing in traffic record information system improvements impacts a reduction in serious injury and fatal crashes? Is there any evidence of how investments in a specific data system or data type can impact states' ability to more strategically select projects that relate to a decrease in crashes?
- The Commonwealth should consider pursuing both e-citation and e-crash at the same time and add the collection of racial profiling data to these systems. Could this be incorporated into the SWISS effort?
- Massachusetts needs to be able to merge the crash and citation data and make it available to the local police to support their planning and resource deployment activities.
- There seemed to be strong support for adding barcodes to registrations, although RMV representative seemed skeptical that this is doable in a short timeframe.
- Boston Police Department (BPD) acknowledged their poor track record in uploading crash data to the state system, but expressed a renewed focus on

the issue and a willingness to find a solution that will work for both BPD and the RMV. Two observations made, however, were:

- Police have a tendency to show the value of property damage below the threshold (\$1,000) for filing accident reports; and
  - When a crash is secondary to other factors (e.g., there are other criminal violations going on with the same event), officers tend to give reporting of crash information lower priority.
- EOPSS representatives noted that saving lives is the primary motivation for addressing the current traffic record problems, but that there are opportunities at this time to help make the traffic records process more efficient and reduce redundant data entry.

There was strong support for establishing an Executive-Level TRCC. EOPSS representatives indicated that they would convene a group of representatives from EOT (which would cover MHD and the Registry), DPH, EOPSS (covering State Police), one local Police agency, and ITD to serve on the Executive-Level TRCC. AOTC would play an advisory role. Other TRCC member agencies would be invited to participate in meetings from time to time based on the topics being discussed.

## 2.3 STRATEGIC OBSERVATIONS

As a result of the Traffic Records Assessment interviews and additional best practices research that was conducted, there is a great deal of valuable information available to guide the Commonwealth's future traffic records activities. Most of the findings relate to institutional or technical challenges that the Commonwealth must overcome, which are described later in this section. In reviewing the key findings, staff from CS prepared an overall "scorecard" for Massachusetts, summarizing the performance of each of the traffic records core systems. This scorecard is shown in Figure 2.2.

Figure 2.2 Traffic Records “Scorecard”

Data	Assessment	Observations
Crash	RED	Data Inconsistent and Incomplete
Citation/Adjudication	YELLOW	Paper Process Good but Inefficient; Courts Lack Data Access
Driver/Vehicle	YELLOW	System is Old and Difficult to Change or Access
Injury Surveillance	YELLOW	Many Systems; Not Linked to Crash; Data Access Issues
Road Inventory	YELLOW	Information Not Used Effectively or Well Understood

### Institutional Observations

One of the major observations was that many of the challenges being faced at this time are institutional in nature rather than technical. Institutionally the current TRCC is not empowered to make funding or program decisions within their own organizations, nor does a strategic plan or direction exist for them to follow. Members of the TRCC have expressed frustration that their activities in recent years have focused on the prioritization and funding of projects under the Section 408 grant program. The projects being submitted for funding have been focused on individual agency need rather than on pursuit of a more holistic strategic direction or integration of the traffic records system. Establishment of an Executive-Level TRCC dedicated to the pursuit of the same goals and objectives for the Commonwealth’s traffic records system would provide for a more cohesive approach to the use of Section 408 as well as other state and local funding for IT projects. It would also enable the working-level TRCC to focus on specific projects, such as updating the crash report form and addressing data quality issues. Another example of an institutional or business process challenge relates to the Commonwealth’s ability to capture data electronically. The technology exists to do this. However, at this time Massachusetts vehicle registrations do not contain a barcode. If the Commonwealth were to pursue electronic collection of information, including barcodes on registrations would be imperative. This would require a change in the policy and procures at the RMV and with police departments, but it is not, most likely, an insurmountable challenge.

There are significant gaps in both data and business processes at this time. Crash data is not being submitted in a timely manner to the RMV, despite Massachusetts law. This causes a delay in the processing of the crash records and the closing of the annual crash file at the RMV, and limits the RMV’s ability to process operator reports. At this time, the RMV is not able to close an annual

year of data for nearly one year following the end of the calendar year due to late submission of crash report forms. This delay means that planners and safety practitioners do not have access to data on the most recent crashes, unless they manually go through paper crash reports obtained from the RMV or their local police departments. This is neither efficient nor cost effective. In absence of a police crash report, the RMV will rely upon an operator crash report. These reports can be biased or contain inaccurate or missing information. It also impacts the completeness of the overall crash file. Another major concern is the lack of reporting to the RMV by a few of the Commonwealth's major city police departments. This skews the analysis of the statewide crash picture. In state-wide analysis of crashes, for example, it appears that very few crashes occur in the City of Boston. Resources, therefore, are directed to other communities. Incomplete information can lead to decision-makers directing funding to the wrong strategies or geographic areas. The quality of location data also is a challenge. Many local jurisdictions are entering location information on crash reports that do not match locations in the road inventory file. This means a crash location may not be recorded or may be recorded incorrectly. It also requires extensive staff resources at MHD to research each of the location discrepancies to amend the crash record.

### **Technical Observations**

Current business practices also impact system efficiency. For example, because much of the crash and citation data is not collected electronically, the data is often manually entered into an electronic system by at least two agencies. Duplicate data entry is not efficient and can lead to data quality errors. Although many police departments have the ability to electronically transmit their crash record data electronically to the RMV, many are printing their reports from their RMS and mailing hard copy reports to the RMV to be re-entered into the CDS due to a lack of the software reporting module, technical support, or equipment. If a citation was issued in that crash, much of the same information will be rekeyed by the MRB in ALARS.

There are multiple factors inhibiting the sharing of data. Some traffic safety information, such as injury information, is protected due to privacy concerns. During the interviews, some stakeholders expressed concern that others outside their own agency or discipline might not have the skills necessary to properly interpret the data. Data sharing also is limited by aging systems. For example, the ALARS is an old system built upon outdated technologies. There are efforts underway by the RMV to replace ALARS, but this will likely take several years to complete. Another challenge is that building the links necessary to grant access to information systems for outside users can be costly and time consuming. As each agency struggles to maintain its own business processes, it can be difficult to prioritize outside requests for assistance.

As mentioned above, several participants in this planning process expressed support for the development of e-citation and e-crash solutions. The 2009

NHTSA-sponsored Traffic Records Assessment, however, commended the Commonwealth on its existing citation process and encouraged a focus on crash data-related improvements. In addition to institutional, and possibly statutory, changes that would need to occur to automate the data collection processes, there are other factors to consider. Any automated solution would require an extensive procurement of software and hardware equipment for law enforcement. The build versus buy decision regarding software is complicated by the need to integrate any new system with the multiple RMSs already in use throughout the Commonwealth. It may be easiest to take an iterative approach to such development, starting with development of an e-citation solution, since there currently is no electronic mechanism (or mechanisms) for reporting citations.

## 2.4 GOALS

NHTSA encourages states to establish and track measurable goals as a way to demonstrate progress in different performance categories. Given the findings and strategic observations, CS recommends that agencies responsible for traffic records systems adopt the following goals:

### Measurable Goals

- Reduce redundant data entry of traffic records information (as measured by a decrease in the number of paper forms submitted by data collectors; an increase in electronic reporting; and a decrease in the amount of time spent entering data into multiple systems).
- Improve the timeliness of reporting to the RMV (as measured by an analysis of the time between the crash and receipt of the crash report from the reporting law enforcement agency).
- Increase the safety and efficiency of police officers and other data collectors (as measured by a decrease in the amount of time required to complete a crash report or citation).
- Improve access to traffic safety data by authorized users (as measured by a decrease in the complexity and time required to obtain data for a basic traffic study and increase in the availability of portals that house traffic safety data).
- Improve data sharing across state agencies (as measured by the number of user sharing agreements in place between TRCC member agencies).
- Improve the completeness of the crash data file (as measured by the number of cities and towns that report to the RMV within the timeframes specified in Massachusetts General Law, Chapter 90, Section 29).

### Process Goals

- Establish an Executive-Level TRCC to develop a strategic direction for the improvement of traffic records which is adopted by all involved agencies.

- Explore electronic data capture technologies and their applicability to Massachusetts data collection operations.

## 3.0 Recommendations

This section outlines a strategic vision for advancing coordination and integration among traffic records information systems in Massachusetts and recommends potential projects consistent with this vision. These projects cover the full range of traffic records operations. These recommendations are based primarily on the goals and objectives discussed in Section 1.0 combined with the current system information documented in Section 2.0. CS also factored in the results of a best practices survey that looked at how other jurisdictions have addressed traffic records challenges, including systems and business processes used to capture and distribute traffic records information.

### 3.1 VISION STATEMENT

To identify projects and set priorities for traffic records systems in Massachusetts, it is important to establish a strategic direction to guide these activities. The first step in achieving consensus among all stakeholders on this direction is to articulate a vision for traffic records management outlining the Commonwealth's primary goals and objectives. The following vision was presented to the Traffic Records Executive Steering Committee on August 19, 2009:

**Save lives and reduce injuries on Massachusetts roadways by using efficient processes to collect, store, and analyze complete and accurate traffic safety information and by making it freely available to all safety stakeholders**

The Commonwealth has been very clear that saving lives and reducing injuries are paramount concerns and that traffic records systems must support these goals. To do this, Massachusetts will design and implement systems to capture complete and accurate traffic records information and make this information available to analysts, planners, and others to help develop crash mitigation strategies and to evaluate the effectiveness of these strategies.

The Commonwealth also has stated that processes to gather and manage traffic records must be efficient to maximize available resources in this area. This efficiency begins with state and local police and emergency medical teams who are the primary source of traffic records information and extends to the agencies responsible for exchanging and using these data.

## 3.2 FRAMEWORK FOR ORGANIZING PROJECTS

CS has organized recommended projects into the following categories:

- Institutional;
- Business Process; and
- Technical.

Institutional projects include cross-agency initiatives that are critical to the success of the business and technical projects. Addressing these institutional issues early will help ensure that key questions are answered and roadblocks removed.

Business process projects are geared toward addressing how agencies perform certain tasks related to traffic records data collection and exchange. While there may be technical components to some of the business process projects, the important focus is on making crucial decisions and establishing a framework that will affect how agencies interact with traffic records systems and information.

Technical projects directly address issues related to the technology used to gather and manage traffic records information. Some are tactical projects that affect primarily one agency while others are large development efforts that will impact the entire Commonwealth.

## 3.3 PROJECT RECOMMENDATIONS

Throughout the business planning process, different groups have identified needs, goals, and objectives for traffic records systems in Massachusetts. NHTSA, in the *Draft Commonwealth of Massachusetts Traffic Records Assessment* report, provided a number of recommendations. CS also conducted interviews with more than 30 traffic records stakeholders and asked them to provide feedback on the most critical issues they believe should be addressed. Thoughts also were expressed during a group meeting with EOPSS executives and at a cross-agency briefing of parties interested in traffic records. These items are summarized in Section 2.0.

To address these issues, CS has identified a set of potential projects. The projects have been divided into three areas: institutional, business process, and technical. Each project includes a description as well as information on any prerequisites, the anticipated impact of the project, any risks or barriers to the project, and potential mitigation strategies to address the risks and barriers. Section 4.0 will evaluate these potential projects in light of stated priorities and other criteria to form a proposed action plan.

Several of the potential projects discussed here relate to major recommendations found in the draft Traffic Records Assessment report. In addition, the NHTSA assessment team made other technical and business process recommendations that the Commonwealth should review and consider. Additional information on this report can be found in Section 2.2.

## Institutional Recommendations

### *Establish Executive-Level Traffic Records Coordinating Committee (ETRCC)*

CS believes that the single, most critical issue is to engage executives across all agencies having a role in traffic records collection and management. These executives will establish a strategic direction for the Commonwealth in this area and provide oversight and support for other projects. NHTSA refers to this as the Executive-Level TRCC and noted the absence of this group in their 2005 and 2009 assessments. Also, throughout the interview process, stakeholders noted that the current TRCC has become mired in funding issues and is unable to provide the strategic focus needed to advance the traffic records system development in Massachusetts.

During the August 19, 2009 cross-agency briefing, it was proposed that the ETRCC consist of representatives from:

- The EOTPW;
- The DPH (part of the Executive Office of Health and Human Services (EOHHS));
- The EOPSS (including the Massachusetts State Police);
- One local police agency; and
- The Information Technology Division (part of the Executive Office of Administration and Finance).

The AOTC would participate in an advisory capacity. In addition, CS proposes that EOPSS provide some level of administrative support for the ETRCC to handle things like scheduling meetings, preparing agendas, distributing minutes and, most importantly, raising issues that require executive review. The ETRCC should meet every three to six months or as necessary in order to review the status of the traffic records program and make decisions regarding plans, coordination, and funding.

This item matches one of the major recommendations for Traffic Records System Management in the draft report of the draft Traffic Records Assessment report.

**Prerequisites:** There are no prerequisites for this project. However, establishing the ETRCC could be considered a prerequisite for all other projects. While certain tactical changes could be made to traffic records systems and processes without a steering committee, CS believes that the ETRCC will be necessary to ensure focus and commitment for key projects that may require an extended time to complete.

**Impact:** CS believes that establishing an ETRCC will reinvigorate aspects of the traffic records program in Massachusetts. By developing and promoting a strategic vision, the ETRCC can free the current working-level TRCC to focus on the

technical aspects of implementing this vision. By establishing priorities against which potential programs may be judged, the ETRCC also will help break deadlocks that are impacting the effectiveness of the current TRCC.

**Risks/Barriers:** At the August 19, 2009 cross-agency briefing, there was broad general consensus for establishing a traffic records ETRCC. The most significant risks at this time are:

- Difficulties identifying specific individuals with sufficient seniority to sit on the ETRCC;
- Problems setting and sticking to a regular meeting schedule; and
- Disagreement within the ETRCC over the direction and priorities for future traffic records projects.

To mitigate these barriers, CS recommends:

- Senior EOPSS management (e.g., Under Secretary or above) be involved in helping to identify and solicit participation from all involved agencies;
- EOPSS provide administrative support to the ETRCC to help schedule meetings and set agendas; and
- The Traffic Records Coordinator prepares a briefing for the ETRCC regarding the history of traffic records operations in Massachusetts as well as the current challenges facing the ETRCC.

### *Establish Policy Regarding Validity of e-Citations*

During the stakeholder interviews, CS determined that there is some uncertainty whether an electronic citation is valid. Specific questions included:

- Must the current uniform citation form be used and, if not, what are the requirements for an electronic or printed substitute?
- What process must be used to provide the operator with the citation, particularly if there is a problem printing the citation at the roadside?
- What rules would apply to signatures, both for the officer and the operator?

