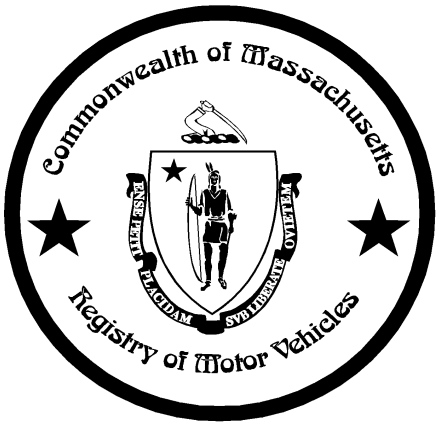

Commonwealth of Massachusetts
Registry of Motor Vehicles

One Copley Place
Boston, Massachusetts 02116

Vendor Electronic Submission Handbook

RMS Vendor Guide to the Electronic Submission

Version 2.0
September 23, 2004

Crash Data System

Introduction

The Massachusetts Registry of Motor Vehicles (RMV) is responsible under Massachusetts General Law Chapter 90 section 26 & 29 for collecting and keeping Accidents Reports for the Commonwealth. The Massachusetts Highway Department (MHD) is the major user of statistical information generated from the detailed accident reports.

State law requires persons involved in an accident to file a report with the RMV within 5 days of the accident if there is $1,000 in damage to any one vehicle or other property or if there is any personal injury.

MHD uses the information entered by the RMV to make decisions about transportation improvements, calculate statistics, and to improve roadway safety. In addition, state and local police, as well as the medical profession and Governor's Highway Safety Bureau often seek access to the Accident Record database to develop enforcement strategies, design programs to improve EMS services, and many other purposes.

Overview

In November 2001 the Massachusetts Registry of Motor Vehicles (RMV) rolled out a new system for collecting motor vehicle crash data in Massachusetts. A major component of this new system is a new paper form for police and operator reports. To help the RMS Vendors put their role in context, the main project goals for the new system are listed below:

Project Goals

1. Capture accurate crash location data
    - Improve collection and storage of crash data and diagrams
    - Promote accurate reporting of data with a redesigned crash form and process
    - Validate crash location captured or entered against a roadway inventory

2. Replace outdated technologies
    - On-line accessibility to multiple agencies
    - Automate and streamline file / document storage and retrieval

3. Reduce / eliminate paper processing through electronic data entry / transfers
    - Increase productivity
    - Increase accuracy
    - Reduce duplicate data entry
    - Improve document management and work flow

In conjunction with the rollout of the new paper Motor Vehicle Crash Police Report form, the Massachusetts Registry of Motor Vehicles (RMV) also implemented a process for submitting these forms electronically. This allows for the automated submission of these reports and significantly reduces the effort and inevitable errors that are associated with making these submissions manually. This benefits both the RMV and the individual law enforcement agencies because manual processes are currently involved on both sides of the submission. It also should reduce the number forms that are sent back for reprocessing due to errors or insufficient information. This document covers the details necessary for the RMS vendors to implement this electronic submission process.

The Police Form

In August 1998, the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), and the National Association of Governors' Highway Safety Representatives (NAGHSR) published a set of criteria called the Model Minimum Uniform Crash Criteria (MMUCC) and recommended that MMUCC serve as the model data elements for crash reporting. The primary benefit of this is uniform reporting across the states. When designing the new form for Massachusetts, we based the data to collect on the MMUCC guidelines.

The police form is the result of many months of intense discussions on what data should be included and what should not using MMUCC as the basis. Participants in these discussions included the RMV, MHD, the Governor's Highway Safety Bureau, the Massachusetts State Police, the Massachusetts Chiefs of Police Association, and the Federal Highway Administration.

The form was piloted in July 2000 by five State Police barracks and five local police agencies producing about 200 crash reports and detailed feedback on the use of the form. The feedback was incorporated and the result is the new Motor Vehicle Crash Police Report form for the Commonwealth of Massachusetts.

On the following page is the new form as well as the overlays that the Police will use when filling out the form. Form instructions are also listed as part of the overlays.