Electronic collection of data at the roadside has been identified as a top priority for improving the quality and timeliness of traffic records information. While the validity of electronic citations could be a stumbling block, CS believes that this issue should be simple to address. The EOPSS General Counsel should work with the EOT General Counsel and the Registrar to review M.G.L., Chapter 90, Section 29. Ideally, clarification and guidance to address electronic citations can be provided in the form of a memorandum from the Registrar to all police departments stating the circumstances under which an electronic citation is valid. This memorandum also would provide requirements for any e-citation system that Massachusetts purchases or develops.

**Prerequisites:** There are no prerequisites for this project.

**Impact:** Given the importance placed on implementing an e-citation system, this project may seem small but could have a big impact. For example, if it ultimately is determined that a change to Massachusetts General Law will be required to enforce electronic citations, then a significant task must precede any development plan. This will impact the schedule for delivery of an e-citation system.

**Risks/Barriers:** The most significant risk is that a thorough review of the current Massachusetts General Law will determine that a statute change is required to issue a valid electronic citation. There is no reasonable mitigation strategy except to complete this task as soon as possible so that any required changes can be addressed quickly.

In addition, there is the risk that electronic citations are found to be valid but with so many restrictions that developing and using an electronic system becomes impractical. For example, a legal review might determine that the citation may be created electronically but must exactly reproduce the look and feel of the current form, including the numbering scheme. If this requires the officer to enter the next number from a citation booklet and then discard the paper citation, it is more likely that the officer simply would prefer to use the existing paper citation. This might seem like a design issue, but actually is based on the legal interpretation of what constitutes a valid electronic citation. The mitigation strategy would be to adopt the broadest possible interpretation of what constitutes a valid electronic citation so that issues like this can be addressed properly in the system design.

### *Establish Framework for Sharing Information*

The ultimate goal of a statewide traffic records information system is to help develop strategies for reducing crashes and the human and financial cost of these events. To do this, any system must link different types of data in a way that facilitates analysis of crashes, citations, and outcomes.

In Massachusetts, as in many states, responsibility for these data is spread across multiple agencies. The key agencies holding traffic records data are:

- The EOTPW (crash data, driver histories, vehicle registrations, road inventory and, in concert with EOPSS, citation data);
- The EOPSS (citation data and, in concert with AOTC, adjudication data); and
- The EOHHS (ambulance trip information, emergency room and hospital discharge data, trauma and fatality information, etc.).

Representatives from these agencies should:

- Identify data to be shared;
- Determine mechanisms for associating records from different systems;
- Address privacy concerns;
- Define rules regarding use of information; and

- Commit to sharing information between state agencies without charge and discuss whether and how to charge external entities.

This group should develop Memoranda of Understanding (MOU) that govern sharing of traffic records data. These MOUs will be reviewed and signed by members of the ETRCC.

**Prerequisites:** There are no prerequisites for this project although it may make sense to address information sharing in parallel with discussions on standards and data exchange opportunities (refer to the section below on Business Process projects).

**Impact:** A commitment to freely share traffic records information is a necessary step to developing an integrated system that supports a full range of analysis options. Ultimately, failure to achieve this commitment will slow the development of crash mitigation strategies and may make certain types of crash analyses impossible.

**Risks/Barriers:** The biggest barrier at this time to linking crashes with outcomes are the rules established by the Executive Office of Health and Human Services governing access to medical outcome data, even after these data have been redacted. CS understands the issues raised by personnel from the Department of Public Health and acknowledges that there are concerns regarding privacy and complexity of medical data. However, to achieve the goal of a fully integrated traffic records system, some method must be found to address these issues.

CS recommends that the data sharing group engage transportation planners and analysts in their discussions. This will allow the group to understand the needs of planners and analysts (i.e., what types of data are required and why, how will the data be used, etc.). This also will allow representatives of the Department of Public Health to communicate their issues and ensure that users of the linked data are aware of these concerns.

## **Business Process Recommendations**

### *Address Gaps in Crash Information*

The top data quality issue identified by the 2009 NHTSA Assessment and during the stakeholder interviews is missing and incomplete crash data, including information from some of the Commonwealth's largest cities. The M.G.L., Chapter 90, Section 29, requires all police departments to submit crash reports to the RMV within 15 days. During the August 19 cross-agency briefing, CS observed a general desire to comply with this requirement but understands that there may be technical challenges to overcome.

This recommendation focuses on the Boston Police Department (BPD) but should be applied to any community that is not supplying crash information to the RMV. A review of the BPD Incident Report Form 1.1, which is used to record crash information, shows the following differences with the Model Minimum

Uniform Crash Criteria (MMUCC), which serves as the basis of the RMV's CDS and Crash Report Form used by other cities:

- The Crash Report Form is specialized for vehicle crashes while the BPD Incident Report Form is generic for any type of incident; and
- The Crash Report Form includes a variety of information not captured on the Incident Report Form, including:
  - Whether the crash occurred at an intersection;
  - The number of occupants in each vehicle and their seating position;
  - Whether the crash involved a hit-and-run or a moped;
  - Information on safety systems (e.g., seatbelts) used;
  - A crash diagram; and
  - Commercial vehicle (i.e., truck and bus) information.

CS recommends addressing this issue with a phased approach that minimizes the impact on all parties but has, as its ultimate aim, a resolution that provides the necessary crash information to the State.

1. The TRCC will prepare a briefing for officers explaining how crash data are used and why they are important. This briefing will emphasize that crash reporting is subordinate to officer safety and dealing with more serious public safety issues.
2. Charge BPD and RMV IT personnel with finding a way to transfer existing crash information from the BPD computer system to the CDS. This will involve automatically moving some historical crash information as well as all future crash information. This also may involve relaxing standards in the CDS to allow incomplete records to be loaded. For this step, there would be no change in BPD procedures. RMV will prepare a memo to all interested parties describing these data and advising users to be aware of any deficiencies while the situation is being resolved.

This has the advantage of immediately correcting crash counts and providing analysts with, at a minimum, information on date, time, and location of crashes. Analysts seeking additional information on these crashes will be required to review the crash narrative or, possibly, the Incident Report Form itself to acquire more information.

3. The TRCC will provide BPD with support and financial assistance to modify the crash reporting process to capture information consistent with the MMUCC. This may involve either updating the BPD system or providing BPD with access to a different crash reporting process. Regardless of the solution, this will involve support for officer training as well as technical support for the new system and the electronic interface to the RMV. To minimize the impact on the RMV, this process should aim to reuse an existing crash reporting interface that the RMV already supports.

This should be part of developing a statewide electronic crash reporting process. BPD should be involved in discussing this process and it might be possible to achieve economies of scale by simultaneously solving crash reporting issues for BPD and other cities and towns.

4. As new crash data are loaded, the RMV will remove old, incomplete crash records and inform all interested parties when this process is complete.

This item encompasses two of the major recommendations on Crash Records in the draft report of the draft Traffic Records Assessment report.

**Prerequisites:** Communities not currently providing crash data to the RMV must commit to this process and provide adequate technical resources to export crash data. The RMV also must commit to modifying the CDS to hold incomplete crash data pending an update to the crash systems used by these communities.

**Impact:** Addressing this issue will have a significant impact on the quality and, more importantly, the perception of completeness of Massachusetts crash data. To fully revamp the crash reporting process will require months, if not years. However, loading existing information will show definite progress on closing the crash data gap and provide the ability to perform some level of crash analysis sooner rather than later.

**Risks/Barriers:** The biggest barrier to solving this problem is the belief that it cannot be solved except by a radical change in BPD procedures. This change involves financial and technological hurdles, as well as modifications in officer procedures, that are so large they become an impediment to even starting the process. Couple this with the risk that agencies may adopt an intransigent position over system changes, the reporting process, or data completeness and this issue seems too big to tackle.

By breaking the process down into a series of steps, we acknowledge that there is no easy fix. By providing an interim process to load existing BPD crash data, we provide an early win that not only shows progress but gets the BPD invested in crash reporting. By coupling the ultimate solution with a resolution to statewide electronic crash reporting, we ease the financial burden on BPD and the technological burden on all parties.

### *Identify Standards and Data Exchange Opportunities*

During the interviews, several stakeholders stated that they were looking for more information on data available from traffic records systems. Because the ultimate goal of these systems is to facilitate exchanging and linking traffic records, CS believes that it would be beneficial to formalize a process for sharing information about these systems.

Possibly as an adjunct to the existing TRCC, interested parties should convene on a regular basis to exchange information on system updates, data availability, security issues, and interface protocols. The key players are agencies with

responsibility for one or more traffic records systems. These agencies were identified above under the institutional project *Establish a Framework for Sharing Information*. Other people interested in obtaining access to traffic records data also would participate.

In addition, this group would provide the ideal forum for reviewing and recommending standards, both in technology and data formats that the Commonwealth should adopt to simplify management of traffic records. This process is not intended to dictate to individual agencies how they must develop and deploy systems. However, standards provide organizations with a clear direction when building or purchasing systems. For example, developing or adopting a standard for the electronic transfer of crash and/or citation data would allow a local police department to discuss this issue with their system vendor with full confidence that the solution will be compatible with state systems.

**Prerequisites:** This project would be more likely to yield positive results if MOUs covering a data sharing framework have been developed. Also, identifying a lead agency that can help coordinate meetings, setup agendas and provide administrative support would make it more likely that this group will meet regularly and produce effective results.

**Impact:** While the specific impact of this project likely will be small, continuous dialog between agencies responsible for traffic records systems will help coordinate overall development efforts. In the long run, this may lead to greater efficiencies and smoother interactions between personnel and systems.

**Risks/Barriers:** If this group fails to meet on a regular basis or participants adopt a parochial attitude toward information exchange, then little would be accomplished by this process. Having MOUs that spell out rules regarding data exchange will provide a framework within which these more technical discussions can occur.

### *Determine Options for Crash Reporting*

As mentioned above, issues with quality and completeness of crash data were key concerns for the 2009 NHTSA Assessment team as well as a variety of other traffic records stakeholders. A previous project addressed the short-term need to load crash records from major metropolitan areas into the RMV's CDS. This project was designed to take definitive steps toward closing the crash data gap while laying the groundwork for a more comprehensive solution.

A more comprehensive crash reporting solution is needed for several reasons:

- Some cities, such as Boston, collect crash data electronically but not at the level of detail necessary to support sophisticated analysis and planning activities;

- There are many communities that do not collect crash data electronically, which leads to delays in reporting and data quality issues as well as requiring significant effort to enter data from paper forms;
- Gaps in the reporting of crash information force the RMV to rely on operator reports, which are likely to be inaccurate and/or incomplete; and
- The disparate crash reporting solutions used throughout the Commonwealth place an excessive burden, both technologically and financially, on the RMV to support different data exchange interfaces.

CS recommends that the Commonwealth engage in a crash reporting system requirements and design process. This process should involve representatives from the RMV, the MRB, the CHSB, and state and local police. This group should be charged not only with determining the features required of any crash reporting solution but with selecting from among different options for implementing the solution.

As discussed in Section 3.1, there are three main options for implementing a crash reporting system:

1. Enhance the functionality of existing police systems by helping local Pads purchase crash reporting modules from their existing vendors;
2. Replace existing crash reporting systems through the development or purchase of statewide solution; and
3. Supplement existing crash reporting systems by providing a hybrid solution that combines different pieces that meet different needs (i.e., buy crash reporting modules but build or purchase an electronic citation system).

The key decisions to be made are “build versus buy” and, if the decision is “buy,” whether to purchase a statewide crash reporting system or focus on solutions from individual police department system vendors. Each of these options has advantages and disadvantages that interested stakeholders must weigh.

Building a crash reporting system may not be the cheapest solution but does provide the Commonwealth with the flexibility to create a system that provides exactly the functionality required. Buying a statewide solution could be the cheapest option overall, but it might require compromises in terms of available functionality and could face an uphill battle in winning acceptance from police departments that must adopt another system and, potentially, discard functionality they already have purchased. Helping police departments buy crash reporting modules for their existing systems would simplify training and overall acceptance by officers and could be implemented more quickly than other solutions. However, this would require the RMV to support many different electronic interfaces and may result in preference being given to certain vendors while police departments with other vendors are left without a clear solution. Only the people involved with using and supporting these systems are qualified to judge the severity of these issues and select the best overall solution.

As part of developing requirements for electronic crash reporting, participating parties also should consider how this system would function in tandem with an electronic citation application. These two systems may or may not be deployed in parallel, but having a consolidated design would allow for sharing of data between the two applications. If an officer needs to create both a crash report and a citation for a single incident, there would be a compelling case for capturing information on drivers and vehicles only once for both systems. This requires a measure of coordinated planning for both system designs.

This item relates to multiple recommendations for Crash Records in the draft report of the draft Traffic Records Assessment report.

**Prerequisites:** There are no prerequisites for this project.

**Impact:** The results of this project will set the direction that the Commonwealth will follow to implement an electronic crash reporting solution. Because of the importance of crash data and the issues identified with the current crash data set, this will be a key project. Achieving buy-in from all stakeholders, particularly the RMV and the police, will be critical to ensuring that any solution the Commonwealth deploys will be broadly accepted and used.

**Risks/Barriers:** The most significant risk is that the group will fail to achieve consensus on a solution that will be broadly accepted, particularly by the police officers who create crash reports. The solution is to involve key players early in the process and ensure that everyone has an opportunity to participate.

A secondary risk is that the group will become bogged down in details and fail to move forward at a sufficiently aggressive pace. To address this, the group should select a lead agency and this agency should define a schedule containing milestones that lead to a final decision within a reasonable time.

## Technical Recommendations

### *Leverage Road Inventory Data to Improve Crash Locations*

During the 2009 NHTSA Assessment and in the stakeholder interviews, people expressed concern that too many crash reports have missing or inaccurate location information. Location is a key field for crash analysis and should reflect the actual location of the crash (as opposed to an estimated location or the location of the person who reports the crash). While there is no easy way to correct location data on crash reports submitted on paper, existing and future electronic crash systems provide an opportunity to leverage road inventory information to validate the location at the time the crash report is created.

The Office of Transportation Planning maintains the road inventory file for Massachusetts, including a list of valid street names and spelling variations. CS proposes that the Office of Transportation Planning be charged with making the list of street names available in a format that promotes use by electronic data entry systems.

In order to facilitate this process, personnel from the Office of Transportation Planning should hold discussions with IT personnel from the Massachusetts State Police (MSP) as well as vendors of the systems most widely used by local police departments. These discussions should cover what type of street information the systems are capable of using and what formats would simplify loading of the data.

Ideally, the Office of Transportation Planning would make one or more street files available on their public Internet site at least once a year. At a minimum, a street file would contain every valid street name (including spelling variations) for every city and town. Depending on what information may be available, these files also might contain minimum and maximum address numbers and/or mileposts for each street. It also might be advantageous to produce a separate file for each city and town, although this would dramatically increase the number of files produced.

IT personnel in charge of each crash reporting system would be responsible for downloading the street files, incorporating them into the system, and using the information to validate crash locations. Clearly, there would need to be the capability to override the validation, if necessary, to allow officers to enter data for crashes that might take place at a location off the road network (e.g., on a large private estate). These same address files also could be used by the RMV to validate and automatically geocode incoming electronic crash data.

This item matches one of the major recommendations for Roadway Information in the draft report of the draft Traffic Records Assessment report.

**Prerequisites:** There are no prerequisites for this project.

**Impact:** As stated above, location is one of the most important fields when analyzing crash data. Inaccuracies and systemic problems with location data could result in crash mitigation efforts being targeted at the wrong place.

In recent years, Massachusetts has significantly increased the percentage of crash reports that are successfully geocoded (i.e., matched to the road inventory network). While this improvement is laudable, it does not address the issue of locations that appear valid but do not accurately represent the crash. Also, the MHD, with the assistance of other groups, expends a significant amount of effort to locate crashes. CS believes that changes in the way location data are entered and validated at the source will be necessary to substantially improve this process.

**Risks/Barriers:** There are three main risks associated with this project. First, the street information available to the Office of Transportation Planning may not lend itself to the process proposed above. Second, the different crash reporting systems used by state and local police may not be able to adequately leverage street information to validate crash locations. Finally, even the best validation process cannot account for all possible real-world scenarios or compensate for incorrect data entry.

There are no reasonable mitigation strategies for the first two risks. However, as the Commonwealth builds or purchases electronic crash reporting technologies, it would be reasonable to require them to support the process described above. The final risk can be addressed by providing training, guidance, and most importantly feedback to police on crash location information. Officers entering crash reports are not trying to deliberately obscure the location. Training and feedback can help them understand how to improve the chances that a crash can be adequately located.

### *Add 2-D Barcodes to Vehicle Registrations*

A key goal of the Massachusetts traffic records system is to improve both the timeliness and quality of data. To achieve this, the Commonwealth is considering ways to create and deploy systems to capture crash and citation data electronically. With correctly designed systems, officers can enter these data at the roadside more efficiently than using paper forms. Capturing records electronically at the source also will improve quality and timeliness by validating data during entry and eliminating multiple rounds of retyping information.

A key factor in speeding data entry is using barcode scanners attached to in-cruiser computers to capture data from licenses and registrations. Massachusetts drivers licenses already contain 2-D barcodes. CS recommends that the RMV modify the vehicle registration to include a 2-D barcode based on the PDF417 specification and provide information on this barcode to police and any vendor wishing to decode it. PDF417 is the standardized barcode format used for transportation, identification cards, and inventory management.

**Prerequisites:** There are no prerequisites for this project, but this project will be a prerequisite for development and broad acceptance of any electronic citation system.

**Impact:** Combined with barcode scanners in police cruisers, this change will have a profound impact on the speed and accuracy with which vehicle information can be captured in electronic crash and citation systems. During the stakeholder interviews, police indicated that an electronic citation system without the ability to scan licenses and registrations would be unlikely to win broad acceptance given the time required to enter this information via a computer keyboard.

**Risks/Barriers:** CS understands that this is not a small change for the RMV to undertake. The biggest risk is that this change must wait for the replacement of the ALARS. RMV currently is contemplating a replacement for ALARS. However, given the size and complexity of this system it would not be unreasonable to imagine this process requiring anywhere from 5 to 10 years.

The RMV should investigate and report on the cost and level of effort to implement this change. If registration barcodes are impractical for the foreseeable future, it may be possible to develop an alternate means for electronically capturing vehicle information. This issue should be addressed by a working

group consisting of the RMV, IT and patrol personnel from state and local police departments (or their vendors), and ITD.

### *Support Current Portals, Plan for Consolidated Portal*

During the interviews, stakeholders confirmed that access to information is key to performing a variety of functions, including developing mitigation strategies to address traffic problems. Currently, many stakeholders obtain information through back channels (i.e., directly from a state agency or even the police department that originally collected the data). This is a time-consuming and inefficient process, particularly when analysts are forced to review paper forms.

Most users agree that, ultimately, a mechanism for delivering consolidated data (i.e., linked data built from multiple sources) is preferable. However, this requires addressing a number of challenges such as privacy concerns, data ownership and access issues, and finding ways to connect different data sets.

While keeping this long-term goal in mind, CS believes that Massachusetts should support existing portal efforts. These systems typically deliver only part of the complete traffic records picture. Nevertheless, they provide a valuable service by making data available in electronic form. And as more data, particularly crash and citation information, are captured electronically, these systems can expand to deliver it to authorized users in a timely and efficient fashion.

CS recommends that the Traffic Records Coordinator meet regularly with personnel responsible for systems that deliver traffic records information to the public. This group should discuss short-term requirements to maintain and enhance existing systems as well as long-term plans for combining these systems. Once a data sharing framework has been established and MOUs signed by participating agencies, this group should be charged with creating a specific plan to develop a consolidated traffic records portal that combines functionality from the existing systems. All agencies should contribute to this plan to ensure that issues of privacy and functionality are adequately addressed.

**Prerequisites:** There are no specific prerequisites for this project, although development of a consolidated traffic records portal will require a data sharing agreement that allows information from different systems to be exchanged and linked in a way that facilitates analysis and planning activities.

**Impact:** Short-term, this project is designed to maintain the status quo. As such, the impact will be small. However, the long-term goal is to provide a means of freely and easily obtained consolidated traffic records information to support a wide a range of needs. Development of such system would be the ultimate expression of traffic records management and would have a significant impact on the use of traffic records data in Massachusetts.

**Risks/Barriers:** If a solution cannot be found to address issues that prevent sharing and linking of different traffic records data sets, then the Commonwealth is unlikely to develop a consolidated portal. There is no specific mitigation

strategy for this other than to continually commit to the ideal of a consolidated traffic records system and work to resolve any impediments encountered.

And while working toward a single system, there is a risk that existing data portals will move in different directions such that no consolidated system can provide all the functionality to which users have become accustomed. To address this, agencies that are developing or maintaining portals should communicate regularly so that all parties are aware of features in other systems and can adopt common themes, where appropriate.

### *Design and Implement an e-Citation System*

During the stakeholder interviews, many people expressed support for an electronic citation system despite the fact that the 2009 NHTSA Assessment reported that Massachusetts has excellent citation data. The widespread support for advancing an electronic citation system stems from the fact that today's citation activities rely heavily on manual procedures and are costly to administer. For example, today's processes require citation forms to be sorted and mailed to different locations and keypunched, perhaps multiple times, into different systems.

An electronic citation system would provide a number of advantages:

- Transactions can be entered and verified at the roadside, which improves data quality;
- A properly designed system can increase officer efficiency at the roadside, which will provide more time to address other duties;
- Electronic records can be transmitted directly to the MRB and the Courts, which improves timeliness by eliminating the requirement to sort and mail forms; and
- By capturing transactions electronically, a significant portion of the keypunching operation is eliminated, which improves both quality and timeliness.

CS recommends that the Commonwealth engage in a requirements and design process for an electronic citation system. This process should involve representatives from the RMV, the MRB, the Courts, the CHSB, and state and local police. The goals for this group are:

- Prepare a requirements document that adequately describes the functionality of this system;
- Include the requirements for any backend system or process changes needed to support electronic transfer of citation data to all authorized parties;
- Consider designing preprinted citation forms that include customer service information on the back;

- Issue a Request for Information (RFI) to obtain feedback from qualified industry experts regarding options for purchasing an electronic citation system;
- Using results from the RFI as well as feedback from internal development resources on the timeframe and cost to produce an electronic citation system with the required functionality, decide whether to develop a custom system or purchase an existing solution;
- Discuss police department hardware and support needs and determine how these needs will be met; and
- Develop or purchase a system in a manner that will allow a pilot test to be executed early in the process in order to confirm the feasibility of the solution.

As mentioned above under the business process project *Determine Options for Crash Reporting*, there is an opportunity to design the electronic citation and crash reporting systems together in order to promote sharing of common data elements, including driver and vehicle information. In the event that these systems are not developed and deployed at the same, the groups in charge of each system still should communicate regularly in order to streamline both data entry processes. They also should examine how additional data (e.g., racial profiling information) can be captured as part of these applications in order to facilitate additional types of analyses.

This item matches one of the major recommendations for Citation and Adjudication Records in the draft report of the draft Traffic Records Assessment report.

**Prerequisites:** Designing and developing an electronic citation system will depend on resolving the question, discussed above, of the validity of electronic citations and the circumstances under which they can be issued. Also, broad acceptance of an electronic citation system likely will depend on providing officers with the capability to read license and registration information at the roadside using a barcode scanner. This will require the addition of 2-D barcodes to vehicle registrations as well as a plan to ensure the correct hardware is available in all police cruisers.

**Impact:** Although NHTSA has praised the quality of Massachusetts citation data, there are enormous inefficiencies in the current process. Development of an electronic citation system, if performed correctly, would enhance both the quality and timeliness of citation data. Because of the uniform citation process currently used in Massachusetts, this also would be a highly visible project with a statewide impact.

**Risks/Barriers:** There is a risk that the Commonwealth will create a system that does not address the specific concerns of the police officers who will use the system. During the stakeholder interviews, police stated that a paper citation can be issued in approximately six minutes and that any electronic system must

improve on this or risk not being used. Even under the best circumstances, officers must have a way to fall back on the current paper process to issue a citation (e.g., when in-cruiser computer systems are not functioning). Without a compelling reason to adopt a new system, the number of paper citations issued could remain high, negating any advantage of electronic data capture.

To address this, state and local police should be heavily involved in requirements and design of any new system. Also, a pilot test should be conducted as early as possible in order to obtain real-world feedback on enforcement concerns.



## 4.0 Action Plan

This section presents recommended criteria for prioritizing projects in order to create an action plan. By applying these criteria to the recommendations contained in Section 3.0, a project schedule is produced that lays out short-, medium- and long-term actions. This section also discusses ways in which projects teams and the Executive-Level TRCC should organize to oversee the implementation of projects and evaluate the effectiveness of these efforts.

### 4.1 PRIORITIZING PROJECTS

To turn a set of individual projects into an action plan, it is critical to have criteria by which projects can be prioritized. Because agencies do not have sufficient resources to fully engage in all projects simultaneously, these criteria will help to determine which projects should be addressed first.

Based on discussions over the course of this project, the following criteria will be used to prioritize projects:

- Show early success;
- Follow a plan that is incremental and scalable;
- Adopt standards that agencies can use for planning and development; and
- Establish processes that improve officer efficiency at the roadside.

Showing early success is an important step to achieving buy-in from all stakeholders. Many projects fail because the time between conception and delivery is so long that requirements change and focus shifts. The project schedule detailed in Section 4.2 includes several short-term actions that should yield results within six months.

It also is important to provide a framework within which projects can be delivered incrementally. Many objectives, including electronic crash and citation systems, must be implemented incrementally across the different jurisdictions within Massachusetts. This will allow stakeholders, including police departments, to prepare for these changes at their own pace.

Incremental and scalable plans also rely on the Commonwealth adopting standards for operations like data capture and exchange. Having standards in place for technologies, data formats, etc. allows organizations to develop and deploy systems knowing that these systems will not be obsolete or incompatible.

Finally, because state and local police are the primary collectors of traffic information, projects must be sequenced in a way that supports roadside efficiency. A police officer's time is valuable and systems and procedures must maximize

use of this time. Without this, officers will tend to continue using existing data collection processes and the Commonwealth will not achieve any significant improvement in data quality, completeness, or timeliness.

These criteria were used to classify the projects described in Section 3.0 as short-, medium-, and long-term. Short-term projects provide early successes while laying the groundwork for medium-term projects that are rolled out incrementally to improve data quality, completeness, and timeliness while also improving efficiency for police officers and state agency staff. Standards are specifically addressed by a project designed to help break down barriers between current traffic records systems. These standards will be incorporated into electronic crash and citation systems.

These prioritization criteria can be used to compare traffic records projects in order to determine which should be performed first. However, these criteria are insufficient to prioritize traffic records against other projects that compete for limited agency resources. Weighing the importance of traffic records in the overall context of agency and state goals is the responsibility of the ETRCC. This group will allocate resources and provide direction sufficient to position traffic records within each agency's portfolio of projects.

## 4.2 PROJECT SCHEDULE

Refer to Section 3.3 for additional technical and business process information on the projects listed here. Figure 4.1 plots the timeframe for each project.

While it is beyond the scope of this project to establish firm dollar values for individual projects, CS has categorized the cost of each as low, medium, or high. In general, a low cost should be less than \$50,000, not including time expended by personnel on the project. Medium cost could run anywhere from \$50,000 to \$250,000, depending on the specifics of the project. A high-cost project likely will be more, and in some cases much more, than \$250,000.

### Initial Actions

#### *Establish Executive-Level Traffic Records Coordinating Committee (ETRCC)*

Organize and convene an ETRCC. The objective for this group is to establish a strategic direction for traffic records management in Massachusetts and to provide support for and oversight of projects in this domain.

As discussed at the August 19 Executive briefing, we recommend that the ETRCC consist of representatives from:

- The EOTPW;
- The DPH (part of the EOHHS);

- The EOPSS (including the MSP);
- One local police agency; and
- The ITD (part of the Executive Office of Administration and Finance).

The AOTC will participate in an advisory capacity and other agencies could be invited to participate on an as-needed basis. The ETRCC will meet every three to six months or as necessary. EOPSS will provide administrative support for this group.

**Deficiencies Addressed:** The ETRCC will address issues observed with the current TRCC. The current TRCC is not empowered to make strategic decisions regarding traffic records priorities and statewide objectives. The lack of direction and executive support has hampered the TRCC's ability to make progress on a variety of fronts.

**Responsible Parties:** EOTPW, EOHHS/DPH, EOPSS, EOAF/ITD, AOTC, and local police.

**Initial Schedule:** The ETRCC should be convened as soon as possible and continue to meet on an ongoing basis.

**Estimated Cost:** The estimated cost for this task is low and consists primarily of time to schedule and hold meetings as well as minor administrative expenses.

## Short-Term Actions

### *Leverage Road Inventory Data to Improve Crash Locations*

Personnel from the Office of Transportation Planning will engage in a discussion with IT personnel/vendors for state and local police systems to determine the best way to provide files containing valid street names, including alternate spellings, for all communities in Massachusetts. The Office of Transportation Planning will develop a way to produce these files and will make them available on their public-facing web site at least annually. IT personnel/vendors will develop a mechanism to import these files and use them to validate crash locations entered into electronic systems.