Commonwealth of Massachusetts
Motor Vehicle Crash Exchange Form

Date of Crash	Time of Crash (24HR)	City/Town

State Police ☐ Local Police ☐ MBTA Police ☐ Other:

AT INTERSECTION: < **LOCATION** > **NOT AT INTERSECTION:**

Route# Direction Name of Roadway/Street

At

Route# Direction Name of Intersecting Roadway/Street

Also at Intersection with

Route# Direction Name of Intersecting Roadway/Street

Route# Direction Address # Name of Roadway/Street

_____Feet N S E W of — — — • — or _____
Mile Marker Exit Number

_____Feet N S E W of Route# Intersecting Roadway/Street

_____Feet N S E W of Landmark

Please Select One of the Following: ☐ **Vehicle 1** ___# Occupants ☐ **Hit/Run** ☐ **Moped**

License # _____ St _____ DOB/Age _____

Sex____ Lic. Class 18 18 Lic. Restrictions 19 CDL _____ Endorsment

Operator _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

Insurance Company_____

Reg # _____ Reg Type_____ Reg State_____

Veh Year_____ Veh Make_____ Veh Config. 20

Owner _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

According to Massachusetts General Law, Chapter 90, Section 26: If the damage to any one vehicle or property is over $1,000 or if there is an injury to any person, you are required to complete a crash report within 5 days of the date of the accident.

Please obtain a copy of the operator crash report from your local police department, Registry branch office or from the RMV Website WWW.MASS.GOV/RMV and submit the original to:

Registry of Motor Vehicles
P.O. Box 199100
Boston, MA 02119
Attn: Accident Records

Also, be sure to forward a copy to your insurance agency, the local police department where the crash occured, and retain a copy for yourself.

If you would like to obtain a copy of the police report or another operator report, please send a letter to the address above with a check for $10 for each requested report made payable to: RMV. Please specify which report you are requesting and list the date and time of the crash and city/town where it occurred along with your name, address and the registration number of at least one vehicle involved.

Please Select One of the Following: ☐ **Vehicle 2** ___# Occupants ☐ **Non-Motorist A** Type 14 Action 15 Location 16 Condition 17 ☐ **Hit/Run** ☐ **Moped**

License # _____ St _____ DOB/Age _____

Sex____ Lic. Class 18 18 Lic. Restrictions 19 CDL _____ Endorsment

Operator _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

Insurance Company_____

Reg # _____ Reg Type_____ Reg State_____

Veh Year_____ Veh Make_____ Veh Config. 20

Owner _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

According to Massachusetts General Law, Chapter 90, Section 26: If the damage to any one vehicle or property is over $1,000 or if there is an injury to any person, you are required to complete a crash report within 5 days of the date of the accident.

Please obtain a copy of the operator crash report from your local police department, Registry branch office or from the RMV Website WWW.MASS.GOV/RMV and submit the original to:

Registry of Motor Vehicles
P.O. Box 199100
Boston, MA 02119
Attn: Accident Records

Also, be sure to forward a copy to your insurance agency, the local police department where the crash occured, and retain a copy for yourself.

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Commonwealth of Massachusetts
Motor Vehicle Crash Police Report

Police Use Only

RMV Document Number

Date of Crash	Time of Crash (24HR)	City/Town	Number Vehicles	Number Injured	Speed Limit _____ Latitude _____ Longitude _____	State Police ❑ Local Police ❑ MBTA Police ❑ Other:

AT INTERSECTION: < **LOCATION** > **NOT AT INTERSECTION:**

9

1

Route# Direction Name of Roadway/Street

At

Route# Direction Name of Intersecting Roadway/Street

Also at Intersection with

2

Route# Direction Name of Intersecting Roadway/Street

Route# Direction Address # Name of Roadway/Street

10

_____Feet N S E W of Mile Marker — — — • — or Exit Number

_____Feet N S E W of Route# Intersecting Roadway/Street

11

_____Feet N S E W of Landmark

3

Please Select One of the Following: ❑ **Vehicle 1** ___# Occupants ❑ **Hit/Run** ❑ **Moped**