**Deficiencies Addressed:** Crash location is a crucial component of every crash report and there are a number of questions concerning the current quality of this information. Incorporating road inventory data into police department systems will allow those systems to immediately validate crash locations.

**Responsible Parties:** EOTPW Office of Transportation Planning, IT personnel/vendors for state and local police.

**Initial Schedule:** This task should be accomplished by the first quarter of 2010.

**Estimated Cost:** The estimated cost for this task is low to medium and consists primarily of programming expertise by the Office of Transportation Planning to

create files of valid street names and by IT personnel/vendors to incorporate this information into police department systems.

#### *Establish Policy Regarding Validity of e-Citations*

Review the current law regarding citations and establish a policy on the validity of electronic citations, including any procedures or processes that affect the design of an e-citation system and use of this system by police. Distribute the policy to state and local police, perhaps as part of a notification regarding plans to develop an electronic citation system.

**Deficiencies Addressed:** An e-citation policy will resolve confusion regarding the validity of these documents and establish the rules governing the creation and distribution of electronic citations.

**Responsible Parties:** EOTPW General Council, EOPSS General Council, Registrar of Motor Vehicles.

**Initial Schedule:** This task should be accomplished by the first quarter of 2010.

**Estimated Cost:** The estimated cost for this task is low and consists primarily of time to review the current law governing citations and prepare a memorandum addressing questions related to electronic citations.

#### *Add 2-D Barcodes to Vehicle Registrations*

The RMV will plan for and implement a 2-D barcode, based on the PDF417 standard, on all vehicle registrations. The RMV will include representatives from state and local police in the design of the barcode to ensure that the registration information they require for crash reports and citations will be available. This project will include tests to ensure that these barcodes can be read by typical scanners deployed in police cruisers. Beginning in 2011, all vehicle registrations will contain barcodes.

**Deficiencies Addressed:** A 2-D barcode on vehicle registrations is necessary in order to streamline entry of vehicle data for electronic crash reports and citations. State and local police have indicated that simplifying the data entry process will be a crucial step in order to gain broad acceptance for these systems.

**Responsible Parties:** RMV.

**Initial Schedule:** This task should be planned by the first quarter of 2010 and accomplished by the fourth quarter of 2010.

**Estimated Cost:** The estimated cost for this task is high based on the anticipated complexity of modifying the ALARS, the need to redesign the vehicle registration, and the potential requirement to purchase and install new printers at RMV facilities.

It may be possible to leverage work planned over the next 12 to 18 months to replace the Massachusetts International Registration Plan (IRP) system, which manages registrations (called cab cards) for commercial vehicles. The

Commonwealth plans to include barcodes on cab cards produced by the new IRP system and to have the capability to produce these cab cards in four RMV offices.

### *Address Gaps in Crash Information*

The Boston Police Department (BPD) and other communities that currently are not contributing crash reports to the RMV's CDS will work with the RMV to develop a short-term fix for this issue. For the BPD, this will involve:

- Analyzing differences between the BPD and RMV crash data sets;
- Developing a file format to hold the BPD crash data;
- Relaxing rules to allow BPD data to be loaded in the CDS;
- Exporting the BPD crash data on a periodic basis; and
- Importing the BPD information periodically into the CDS.

This same process will be following for other communities. In addition, the TRCC will provide support and financial assistance to the BPD (and other communities as appropriate) to modify their crash reporting process to capture information consistent with the MMUCC. This step may occur in conjunction with the design of a statewide electronic crash reporting process.

The TRCC also will prepare briefing materials for police officers explaining the importance of crash data and how crash data are used. The purpose of these materials is to gain the support of officers for the collection of crash data by showing how complete, high-quality data can be used to reduce crashes and improve traffic in the officers' communities. The TRCC will solicit feedback from its police department members regarding the best format in which to deliver this information.

**Deficiencies Addressed:** An interim process will rectify some of the most glaring deficiencies in the transfer of crash data to the RMV, while engaging the necessary agencies in the design of a long-term solution to improve both the quality and completeness of crash data.

**Responsible Parties:** RMV, local police.

**Initial Schedule:** This task should be accomplished by the second quarter of 2010.

**Estimated Cost:** The estimated cost for this task is medium to high given that a number of potentially complicated interface and system changes must be designed and implemented by the RMV and multiple police departments. These changes include modifications to the existing crash data system to allow incomplete records to be loaded, processes within police department systems to export and format crash data, and one or more new interfaces to support the electronic transfer of these crash data to the RMV.

## Medium-Term Actions

### *Design and Implement an e-Citation System*

The responsible parties, led by EOPSS, will work together to prepare a requirements document that describes the functionality of an e-citation system and any necessary backend system or process changes. They will gather data on from internal and external resources regarding the level of effort required to produce an e-citation system that meets these requirements. Using this information, the group will decide whether to develop a custom system or purchase an existing solution. Regardless of the solution, the group will plan for a pilot test early in the process to confirm the feasibility of the new system.

In association with this project, the responsible parties will consider whether to create preprinted citation forms that include customer service information on the back. The group also will discuss how to provide police departments with the necessary hardware and technical support for the new e-citation system.

The group also will consider how the e-citation system functions in tandem with an e-crash system. Ideally, both systems should share common data elements in order to minimize data entry requirements. This group also will consider relevant results from the standards and data exchange project discussed below.

**Deficiencies Addressed:** The current paper-based citation process relies heavily on manual procedures, including keypunching of data from the citation form. It is prone to error, data are not available in a timely fashion, and it consumes valuable staff resources. A correctly designed electronic system will correct these issues and reduce the time required for an officer to issue a citation.

**Responsible Parties:** RMV, MRB, the Courts, CHSB, and state and local police.

**Initial Schedule:** This task should be accomplished by the fourth quarter of 2010.

**Estimated Cost:** The estimated cost for this task is medium to high depending on whether the Commonwealth elects to buy/customize an existing solution or build a new system. In addition, this task may need to include budget to assist police departments in training users and outfitting cruisers with the necessary hardware, including printers and scanners, and helping the RMV to develop and distribute new printer-compatible citation forms.

### *Determine Options for Crash Reporting*

The responsible parties, led by EOPSS, will review the options for providing police departments with electronic crash reporting capability. The group will choose whether to help police departments enhance their existing systems through the purchase of crash reporting module, purchase or build a statewide crash reporting system, or recommend some combination of solutions.

The group will review the pros and cons of each solution, including how well the solution provides the necessary crash reporting functionality, the initial and long-term costs of the solution, the overall complexity of the solution, and how close the solution brings the Commonwealth to its goal of universal electronic crash reporting.

The group also will consider how the e-crash system functions in tandem with an e-citation system. Ideally, both systems should share common data elements in order to minimize data entry requirements. This group also will consider relevant results from the standards and data exchange project discussed below.

**Deficiencies Addressed:** Unlike citation data, which are gathered in a uniform manner, there are wide variations in the collection of crash reports. Many crash reports continue to be collected on paper. By providing support for the purchase or development of electronic crash reporting solutions, the Commonwealth can collect uniform crash data that are delivered in a timely manner.

**Responsible Parties:** RMV, MRB, CHSB, and state and local police.

**Initial Schedule:** This task should be accomplished by the fourth quarter of 2010.

**Estimated Cost:** The estimated cost for this task is medium to high depending on whether the Commonwealth elects to purchase or develop a statewide solution or to help police departments purchase modules for their existing systems. Some solutions may require the RMV to develop and support additional crash data interfaces.

### *Identify Standards and Data Exchange Opportunities*

Agencies or groups with an interest in traffic records will meet periodically to exchange technical information related to these data. These same people also will be charged with reviewing and recommending standards that the Commonwealth can adopt for traffic records storage and exchange.

**Deficiencies Addressed:** During the interview process, many stakeholders expressed a desire for more information on available traffic records data. Stakeholders also stated that it will be critical to develop standards that can be referenced by agencies. These standards will ensure that software developed or purchased today will continue to be usable in the future.

**Responsible Parties:** Any agency or group with an interest in traffic records data. EOPSS will take the lead in scheduling and providing administrative support for these meetings.

**Initial Schedule:** This task should produce concrete results by the fourth quarter of 2010. Relevant results will be shared as they are produced with the electronic crash and citation design projects. This is an ongoing task that should continue as long as there are issues to discuss.

**Estimated Cost:** The estimated cost for this task is low and consists primarily of time for business and IT personnel from agencies and groups with an interest in traffic records systems to meet, discuss standards, and exchange information related to the traffic records data stored in various systems.

### *Establish Framework for Sharing Information*

Personnel from agencies responsible for Massachusetts traffic records systems will meet to establish a framework for sharing information. The guidelines will:

- Identify data to be shared;
- Determine mechanisms for linking data from different systems;
- Address privacy concerns;
- Define rules regarding use of traffic records information; and
- Commit to sharing data between state agencies without charge.

In addition, these agencies will discuss access by organizations that are not state agencies and determine whether to charge these organizations for the data.

These agencies will development Memoranda of Understanding (MOU) that govern the sharing of traffic records data. These MOUs will be reviewed and signed by members of the Executive-Level TRCC.

**Deficiencies Addressed:** Without agreements that cover the sharing of traffic records information between Massachusetts agencies, it will not be possible to develop a single traffic records system that can provide access to crash and citation data linked to medical outcome information. These linked data are necessary in order to fully analyze crashes and develop effective mitigation strategies. These information sharing agreements also will spell out the level of access that external users (e.g., regional planning authorities) would have to the linked information.

**Responsible Parties:** EOTPW, EOHHS, EOPSS.

**Initial Schedule:** This task should be accomplished by the fourth quarter of 2010.

**Estimated Cost:** The estimated cost for this task is low and consists primarily of time to discuss privacy and other concerns related to sharing of information, develop MOUs that document the information sharing arrangements between Massachusetts agencies, and have members of the ETRCC review and sign the MOUs.

## **Long-Term Actions**

### *Support Current Portals, Plan for Consolidated Portal*

The TRCC will provide support for existing traffic records data delivery solutions (i.e., portals) while the lead agencies responsible for traffic records systems

will work to define and develop or procure a mechanism for delivering consolidated traffic records information. Consolidated traffic records data will consist of linked data from all traffic records systems. Personal identification information will be removed or obscured consistent with data sharing agreements between agencies. The consolidated data will be delivered via a secure, easy-to-use, Internet-based portal. Support for extracting and interpreting data will be provided through a helpdesk that will escalate domain-specific issues to the appropriate state agency.

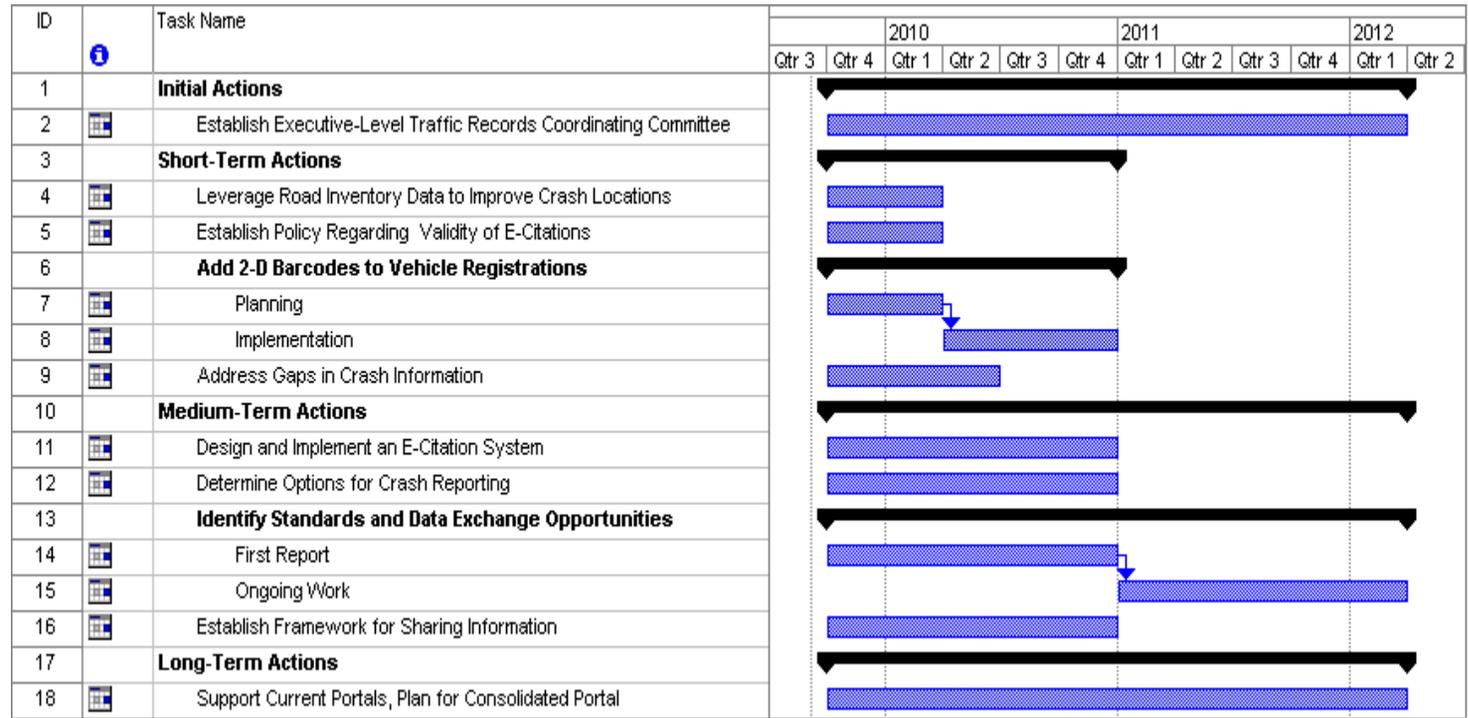
**Deficiencies Addressed:** A consolidated traffic records portal will allow authorized users to access linked data sets necessary to perform a complete range of traffic planning and analysis activities, including the development of crash mitigation strategies. Without simple and free access to this type of consolidated data, certain types of analyses will not be practical (or possible).

**Responsible Parties:** EOTPW, EOHHS, EOPSS.

**Initial Schedule:** Support for current portal should begin immediately. Development of a consolidated portal should be accomplished by the first quarter of 2012.

**Estimated Cost:** The estimated cost for this task is medium to high depending on the level of support needed by current portal solutions as well as the complexity of accessing and linking data from different systems and the functionality desired for a consolidated traffic records portal. This project also will incur ongoing annual maintenance and support costs for the consolidated portal, which can be estimated at approximately 20 percent of the development cost.

Figure 4.1 Project Timeline



## 4.3 PROJECT OVERSIGHT

The responsible parties for each project, including lead agencies where identified, will establish specific project work steps and provide day-to-day project oversight. When scheduling an ETRCC meeting, EOPSS personnel providing administrative support for this group will, as part of the meeting agenda, suggest that executives solicit feedback on the status of outstanding projects prior to the meeting. In addition to keeping executives informed of the status of traffic records projects, this process will allow the full ETRCC to discuss the implications of cross-agency projects and provide feedback as necessary to agency personnel.

## 4.4 MEASURING SUCCESS

It is important to have an objective means by which to measure progress and determine the success of a project. For traffic records systems, NHTSA has defined six performance categories, listed below. As part of a Section 408 grant application, NHTSA requires that every proposed project indicate how the project will improve performance in one or more of these categories. NHTSA also evaluates historical performance improvements as part of the grant review process. Therefore, it is critical to keep these measures in mind when evaluating the impact and effectiveness of any traffic records project. Figure 4.2 shows one way in which goals and objectives for the Massachusetts traffic records systems can be mapped to the NHTSA performance categories.

The NHTSA performance categories are:

- Timeliness (e.g., average time to gather and post data);
- Accuracy (e.g., uniquely identifiable records, validated data items);
- Completeness (e.g., percentage of data items entered and records submitted);
- Uniformity (e.g., data captured and reported consistently);
- Accessibility (e.g., free and accessible data made available to authorized users); and
- Integration (e.g., different data linked to support all types of traffic record analyses).

CS recommends that the ETRCC identify the appropriate party to track performance metrics in each of these categories and that actual results be evaluated on a regular basis to inform activities of the ETRCC.

Figure 4.2 Mapping Goals and Objectives to NHTSA Performance Categories



Each project in this business plan is designed to positively affect, either directly or indirectly, one or more of these performance measures. The responsible parties for each project should be briefed on these measures by the Traffic Records Coordinator prior at the time the project is initiated. The responsible parties also should be encouraged to define success measures of their own and to report progress on a periodic basis to the ETRCC.

## A. Stakeholder Involvement

The following tables detail the stakeholders that were involved during the planning and development of the Statewide e-Citation and Traffic Records System Business Plan. The tables include the names of people interviewed as well as those who participated in meetings related to the project. Additional people were invited to participate. Note some interviews included junior staff, in addition to the main interviewees, that are not listed below.

**Table A.1 Project Interviewees**

Representing	Last Name	First Name	Title	Company
Director, Highway Safety Office and Staff	Burgess	Sheila	Director	Highway Safety Division
	Slater	Jim	Deputy Executive Director	Criminal History Systems Board
	Hughest	Sean	CIO	Criminal History Systems Board
Crash File Manager	Jaros	Johannah	(IT)	Registry of Motor Vehicles
	Chanthaboun	Sye	(IT)	Registry of Motor Vehicles
	Perduyn	Karen	Supervisor	Registry of Motor Vehicles
State Law Enforcement	Sullivan	Peg	MIS Director (IT)	Massachusetts State Police
	Barry	Major Mike	Div. of Field Services	Massachusetts State Police
State DOT Roadway, Crash Location, Traffic Engineering	Polin	Bonnie	Chief Safety Analyst	MassHighway
	Conard	Rick	Transportation Program Planner	MassHighway
	Berger	Mark	Manager of Data Resources and Freight Planning	Executive Office of Transportation
State EMS and Trauma Data Systems Managers	Okeefe	Jerry		Department of Public Health
	Hobbs	Sylvia	(IT)	Department of Public Health
	Dion	Derryl	MFIRS Manager	Dept of Fire Services
State Injury Surveillance, Mortality, and Hospital Discharge/ED Data	Hackman	Holly	Injury Epidemiologist	Department of Public Health
Merit Rating Board	Hill	Richard	Assistant Director	Merit Rating Board
	Mulhall	MaryAnne	Director	Merit Rating Board
Administrative Office of the Courts	McCue	Phillip	Director of Court Operations	Administrative Office of the District Court
	Burlingame	Craig	CIO	Administrative Office of the District Court

Representing	Last Name	First Name	Title	Company
Local Law Enforcement	Meaney	Robert	Chief	Medfield Police Department
	O'Leary	Dan	Chief	Major Cities Chiefs
	Mahoney	Philip	Chief	Woburn PD
	DeRosa	John	Captain	Peabody PD
	Mazzie	Steve	Chief	Everett PD
	Ouellette	Neil	Chief	Danvers PD
	Casey	William	Deputy Superintendent (IT)	Boston PD
	Sampson	Wayne	Director	MCOPA
Local DOT, City/County Traffic Engineers, MPOs	Hadfield	Jim	Director of Highway Planning	Southeastern Regional Planning and Economic Development District
SAFETYNET and FARS	Paragona	Laurann	FARS Supervisor	Registry of Motor Vehicles
Office of Consumer Affairs and Business Regulation	Burnes	Nonnie	Commissioner	Massachusetts Division of Insurance

**Table A.2 EOPSS Project Planning Meeting Participants**  
*July 29, 2009*

Representing	Last Name	First Name	Title	Company
EOPSS	Grossman	John	Undersecretary of Forensic Science and Technology	Executive Office of Public Safety and Security
	Schwartz	Kurt	Undersecretary of Law Enforcement and Fire Services	Executive Office of Public Safety and Security
	Massing	Greg	General Counsel	Executive Office of Public Safety and Security
Law Enforcement	Wood	Curtis	Executive Director, Chief Information Officer	Criminal History Systems Board, EOPSS
	Windle	Paul		Criminal History Systems Board, EOPSS
	Dearwester	Kelly		Criminal History Systems Board, EOPSS
Highway Safety User	Burgess	Sheila	Director	Highway Safety Division, EOPSS
Consultant Team	Wright	Brad	Vice President	Cambridge Systematics, Inc.
	Giuffre	William	Principal, Project Manager	Cambridge Systematics, Inc.
	Woodley	Casey	Sr. Associate	Cambridge Systematics, Inc.

**Table A.3 Executive Steering Committee Meeting Participants**  
*August 19, 2009*

Representing	Last Name	First Name	Title	Company
EOPSS Secretariat	Burke	Kevin M.	Secretary	Executive Office of Public Safety and Security
	Grossman	John	Undersecretary of Forensic Science and Technology	Executive Office of Public Safety and Security
	Schwartz	Kurt	Undersecretary of Law Enforcement and Fire Services	Executive Office of Public Safety and Security
	Massing	Gregory	General Counsel	Executive Office of Public Safety and Security
	Wells	Karen	Sr. Counsel	Executive Office of Public Safety and Security
Law Enforcement	Wood	Curtis	Executive Director, Chief Information Officer	Criminal History Systems Board, EOPSS
	Windle	Paul	Director	Criminal History Systems Board
	Dearwester	Kelly	Project Manager	Criminal History Systems Board
Highway Safety User	Burgess	Sheila	Director	Highway Safety Division, EOPSS
	McCroom	Sandra	Executive Director	Office of Grants and Research, EOPSS
State Police	Delaney	Col. Mark	Superintendent	Massachusetts State Police, EOPSS
	Saltzman	Michael	Troop Division Commander	Massachusetts State Police, EOPSS
Citation	Mulhall	Mary Ann	Director	Merit Rating Board, EOPSS
Courts	McCue	Philip	Director of Court Operations	District Courts
	Prior	Mark	Team Leader	Administrative Office of the Trial Courts
Driver/Vehicle	Deveney	Erin	Chief of Staff	Registry of Motor Vehicles, EOTPW
Public Health	Golden	Kristen	Director	Massachusetts Department of Public Health
	O'Keefe	Jerry	Director	Massachusetts Department of Public Health
Local Police	Sampson	Chief Wayne	Executive Director	Massachusetts Chiefs of Police Association

Representing	Last Name	First Name	Title	Company
	Cunningham	Chief Terrence	President	Massachusetts Chiefs of Police Association
	Ouellette	Neil	Chief	Massachusetts Chiefs of Police Association
	Linskey	Daniel	Superintendent	Boston Police Department
	O'Leary	Daniel	President	Massachusetts Major Cities Chiefs
Office of Consumer Affairs and Business Regulation	McCall	Thomas	Attorney	Massachusetts Division of Insurance
	Murphy	Joe	1 <sup>st</sup> Deputy	Massachusetts Division of Insurance
Highway	Tramontozzi	Frank	Chief Engineer	Massachusetts Highway Department
Legislature	Brooks	Angela	Legal Counsel	Office of Senator Sonia Chang-Diaz
	Ross	Heather	Legal Director	Office of Representative Byron Rushing
Administration and Finance	Margulies	Anne	CIO	Executive Office of Administration and Finance
	Harmer	Darrel	ITD Program Manager	Information Technology Division
Consultant Team	Wright	Brad	Vice President	Cambridge Systematics, Inc.
	Giuffre	William	Principal, Project Manager	Cambridge Systematics, Inc.
	Woodley	Casey	Sr. Associate	Cambridge Systematics, Inc.

## B. Review of Existing Traffic Records Systems

This section provides the results of a national survey, conducted by Cambridge Systematics, to identify and obtain information regarding best practices in traffic records systems as well as systems to manage data associated with crash, citation, and racial profiling. The purpose of this review is to identify concepts and best practices to be incorporated into the Statewide e-Citation and Traffic Records System Business Plan.

### B.1 CASE STUDIES

This section presents several case studies intended to demonstrate how other states have approached the problem of traffic data collection and management. Lessons from these case studies may be applied to different facets of the Business Plan.

#### Crash and Citation

##### *Badger TraCS – Wisconsin<sup>7</sup>*

Traffic and Criminal Software (TraCS), an application developed by the State of Iowa in partnership with the Federal Highway Administration (FHWA), serves as a national model for the development of automated reporting systems for law enforcement. TraCS, which is discussed in greater detail later in this report, has a modular architecture capable of sharing common data among forms and can incorporate crash, citation, OWI, commercial motor vehicle inspection, and incident forms. TraCS currently is licensed by 17 states and can be customized to meet the unique needs of different states. Wisconsin's version of the system is Badger TraCS.

#### Cost

Badger TraCS is furnished free-of-charge to interested law enforcement agencies in Wisconsin. The local agency is responsible for equipment costs and technical support. It costs between \$2,000 to \$7,000 to equip a squad car depending on options chosen and existing equipment.

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<sup>7</sup> <http://www.dot.state.wi.us/drivers/drivers/enforce/tracs/badgertracs.htm>.

## **Forms**

Available forms include Uniform Traffic Citation, citation warning, crash (Crash, Deer, and Amended), Alcohol, Attachment, and Municipal citation. Local forms development is not permitted. Local agencies are encouraged to submit form suggestions to the Wisconsin TraCS Steering Committee for inclusion in the statewide suite.

## **Integration with Record Management Systems (RMS)**

Data can be exported out of TraCS in multiple different formats. These data can be imported into a police agency's RMS, assuming the RMS supports data import. TraCS is a field data collection tool. Generally, data are collected using TraCS and then exported to other systems. However, some form fields support an external search feature to allow data retrieval from a variety of external data sources.

Additional Information:

- Copies of crash reports can be printed in a squad car if the vehicle is equipped with a printer;
- The ability to fax and/or e-mail reports is not currently available in TraCS, but it is being considered for a future release; and
- TraCS includes the ability to accept and/or reject forms and send them back to the field office for correction.

## **Results<sup>8</sup>**

- 37 percent of 2008 crashes submitted electronically.
- 26 percent of 2008 citations submitted electronically.

### **Timeliness of Crash Data**

- 2004 (before): 47 days (paper crashes).
- 2007 (after): Ten days (electronic crashes).

### **Accuracy of Citations**

- Paper (before): Seventeen percent error rate.
- Electronic (after): Five percent error rate.

### **Increased issuance of Citations**

- Agencies show 30 percent increase in issued citations.

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<sup>8</sup> [http://www.atsip.org/images/uploads/15\\_-\\_Badger\\_TraCS.pdf](http://www.atsip.org/images/uploads/15_-_Badger_TraCS.pdf).

#### Improved Location data

- State Highway and Local Road tables are supplied to TraCS users.
- This results in more uniform street names.

#### **Washington Statewide Electronic Collision and Ticket On-Line Records (SECTOR)<sup>9</sup>**

SECTOR, an electronic ticket and collision reporting application, is the result of several years of planning and development by law enforcement and state and local agencies. SECTOR utilizes state-of-the-art technology and incorporates all standards and requirements as established by the Legislature, the Uniform Citation Committee, and the Police Traffic Collision Report. A multiagency team ensures that it continues to meet established business needs and legal requirements.

Since the production release of SECTOR, thousands of tickets and collision reports have been successfully created and transmitted to the appropriate agencies. The development and successful implementation of SECTOR has created a robust solution that can be shared at no cost to all Washington State law enforcement agencies. The capabilities of SECTOR will continue to expand with a number of enhancement projects already in progress.

#### **Racial Profiling**

##### *San Jose, California Racial Profiling<sup>10</sup>*

In June 1999, San Jose began implementing a data collection system that focused on four key pieces of information: race/ethnicity of the driver, gender, age (adult or minor), and the reason for the stop. This simple system is designed to minimize the burden on line officers. Since 1996, every patrol car in the San Jose Police Department (SJPD) has been equipped with a mobile data terminal (MDT). San Jose's data collection system, however, can be used with or without the MDT units. Using letter codes, the traffic-stop data collection system is designed to collect and relay information verbally (via police radio) or by typing the information into the MDT in the patrol car. This system eliminates the need for officers to complete or collect written forms or reports.

##### **Traffic-stop protocol before June 1999**

Even before the data collection system was implemented, whenever officers made a traffic stop, they advised the communications dispatcher via radio or MDT that a traffic stop was being made. At that time, the officer would tell the dispatcher the driver's gender. After the stop was completed, the officer would

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<sup>9</sup> <http://www.trafficrecords.wa.gov/sector.htm>.

<sup>10</sup> <http://www.ncjrs.gov/pdffiles1/bja/184768.pdf>.

use an alpha code to indicate to the dispatcher the result of the stop (e.g., whether a citation was issued, whether an arrest was made). For instance, the officer would clear a call by stating on the radio “10-98 D-David.” The “10-98” meant that the call was being cleared and the “D-David” meant that a traffic citation had been issued.

### **The new data collection system**

Under the new data collection system, three additional alpha codes are being used by officers when clearing a stop. These new alpha codes indicate the reason for the stop, the race of the driver, and whether the driver is an adult or a juvenile. For example, under the new system an officer clears a call by stating “10-98 D-David V-Victor W-William A-Adam.” “D-David” means that a moving violation citation was issued. “V-Victor” means the reason for the stop was a vehicle code violation. “W-William” means the race of the individual driver was White. “A-Adam” means the driver was an adult. This information can be relayed to the dispatcher via radio or the MDT unit.

Once the officer provides the information by computer or over the radio, it is relayed to an automated computer-aided dispatch system and automatically entered into a new database. By collecting the information immediately after each stop on an already existing system, SJPd is able to keep up-to-date accurate information on all vehicle stops.

## **Traffic Records System Integration and Management**

### *Washington Traffic Records System<sup>11</sup>*

Washington Traffic Records is a virtual system of hardware, software and processes that capture, store, transmit, and analyze the following types of data:

- Collisions;
- Citations and Adjudication;
- Drivers;
- Registered Vehicles;
- Traffic Fatalities;
- Motor Carriers (Commercial Vehicles);
- Injury Surveillance (Emergency Medical Services, Emergency Department, Trauma, Hospital inpatient, Death Records); and
- Roadway (Traffic Volume, Features Inventory, Geometrics, etc.) and Location (Geographic Information Systems).

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<sup>11</sup> [http://www.trafficrecords.wa.gov/pdfs/trc\\_docs/wa\\_trs\\_an\\_overview.pdf](http://www.trafficrecords.wa.gov/pdfs/trc_docs/wa_trs_an_overview.pdf).

### **Electronic Traffic Information Processing (eTRIP)<sup>12</sup>**

The eTRIP initiative is a collaborative effort among state and local agencies to create a seamless and integrated system through which traffic-related information can travel from its point of origin to its end use and analysis. The goal is to eliminate inefficiencies characteristic of the State's current paper-based process of collecting and exchanging core business information.

The eTRIP initiative has been divided into separate projects that will be completed over several phases. The initial project would focus on enabling law enforcement agencies to electronically create tickets and collision reports in the field and transmit this data to state repositories and authorized users. Together, these projects will carry out the following objectives:

- Support efforts to provide law enforcement officers with methods to electronically capture ticket data, collision report data and other data in the field;
- Develop a statewide data exchange network to allow this data to be transmitted electronically to users; and
- Prepare agency systems and repositories to receive electronic traffic data.

### *Data-Driven Approaches to Crime and Traffic Safety (DDACTS)<sup>13</sup>*

DDACTS integrates location-based crime and traffic data to establish effective and efficient methods for deploying law enforcement and other resources. Using geomapping to identify areas that have high incidences of crime and crashes, DDACTS uses traffic enforcement strategies that play a dual role in fighting crime and reducing crashes and traffic violations. Drawing on the deterrent of highly visible traffic enforcement and the knowledge that crimes often involve the use of motor vehicles, the goal of DDACTS is to reduce the incidence of crime, crashes, and traffic violations across the country.

### **Partnering With Local Agencies**

The National Highway Traffic Safety Administration (NHTSA), Bureau of Justice Assistance (BJA), and the National Institute of Justice (NIJ) jointly are demonstrating Data-Driven Approaches to Crime and Traffic Safety. Working with non-Federal organizations, the partnership will demonstrate a local law enforcement operational strategy built around:

- Timely and accurate data collection and analysis;
- Identification of crime and traffic safety hot spots;

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<sup>12</sup> <http://www.trafficrecords.wa.gov/etrip.htm>.

<sup>13</sup> <http://www.ojp.usdoj.gov/nij/topics/law-enforcement/traffic-safety/ddacts.htm>.

- Local partnerships, including the full range of stakeholders; and
- Integrated and strategic operations to extend resources and maximize impact.

DDACTS will be offered to law enforcement agencies nationwide to assist them in developing, implementing, and evaluating their individual locally driven initiatives. NHTSA and BJA will support data collection and analysis combined with intelligence-led policing initiatives, and will provide technical support, web-based data reporting, and an evaluation contractor. NIJ will provide guidance on spatial analysis.

## B.2 BEST PRACTICES

This section lists various best practices identified by the Association of Transportation Safety Information Professionals (ATSIP). The goal of ATSIP is to improve traffic records systems operated in support of state and local highway traffic safety programs. The Best Practices Challenge is a program that seeks state-of-the-art practices and applications in various disciplines, including data collection, management, analysis and applications.

### **2008 Best Practices Winner**

***Project Title:** Virginia DMV Advanced CMV Data Extraction, Analysis and MCMIS Upload*

***Lead Agency:** Virginia Department of Motor Vehicles*

In Virginia, commercial motor vehicle data was being captured only on Virginia State Police commercial supplemental reports, separate from the statewide FR300 Police Crash Report. This data was then submitted to the Federal Motor Carrier Safety Administration (FMCSA) from the Virginia State Police via the SafetyNet database. Unfortunately, not all Virginia commercial vehicle crash data was collected. Local law enforcement investigations of commercial motor vehicle crashes were not submitted to FMCSA, resulting in Virginia underreporting commercial motor vehicle large truck and bus crashes by 40 to 50 percent.

The primary goal of this project was to improve the quality and quantity of large truck and bus crash data (fatal and nonfatal). These data then could be used to evaluate program effectiveness, identify problems and trends, and help target spending to reduce or eliminate the number of problematic and dangerous commercial motor vehicle drivers on Virginia's roadways.

Based on detailed selection criteria created by the Virginia Highway Safety Office at DMV and FMCSA, this project involved successful extraction and analysis of missing and incomplete commercial motor vehicle data from Virginia's crash/highway safety information systems. The work of this team resulted in improved quantity and quality of large truck and bus crash data. Additionally, as a result of this project, an additional 6,640 potentially dangerous commercial

motor vehicle drivers can now be identified and targeted for additional enforcement activities.

This project has been recognized as one of the best examples of a state integrating the planning of highway safety programs with highway safety information systems in the country. This project has been showcased as a model for other states at conferences in Utah, Florida, and Texas.

## **2008 Best Practices Runner Up**

***Project Title:** Kentucky's Open Portal Solution "KyOPS" Mapping Project<sup>14</sup>*

***Lead Agency:** Kentucky State Police*

In addition to processing paper collision reports, the Kentucky State Police (KSP) KyOPS (Kentucky's Open Portal Solution) software suite provides officers throughout the Commonwealth with a tool for electronic submission of police reports. One of the software applications within KyOPS is E-CRASH. The E-CRASH application is a connectionless electronic data capture application that allows Police Officers to create and submit collision reports. The E-CRASH application contains all of the CRASH quality control business edits to ensure the accuracy of the collision report. The E-CRASH reports are automatically processed, stored, managed, and maintained in the CRASH data and document repositories. Presently, over 40 percent of the collision reports that are processed in Kentucky are submitted using the E-CRASH application.

In addition to E-CRASH, there are several other KyOPS software applications. They include:

- **E-CRIME:** Allows police officers to create, submit, and edit electronic Uniform Offense Reports (UOR). The E-CRIME application contains all of the UOR quality control business edits to ensure the accuracy of the report.
- **E-Citation:** Allows officers across the state a tool to create, print, and transmit Citation Reports from the vehicle in a very timely fashion to ensure the safety of the officer and the public. Linkages between the Citation module and the Administrative Office of the Courts systems will automate the transfer and processing of citation data between organizations.
- **KyOPS Scan:** Allows the officer to collect driver, passenger, owner, victim, offender, and witness information by scanning a driver's license with a 2-D barcode. Presently, the KyOPS application can scan and interpret the

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<sup>14</sup>[http://www.atsip.org/index.php?/2004forum/more/session\\_28\\_presentation\\_kyops\\_kentuckys\\_open\\_portal\\_solution\\_for\\_electronic/](http://www.atsip.org/index.php?/2004forum/more/session_28_presentation_kyops_kentuckys_open_portal_solution_for_electronic/).

barcode from 37 states. KyOPS Scan functionality has been embedded in the E-CRASH, E-CRIME, E-Citation, and E-NIBRS application.

- **E-NIBRS:** Enable Kentucky to interact with the National Incident-Based Reporting System (NIBRS). The E-NIBRS application will contain the required edits as identified by the NIBRS standards.

## 2008 Best Practices Runner Up

*Project Title: The Evolution of Traffic Records in Indiana*<sup>15,16,17</sup>

*Lead Agency: State of Indiana Traffic Records Coordinating Committee*

The goal of this program is to create an integrated traffic records system through a collaboration of all local, state, and Federal entities responsible for motor vehicle safety.

Electronic Citation and Warning System (eCWS)

The eCWS program created by the Indiana Judicial Technology and Automation Committee provides law enforcement officials with the necessary tools to capture the information on a traffic citation or warning. The program also provides the ability to transmit the citation information electronically to all interested entities. Those parties include local, state, and Federal levels that need this information for courts, Bureau of Motor Vehicle (BMV) purposes, and adjudication. This project has improved timeliness, accuracy, completeness, and integration on all levels.

### eCWS Program Facts

- Pilot went live July 1, 2007 with five law enforcement officers – their suggestions and input have helped refine the system.
- Eliminates handwritten tickets and the need for multiple agencies to enter the same information.
- Enhances safety by reducing time spent at the roadside by as much as 50 percent.
- Increases accuracy of information through the use of barcode scanners that prepopulate driver and vehicle information.
- Electronic transfer provides improved, up-to-date data.
- eCWS is available to law enforcement agencies free of charge.

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<sup>15</sup> [http://www.atsip.org/images/uploads/50\\_-\\_Traffic\\_Records\\_Assessments.pdf](http://www.atsip.org/images/uploads/50_-_Traffic_Records_Assessments.pdf).

<sup>16</sup> [http://www.ai.org/cji/files/Traffic\\_Records\\_Evolution\\_Report\\_Update\\_6-08.pdf](http://www.ai.org/cji/files/Traffic_Records_Evolution_Report_Update_6-08.pdf).

<sup>17</sup> [http://www.state.in.us/cji/files/Traffic\\_Records\\_Evolution\\_Version\\_2.pdf](http://www.state.in.us/cji/files/Traffic_Records_Evolution_Version_2.pdf).

- Indiana State Police (ISP) and ISP Commercial Vehicle Enforcement Division (CVED) units deployed on January 1, 2008.

### **ARIES Electronic Crash Reporting**

In 2003, the eVCRS/Aries system was implemented in Indiana. The lack of computers in police units and a reluctance to change to a computer-generated crash report were reasons for agencies to not participate. The submission rate of electronic crash reports has jumped from 32 percent as of December 31, 2005 to a current rate of 98 percent. This increase can be attributed to the following:

- Enforcement agencies were surveyed to determine their reporting and equipment needs.
- The ARIES/eVCRS program was provided to agencies, along with configuration assistance, regular upgrades, free Help Desk services.
- Visits were made to larger agencies to promote program enrollment.
- Training was provided at local agencies.
- Deployment of surplus laptops to local agencies.
- Law enforcement liaisons recruited agencies and encouraged timely submission.
- Electronic submission reduced operating and mailing costs and saved staff time.
- Bar code scanning capability enables automatic loading of driver and vehicle information.
- The Easy Street draw program in ARIES eliminates hand drawing of crash diagrams.

### **Percentage of Crash Reports Submitted in Five Days or Less**

- 2004: 7 percent.
- 2005: 25 percent.
- 2006: 37 percent.
- 2007: 61 percent.
- 2008: 77 percent.

### **Other Improvements**

- System is mapping 83 percent of crashes.
- Improvements in data quality (three percent error rate down from 40 percent) due to standardization of input and immediate feedback to the officer via ARIES mean complete, accurate, and timely data are available to NHTSA, FMCSA, FHA, INDOT, ICJI, ISP and other traffic safety professionals.

- eCWS reduced time to write ticket by greater than 50 percent, which improves officer safety and increases efficiency and accuracy.
- Increased CODES linkages were used to help pass a seat belt law.
- Costs.

eCWS and electronic crash database applications are free to law enforcement (excludes equipment costs).

### **Funding**

- Indiana received funding from:
  - Byrne/JAG (Department of Justice);
  - Homeland Security;
  - FMCSA;
  - NHTSA; and
  - State Supreme Court.
- Over \$5,500,000 since FY 2006 for traffic records.

### **Privatization of Traffic Records<sup>18</sup>**

In 2006, the State of Indiana passed legislation that allowed for the privatization of traffic records. It was determined that a private company would be hired to manage the crash records system and repository, under the guidance of the Indiana State Police. In October 2006, Holt, Sheets, and Associates were awarded the contract. As payment, Holt, Sheets and Associates were granted the right to sell crash reports and data extracts to interested parties, including insurance companies, attorneys and the general public.

Holt, Sheets, and Associates deployed the [www.buycrash.com](http://www.buycrash.com) web site in January 2007. This web site provides access crash reports nationally for a fee. An individual can purchase a crash report submitted by a law enforcement agency on-line for \$12.00. This report is available on the web site normally within five days or less. The submitting agency receives a reimbursement of \$8.00 per report sold, which is a 60 percent increase over the \$5.00 charge for reports produced in house.

- State of Indiana previously requested Federal funds on an annual basis to ensure the continued operation of the crash records operation. Due to the privatization of crash records, the operation is now self-sustaining and no longer requires any Federal funds for its continued maintenance and support.

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<sup>18</sup> [http://www.ai.org/cji/files/Traffic\\_Records\\_Evolution\\_Report\\_Update\\_6-08.pdf](http://www.ai.org/cji/files/Traffic_Records_Evolution_Report_Update_6-08.pdf).

- Outsourcing crash records eliminated an annual cost to the State Police of over \$1,000,000 in staffing, consulting, and system maintenance costs. The savings allowed ISP to hire additional troopers in 2007, and add civilian staff in other areas.
- Profit from sale of reports gives the vendor an incentive to work diligently with agencies to ensure reports are complete, accurate, and submitted in a timely fashion to the central repository. Additionally, this motivates the vendor to ensure a system that is on-line 24 hours a day, 7 days a week, and runs with optimum performance. This benefits the Indiana Department of Transportation, Bureau of Motor Vehicles, and other users of the aggregate traffic safety data.
- Additional cost savings have been realized by both state and local police agencies because manual requests to their records divisions have been reduced. This is a very significant savings to larger agencies, such as ISP and Fort Wayne Police Department.
- Buyers of local agency reports, which constitute 93 percent of the states crash reports, have the option to purchase the report on-line. This is a significant convenience, especially if they would have to travel a significant distance to the investigating agency. The buyer may still elect to purchase it directly from the agency, if desired.

## **NHTSA Traffic Records System Inventory – State Surveys Summary<sup>19</sup>**

To ensure the following summary reflects the most recent and up-to-date practices in traffic records data systems, only surveys completed from January 2008 to present were reviewed. This summary reflects information obtained from the Traffic Records Improvement Program Reporting System (TRIPRS) for the states of Alaska, Colorado, Illinois, Indiana, Maryland, Michigan, Missouri, and Ohio.

### *Traffic Crash Data System*

- The estimated number of crashes not entered into the official state repository ranged greatly, from 15,000 (Michigan) to 160,000 (Maryland).
- The percentage of crashes submitted electronically to the state repository ranged significantly, from zero (Maryland) to 99 percent (Indiana).
- The current criteria for reporting were relatively consistent across all states: fatality, injury, or property damage ranging from anything over \$100 to anything over \$2,000.

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<sup>19</sup> <http://24.123.50.116/nhtsa/tri/f?p=103:13:2594085118834101>.

- All states responded that they have a single Police Accident Report (PAR) that is used by the state and all county and local jurisdictions.
- Most states responded that all agencies are required to report crashes, including the full data set in the data dictionary.
- There are a few states that provide crash data collection software for police agencies, such as Mobile Capture and Reporting System (MCR) and ARIES. In addition, the Michigan Highway Safety Office provides grant funding to local police agencies to collect and submit crash data. Local police can use a vendor of their choice if their software and hardware meet the state criteria.
- All states responded that both police reports and property damage reports are collected by their crash system, while operator reports and private property reports are collected by most crash systems. In addition, Illinois also collects toxicology reports, coroner reports, death certificates, and crash investigation/reconstruction reports.
- Internal agency staff has access to the data for on-line queries and analysis in all states, while other state agencies, local agencies, and public/private sector entities had access to the data in most states.
- Respondents indicated that their crash files are linked to other databases, including Truck, Roadways, EMS, Injury Surveillance System, Citation, Driver Licensing, Vehicle Registration, CODES, and various locally maintained systems.
- Most states used MMUCC guidelines when revising their crash report form.
- There are various quality control measures in place, including:
  - Three levels of edits, numerous reports and Safety Data Mart QC queries and reports (Illinois);
  - When reports are submitted, approximately 250 data edits are applied (Indiana);
  - Manual entry and audit process (Maryland); and
  - Data edits and quality assurance and quality control reports are generated weekly (Michigan).
- Oracle databases are the most commonly used systems for master crash data and data analysis.

### *Traffic Citation Data System*

- Most responding states said they have a central citation tracking system. However, many states do not require all agencies to submit traffic citation data.
- All states responded that they use a uniform traffic citation form, with many having electronic citation capabilities as well.

- Of the two states that responded (Indiana and Michigan), all police agencies in their respective states use the state citation and some of them also use electronic submission, 17 percent and 15 percent respectively. However, neither state has a system to track impaired driving.
- All states responded that they have an automated court information system for traffic citations.
- Data usually are accessible to internal agency staff, other state agencies, local agencies, and public/private sector entities for on-line queries and analysis. However, most state citation files are not linked to other databases.

## B.3 POTENTIAL SOLUTIONS

This section addresses the specific problems faced by the Commonwealth in capturing crash and citation data and discusses how these problems could be resolved by enhancing, replacing, or supplementing existing solutions.

### Problem Identification

Massachusetts has 451 law enforcement agencies responsible for reporting crash and citation data to the RMV. Of these agencies, about 88 are transmitting crash data electronically to the Registry of Motor Vehicles (RMV) and another 343 submit paper reports to the RMV, while utilizing individual Record Management Systems (RMS). Approximately 20 rely on tracking and reporting crash information via a paper-based process only, without the use of an RMS. Massachusetts General Law Chapter 90, Section 29 requires all law enforcement agencies in the Commonwealth to report an incident within 15 days.<sup>20</sup> However, there are no penalties for noncompliance within the statute and a number of agencies across the State send in reports with many blank data fields. There also is a lack of quality control for data being entered into the RMV crash file. Very few edits are applied by agencies prior to submission to the RMV and by the RMV during data entry into the system. In addition some agencies are not using the statewide mandated crash report form or submitting completed reports, which contributes greatly to the under- and nonreporting of crashes in the Commonwealth.

### Needs/Criteria

Massachusetts is in need of a traffic records system that accommodates the specific needs of the State. Ideally, this system could be distributed statewide

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<sup>20</sup> Massachusetts General Law Chapter 90, Section 29, "Deputy registrar, chief deputy registrar, etc.; appointment; duties; investigation of motor vehicle accidents; suspension or revocation of licenses". Available on-line at: <http://www.mass.gov/legis/laws/mgl/90-29.htm>.

through one statewide license; have the right functionality, including workflow and security settings; be easy to implement and access for a number of different system users; and preferably operate with existing Record Management Systems of law enforcement agencies throughout the State.

### *Review of Candidate Systems*

Systems reviewed in the following section were identified by drawing upon our expertise in the area of crash and citation data management and supplemented by a review of available literature in this area. The candidate systems reviewed below were considered based on their:

- Strengths and weaknesses of each system or process;
- Technologies and techniques from each system that could be adopted within the Commonwealth; and
- Potential impediments to adopting concepts from each system.

There are three broad categories of options for Massachusetts for improving its traffic records data collection process. The first option is to *enhance* existing systems. An example of this would be the purchasing of additional software modules compatible with existing RMS implementations. The second option is to *replace* existing systems. This would consist of purchasing new statewide RMS systems with electronic citation and crash capabilities built in to replace existing systems throughout the Commonwealth. All local agencies would then use these uniform systems. The third option is to *supplement* existing systems. This would entail building in-house system(s) from scratch that police departments would use in addition to existing RMS systems.

One drawback of vendor-based systems is that pricing typically is assessed on an agency-by-agency basis, rather than charging one statewide licensing fee for developing the software. The more desirable alternative would be for the State to pay vendors a one-time purchasing fee to have the software developed and distributed the software to local agencies around the State.

### *Option 1: Enhance Existing Systems*

There are over 20 different RMS vendors utilized by local law enforcement agencies across the Commonwealth, making it difficult to enhance the traffic records system of every local agency in the State. However, the majority of these agencies use software from only a few different vendors. The most prevalent RMS vendors are TriTech (previously IMC), Larimore Associates, Pamet Software, QED, and MICROsystems. The RMV currently supports electronic file transfer from individual law enforcement agencies using the following systems: TriTech (IMC), QED, Ledgelight, and the State Police's RAMS II.

### **TriTech<sup>21</sup>**

TriTech is the most widely used vendor by far, with close to 60 percent of local agencies using their systems. TriTech offers a host of systems in addition to law enforcement software such as Computer-Aided Dispatch (CAD), Fire Records Management, EMS Patient Care Reporting, and Corrections Management. Purchasing additional modules or “add-ons” for existing TriTech systems would have the biggest impact in enhancing citation and crash data collection across the Commonwealth.

Add-ons include mapping and field collection capabilities. TriTech’s IMC Mobile Data software can provide RMS data to in-vehicle computers to allow officers to enter and manage a variety of data while in the field. IMC Mobile is designed with agency-specific features that enable field personnel to access, enter, and edit cases directly from in-house IMC records systems (Law-Investigative, Fire, and EMS Patient Care Reporting). IMC Mobile includes security to protect data even if the unit’s wireless connection is lost with the base.

### **Larimore Associates<sup>22</sup>**

Larimore Associates is another vendor that offers a variety of software applications, including Incident/Accident Reporting, State Accident Reporting, and Citation systems. The Incident/Accident Reporting system can be fully integrated with Larimore CAD, Arrest, Case Management, and/or Property Tracking Systems for error-free transfer of data. Or it can work as a standalone system. However, it doesn’t appear that this system can be integrated with the Larimore Citation system or support in-vehicle electronic crash data collection. The Citation system can track everything related to citations, including information about the offender, the vehicle, and the violation, but there appears to be a lack of support for electronic field collection as well.

### **Pamet Software<sup>23</sup>**

Pamet Software offers law enforcement agencies an integrated RMS with via PoliceServer application. PoliceServer can be used separately or integrated with Pamet’s other software products, including CADServer, Advanced Reporting, GIS Mapping, Mobile Computing, Digital Imaging, FireServer, and EMSServer. There does not appear to be support for automating or integrating crash and citation systems.

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<sup>21</sup> <http://www.imcus.com/Products/Law-RMS.aspx>.

<sup>22</sup> [http://www.larimore.net/products\\_police.htm](http://www.larimore.net/products_police.htm).

<sup>23</sup> <http://www.pametsystems.com/policeserver.htm>.

**QED Inc.**<sup>24</sup>

QED provides an Incident Management and Reporting System as part of their Crimeweb software. The web-based system is designed to be used from mobile units or in the station. Reports can be entered, reviewed, updated, or browsed in real time regardless of location. Application security dictates the capabilities of each user. The program allows for integration with CAD and Master Name files, which reduces duplicate entry. Search capabilities on all data fields and a narrative search tool also are available. The Web-Based Journals and Logs allow administrators to see department activity (CAD incidents, arrest/bookings, police reports, etc.) at a glance. The QuickFind feature also can be used to pull up a particular case or report. Supervisors can retrieve a shift log of reports due for review, rejection, or approval. Rejected reports are sent back to the user for modification.

**MICROSystems Incorporated**<sup>25</sup>

MICROSystems Incorporated offers crimeTRACK for law enforcement agencies. Available crimeTRACK modules include CAD, Case Management, Arrest and Booking, Barcoding, Detective Case Management, Field Interview Cards, and Black Book. However, electronic capturing of crash and citation data, along with integration between these two systems, is not supported by crimeTRACK.

**Keystone Public Safety Inc.**<sup>26</sup>

While not widely used by local agencies across the Commonwealth, Keystone Public Safety also provides integrated software for crash and citation records systems, among other modules. In addition, data captured during the day-to-day functions of law enforcement agencies may be accessed in a variety of analytical modes using their Police Information Reporting System (PIRS), which is an integrated system for data collection, reporting and administrative requirements of local and county law enforcement agencies. This system provides record keeping from incident inception to final disposition. However, in-vehicle electronic capturing of crash and citation data is not currently supported by this system.

*Option 2: Replace Existing Systems*

Another alternative for the Commonwealth is to purchase a new statewide system to replace existing systems across the State. Ideally, all or most local agencies would replace their existing systems with this one statewide system. This would ensure data integrity for statewide reporting through field edits/

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<sup>24</sup> <http://www.qed.com/Policerms.htm>.

<sup>25</sup> <http://www.crimetrak.com/>.

<sup>26</sup> <http://www.keystonepublicsafety.com/>.

validations and allow for easy retrieval of data from other sources to populate crash and citation forms. One major downfall to this option is the cost and potential for resistance from local agencies. Since most agencies already have an RMS in place, they might resist spending money for a new system and using a new system will require retraining officers and administrative staff. Also, selecting one vendor for the State could potentially result in contention by vendors or even legal disputes.

#### **Traffic and Criminal Software (TraCS)<sup>27</sup>**

Traffic and Criminal Software (TraCS) integrates electronic collection of crash and citation data within a police vehicle. TraCS is application software that, combined with laptop computers and data communications, provides officers with the functionality needed to record and retrieve incident information wherever and whenever an incident occurs. TraCS, an application developed by the State of Iowa in partnership with FHWA, is designed with modular architecture capable of sharing common data among forms and incorporating crash, citation, OWI, commercial motor vehicle inspection, and incident forms. Technologies such as bar code scanners, digital cameras, and Global Positioning Systems (GPS) may be integrated with TraCS.

#### **TraCS is currently licensed by the following 17 states:**

- Alaska
- Arizona
- Arkansas
- Delaware
- Florida
- Georgia
- Iowa
- Nebraska
- New Mexico
- Oklahoma
- Pennsylvania
- South Dakota
- Tennessee
- Wisconsin

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<sup>27</sup> [http://www.tracsinfo.us/Tracs\\_Home.asp](http://www.tracsinfo.us/Tracs_Home.asp).

### **The National Model**

The National Model for the Statewide Application of Data Collection and Management Technology to Improve Highway Safety is a nationally recognized program for sharing information, resources, and technologies to improve safety. The focus of the National Model is improving data collection for roadway incidents, leveraging proven technology for law enforcement, streamlining the communication of safety information to key stakeholders, and extending use of this information for short- and long-range safety and law enforcement programs.

The National Model is an effort to demonstrate how new technologies and techniques can be used in a statewide operational environment to improve the safety data collection and management processes. Using this approach shortens the data collection time, minimizes disruption to traffic, increases officer efficiency and safety, and improves data quality, all of which contributes to better information for safety decisions and improved public safety. The TraCS software package fully implements the National Model.

The benefits of the TraCS package include the following:

- Facilitates sharing software among states through use of a common source code;
- Provides an open architecture allowing TraCS to be customized without modifying the source code;
- Provides the ability to mimic the look and feel of existing paper-based reports;
- Allows for agency-specific and state-specific functionality;
- Maintains data integrity for statewide reporting through field edits/validations;
- Allows retrieval of data from other sources to populate TraCS forms (e.g., databases of driver license and vehicle information);
- Provides the capability to import data into the TraCS database (e.g., citation dispositions);
- Allows customization of the content and format of data exported from the TraCS database, including creation of Global Justice Data Model for Extensible Markup Language (GJDMXML) compliant export files by utilizing an Extensible Stylesheet Language Transformation (XSLT) style sheet;
- Supports Access 2000, Microsoft SQL Server 2000 or Oracle 9i and above and maintains the potential to use additional databases if needed;
- Allows a variety of file formats to be attached to and stored with TraCS reports; and
- Includes a Software Development Kit (SDK).

### **Ledge Light Technologies<sup>28</sup>**

Ledge Light Technologies is the software developer of the Crash Reporting System used in the Maine, Rhode Island, Vermont, and many local law enforcement agencies across the United States. Currently, only one local agency in Massachusetts (Framingham) uses this vendor for their RMS. Ledge Light's products cover the entire spectrum of traffic records needs from the mobile level for data collection in the field, to the agency level for data retention and reporting. At the state level, their products cover data transmission, data storage, reporting and analysis, and exporting to various state agencies in many formats. Their Crash Reporting System data collection client allows for the following:

- Searching;
- Printing;
- Exporting;
- Auditing;
- Wireless access;
- Mapping and GPS capabilities; and
- Barcode reading.

Their Citation systems allow for capturing and printing citation of data in the field, including searching, exporting, auditing, and wireless capabilities.

### *Option 3: Supplement Existing Systems*

The Commonwealth also has the option of supplementing existing RMS implementations with statewide electronic citation and/or electronic crash systems. These new systems could be developed in house or by a vendor and would be available to any agency wishing to use them. While the design of a statewide e-citation/e-crash system is beyond the scope of this document, this system likely would:

- Be free of charge to any participating agency;
- Provide a streamlined, web-based interface;
- Include some level of training and/or technical support for participating agencies;
- Integrate with existing data sources, such as the Road Inventory information available from the Executive Office of Transportation;
- Include standard edit checks and other mechanisms to ensure data quality;

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<sup>28</sup> <http://www.ledgelight.com/Products.aspx>.

- Support printing of citation and crash documents using any standard in-car printer;
- Support the most common in-car bar code scanners for driver licenses and, eventually, registrations;
- Store all reports in a central server;
- Provide administrative capabilities to allow participating agencies to review, correct and print reports entered by their officers and to extract data in a format that can be imported into the local RMS system; and
- Automatically transmit completed reports to the appropriate agency, including RMV, Merit Rating Board, and Courts.

The cost of supplementing existing RMS implementations with a statewide e-Citation/e-Crash system would be split between the Commonwealth and individual participating agencies. The Commonwealth would be responsible system design, development, and maintenance costs. This could be a substantial upfront cost that must be expended before this system could be placed into operation. Individual agencies would be responsible for any necessary hardware upgrades to existing vehicles as well as local administrative costs. Agencies may not have the funding to support these upgrades or may be required to roll out the upgrades over a substantial period of time, leading to a mixture of manual and electronic reports from a single agency.

A statewide system would promote uniformity. Data entered by any participating would be guaranteed to meet a given set of standards, both in the quality and the format of the data. However, because this system would not be mandatory, there would be organizational issues in combining these data with other electronic sources (e.g., e-Citation/e-Crash systems integrated into existing RMS implementations) as well as reports submitted using existing paper forms.

Finally, local police departments may be reluctant to adopt another system to perform electronic citation and crash functions. There are a number of institutional barriers to this process and one of the ways potentially to combat these issues will be to keep the process within the existing, accepted RMS system. To be successful, any solution must be fully endorsed by the officers in the field that will be responsible for using it.

## B.4 SUMMARY

We can see through a review of the national trends and best practices that there are a variety of electronic crash and citation systems currently being utilized across the county. Some states have vendor-built systems while others have developed their systems in-house. A number of states have electronic capture and transmittal capabilities and some provide statewide crash or citation system software to their local law enforcement agencies. A review of the three broad categories of options for Massachusetts, to *enhance*, *replace*, or *supplement* existing

data collection systems, reveals a number of different avenues the Commonwealth can take to improve traffic records data. A fourth option, while potentially costly, is to utilize a combination of the previously mentioned alternatives. This could entail developing a statewide system to be disbursed to local agencies along with developing a set of unified elements and requirements for vendors when adding modules to existing RMS systems. However, any potential solution will require that a set of technological, institutional, and financial issues be resolved jointly by all participants.

Regardless of how the Commonwealth of Massachusetts chooses to proceed, it is essential that the system(s) have the capability to eventually integrate electronic crash with electronic citation and that it can be implemented in phases. It is equally important that the system(s) support in-vehicle electronic capturing of crash and citation data. This will allow for standalone utility of the system if both electronic systems are not developed and utilized simultaneously. It also will not preclude the ultimate goal of future integration between these two systems.



## C. Draft Traffic Records Assessment Executive Summary

A Technical Assessment Team, assembled by the National Highway Traffic Safety Administration (NHTSA), conducted an assessment of the Commonwealth's traffic records systems March 16 to 20, 2009. The Assessment Team was comprised of professionals with backgrounds and expertise in the several component areas of traffic records data systems (crash, driver, vehicle, roadway, citation, adjudication, and injury surveillance data systems). This section provides the Executive Summary of the draft report. Please note that the draft report provided recommendations in addition to the ones provided below.

### C.1 EXECUTIVE SUMMARY<sup>29</sup>

Upon request by the Highway Safety Division (HSD) of the Massachusetts Department of Public Safety (DPS), the National Highway Traffic Safety Administration (NHTSA) assembled a team to conduct a traffic records assessment. Concurrently the HSD carried out the necessary logistical and administrative steps in preparation for the onsite assessment. A team of professionals with backgrounds and expertise in the several component areas of traffic records data systems (crash, driver, vehicle, roadway, citation, adjudication, and injury surveillance data systems) conducted the assessment March 16 to 20, 2009.

The scope of this assessment covered all of the components of a traffic records system. The purpose was to determine whether the traffic records system in Massachusetts is capable of supporting management's needs to identify the Commonwealth's safety problems, to manage the countermeasures applied to reduce or eliminate those problems, and to evaluate those programs for their effectiveness.

#### Background

A similar assessment in 2005 produced a *Traffic Records Assessment Report* that offered a number of recommendations to improve the Commonwealth's traffic records system. A June 2008 update of the 2005 *Assessment Report* provides the status of the original report's recommendations. Some progress was noted in

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<sup>29</sup> NHTSA, *DRAFT Commonwealth of Massachusetts Traffic Records Assessment*, March 16-19, 2009.

several areas. The Traffic Records Coordinating Committee (TRCC) was formalized via a memorandum of understanding (MOU) between TRCC member agencies and the agencies who maintain the key traffic records information systems. The Massachusetts Highway Department (MassHighway) has established a Web-Based Crash Mapping Tool to allow state and regional planning agencies to identify crash locations at the community level. The crash records system is now accepting electronically transmitted records via an interface that has been developed for agencies to transmit their records directly from their Records Management Systems (RMS) to the Registry of Motor Vehicles (RMV). The recently appointed director of the HSD has taken on the role of promoting traffic records improvement and serves as the TRCC chair. However some major issues remain and are discussed in the summary below and the full report that follows.

### **Crash Records**

The statewide Crash Data System (CDS) is maintained by the RMV and is populated by crash reports sent to the RMV both electronically and on hard copy forms. While users have good access to RMV data and rely on it for their programming and planning needs, the State nevertheless is facing serious challenges in its attempts to provide crash data to users throughout the highway safety community. The current condition of the crash file renders it very unreliable as a source of data to drive decisions in program planning and policy-setting by the State's highway safety managers.

The CDS cannot be considered to meaningfully represent the crash experience in Massachusetts for several reasons. Several large agencies (in particular Boston and Springfield) do not send reports for a vast majority of their crashes. For example, according to crash statistics Boston only submitted 92 crash reports in 2007. Although there is a statutory requirement for all agencies to report crashes to RMV, there is no penalty for noncompliance. Many agencies across the State send in reports with many blank data fields. Compounding the problem further is the lack of edits being applied at RMV during data entry. Even those agencies sending reports electronically do not apply edits prior to submission. Although about 88 agencies are sending reports electronically, they are being generated from their own Records Management Systems (RMS) but are not being collected via field data collection applications on laptops in the police vehicles. If used, such applications could provide for editing at time of entry. Another practice that further diminishes the quality of the entire crash file is the reliance on operator reports. In the absence of a police report for a crash, information from an operator report is entered into the system time permitting.

Nevertheless the State is to be commended for its recognition of the potential value of electronic data collection and its benefits not only in the increased quality of data, but the time and cost savings to the law enforcement agencies. The HSD plans to meet in the near future to begin laying out a plan and schedule for expanding local agency installation of the electronic data transmission interface. To realize the full benefits of electronic data collection and transmission, major

changes in policies and procedures are required at law enforcement agencies and the RMV.

## **Citation and Adjudication Records**

Massachusetts unlike many States has excellent citation data. The RMV is the responsible agency for printing and distributing all ticket books (Uniform Ticket Books) to the law enforcement agencies throughout the State.

Upon issuance of a citation (for a civil as well as a criminal violation) by a law enforcement officer, a copy is sent both to the District Court and to the Merit Rating Board (MRB) at the RMV for entry into the driver record. For civil infractions a final disposition is applied automatically when the fine is paid or when the findings from a hearing are applied to the citation by the MRB. In criminal cases the final dispositions are applied when received from the courts (58 of the 62 District Courts send the dispositions electronically via the MassCOURTS case management system). It is interesting to note that, again unlike most States, the MRB receives all dispositions regardless of the judicial finding (guilty, dismissed, etc.).

Consequently, the MRB is capable of identifying all actions taken on any citation (civil or criminal) throughout the life cycle of that citation and is capable of accounting for all citations from the time they are printed, distributed to law enforcement, issued to an offender, adjudicated in the court, and posted in the driver history record. This is a resource unavailable in most States for conducting analyses to determine the effectiveness of enforcement of the State's traffic laws and to ensure the integrity of citation processing.

While electronic processing is in use between the courts and RMV, no similar process exists between law enforcement and the courts. No law enforcement agencies have the capability to issue citations electronically for transfer to the courts. The Administrative Office of the Trial Courts (AOTC) as well as the MRB and law enforcement all indicated a great deal of interest in bringing about electronic ticketing. It appears that establishing a project team, under the auspices of the TRCC, with representatives from the above entities would be well received and could provide some immediate near-term benefits.

## **Roadway Information**

The system upgrade to the crash file in 2001 helped to resolve about half of the location coding problems previously experienced with multiple names for the same street. The system was designed to collect more accurate information using "pick lists" for street names and through an error resolution process at the RMV. However, the "pick lists" used by local police in their RMSs and that used in the crash file at RMV have different names in the pick list due to different sources for street names.

State, regional, and local planners and engineers and safety personnel need access to the entire crash report for a more detailed analysis of crash data

through the information in the report narrative and collision diagram. Electronically transmitted reports do include this information, but it is extremely difficult to retrieve this information from hard copy forms.

### **Driver and Vehicle Records**

Problems were found by the State Auditor last July with driver histories in the RMV resulting in failures to suspend or revoke licenses. The MRB inputs the citations and convictions for the RMV and took immediate action, working with the RMV and the courts to establish electronic submissions from the District Courts to solve the problem. By the beginning of this year most input from District Courts is electronic, and efforts are underway to extend that capability to the other courts. Thus a very positive development was achieved in a short time-frame to correct a serious problem. Exploring this development revealed that the MRB is providing important, timely, and useful citation data to law enforcement and the courts and could be a rich source of traffic safety information.

The motor vehicle functions of the RMV have taken advantage of the electronic interactive applications available to them: the National Motor Vehicle Title Information System, the Electronic Line and Title system, and the Business Partner Electronic Vehicle Registration.

### **Injury Surveillance System Components**

Massachusetts has several components of a statewide injury surveillance system. The Division of Health Care Finance and Policy (DHCFP) compiles statewide hospital discharge, emergency department (ED), and outpatient services databases. The Department of Public Health (DPH) Injury Surveillance Program has just begun collecting data in a statewide trauma registry and is preparing to capture statewide emergency medical services (EMS) data by September of 2009. DPH also maintains a statewide death certificate database.

The Injury Surveillance Program has access to all of these databases and has the ability to deterministically link injury episodes across data sets. The Injury Prevention Program uses these data for a number of injury prevention programs and reports. Data in the statewide injury surveillance system has been compiled into the Massachusetts Community Health Information Profile (MassCHIP). Many of these data sets also have been integrated with the statewide crash file through the Massachusetts Crash Outcome Data Evaluation System (CODES) project.

A wealth of traffic safety information for traffic safety research is available in these two systems. However, due to access restrictions and other obstacles the full potential of these systems has not been realized.

### **Traffic Records Coordinating Committee (TRCC)**

As noted above, the State has made progress since the 2005 assessment in formalizing its TRCC with a Charter, Mission Statement and an official list of voting

members. The Committee is chaired by the Director of the Highway Safety Division. Meetings are held bimonthly. One area that needs to be addressed is the absence of an Executive Level group, although the Executive Leadership group for the State's Strategic Highway Safety Plan informally fills that role. Another is the notable absence of active participation from the judiciary. It is acknowledged that they have been invited but have declined. However, a member of the AOTC has expressed an interest in participating in the planning of any projects that would be of benefit to the judiciary, particularly to develop any initiatives related to electronic ticketing.

### **Strategic Planning**

The current Strategic Plan is primarily a compilation of Section 408 grant submissions. However, the Highway Safety Division is in the process of preparing a Traffic Records Business Plan which will cover all Commonwealth information technology initiatives for traffic safety information. The Business Plan, along with the deficiencies identified in this Assessment, is intended to be the source of information for the projects to be included in the application for Section 408 funding.

Following are the major recommendations for improvements to the State's traffic records system. The references indicate the sections of the report from which the recommendations are drawn.

## **C.2 MAJOR RECOMMENDATIONS**

### **Traffic Records System Management**

- Establish the executive level of the TRCC to ensure full support and authorization of the TRCC and its members by the executives of the agencies in whose area of responsibility the components of the traffic records system fall. **(Section 1-A)**.
- Refocus the TRCC on the global strategic direction of the traffic records system, rather than on the oversight of 408 grant spending. **(Section 1-A)**.
- Establish performance measures in the design of proposed projects that will measure data quality improvements. **(Section 1-B)**.
- Promote users' access to and use of the traffic records system in order to build support for data improvement, especially as it relates to crash data collection by law enforcement. **(Section 1-C)**.

### **Crash Records**

- Establish crash reporting improvement as a top priority of the TRCC and the member agencies. **(Section 2-A)**.

- Develop a comprehensive plan to improve crash data to acceptable levels by the end of 2010 (or sooner) and obtain executive level endorsement of the plan, up to and including the Governor, if necessary, to ensure that all law enforcement agencies meet their reporting requirements under the law. **(Section 2-A).**
- Include in the plan a timeline to gradually eliminate the need for operator reports in the CDS. A five-year timeline with options to accelerate that is recommended. **(Section 2-A).**
- Expand the edit checks in CDS for manual data entry to a set that is operationally meaningful, establishes a high standard for data quality, and meets with the approval of the TRCC members. **(Section 2-A).**
- Establish a formal quality control program with operationally meaningful measurements, a tracking system that ensures reports containing serious errors are returned to the law enforcement agency for correction, and are subsequently returned to RMV in a timely fashion. Track all errors and use the information to develop additional content for crash reporting training and refresher training. **(Section 2-A).**
- Ensure that crash report images (including the narrative and diagram) are available for all crashes to all legitimate users of the crash data, especially those who rely on accurate location information. Scanning of paper forms and creation/storage of PDFs from electronic crash reports would allow users in law enforcement and engineering agencies, in particular, to access the detailed information they need from the narratives and diagrams. **(Section 2-A).**

### **Citation and Adjudication Records**

- Charge the TRCC with establishing a working group of the appropriate stakeholders to plan for the implementation of e-citations in the State. **(Section 2-E).**

### **Roadway Information**

- Implement an imaging system to capture each crash report for use by safety engineers and law enforcement to study crash locations for countermeasure development. **(Section 2-B).**
- Develop a naming convention and training program to be applied to the “pick list” for identifying street names for crash report location. **(Section 2-B).**

### **Injury Surveillance System Components**

- Integrate the statewide crash database into MassCHIP. **(Section 2-F).**

- Explore the possibility of granting user access to MassCHIP for Highway Safety Division program managers and analysts. **(Section 2-F)**.
- Partner with CODES to make available a linked crash and citation database for use by MassHighway and the Highway Safety Division. **(Section 2-F)**.



## D. References

Resources consulted during the planning and/or development of the Statewide e-Citation and Traffic Records System Business Plan are provided in this section.

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