License # _____ St _____ DOB/Age _____

Sex____ Lic. Class 18 18 Lic. Restrictions 19 CDL _____ Endorsment

4

Operator _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

Insurance Company_____

5

Vehicle Travel Direction: N S E W Responding to Emergency?____

Citation # (If Issued)_____

6

Viol. 1: Ch/Sec/Sub _____ Viol. 2: Ch/Sec/Sub _____

Viol. 3: Ch/Sec/Sub _____ Viol. 4: Ch/Sec/Sub _____

Reg # _____ Reg Type_____ Reg State_____

Veh Year_____ Veh Make_____ Veh Config. 20

12

Owner _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

Vehicle Action Prior to Crash 21

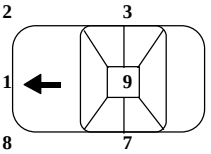
Event Sequence 22 22 22 22

Most Harmful Event 23

Driver Contributing Code 24 24

Underride/Override 25 Towed ____

Damaged Area Code: (Circle Up to Three)



0 None
10 Undercarriage
11 Totaled
97 Other
99 Unknown

13

Please fill out for operato and all occupants involved

Name (Last First Middle)	Address	Age/DOB	Sex	26 Seat Pos.	27 Safety System	28 Airbag Status	29 Airbag Switch	30 Eject Code	31 Trap Code	32 Injury Status	33 Transp. Code	Medical Facility
Operator	See Above	- - - - - - - -	- - -	- - -								

7

Please Select One of the Following: ❑ **Vehicle 2** ___# Occupants ❑ **Non-Motorist A** Type 14 Action 15 Location 16 Condition 17 ❑ **Hit/Run** ❑ **Moped**

License # _____ St _____ DOB/Age _____

Sex____ Lic. Class 18 18 Lic. Restrictions 19 CDL _____ Endorsment

8

Operator _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

Insurance Company_____

Vehicle Travel Direction: N S E W Responding to Emergency?____

Citation # (If Issued)_____

Violation 1: Ch_____Sec_____ Violation 2: Ch_____Sec_____

Violation 3: Ch_____Sec_____ Violation 4: Ch_____Sec_____

Reg # _____ Reg Type_____ Reg State_____

Veh Year_____ Veh Make_____ Veh Config. 20

Owner _____ (Last First Middle)

Address _____

City _____ State_____ Zip _____

Vehicle Action Prior to Crash 21

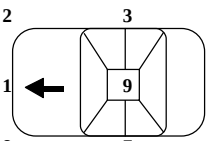
Event Sequence 22 22 22 22

Most Harmful Event 23

Driver Contributing Code 24 24

Underride/Override 25 Towed ____

Damaged Area Code: (Circle Up to Three)



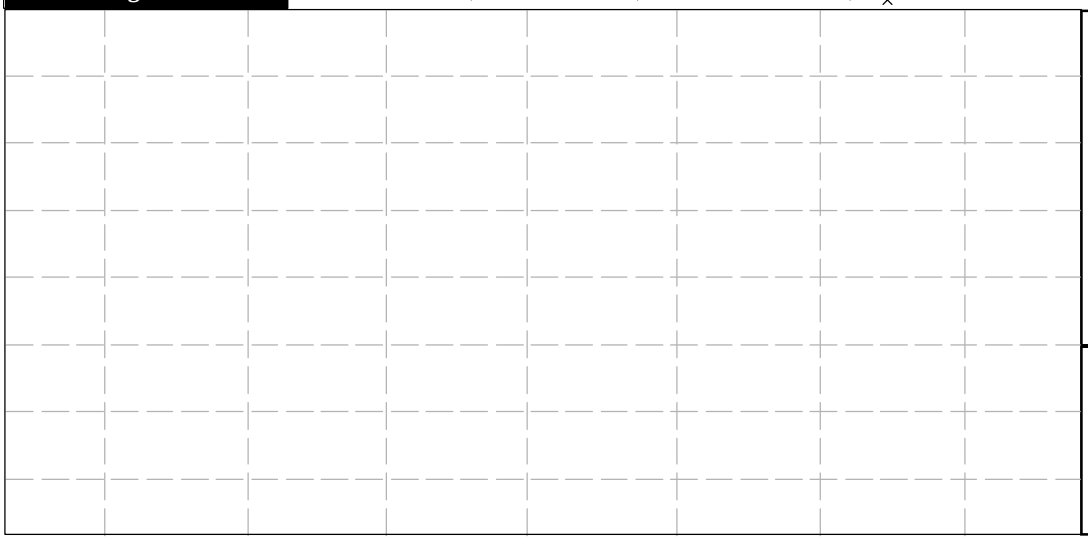
0 None
10 Undercarriage
11 Totaled
97 Other
99 Unknown

Please fill out for operator and all occupants involved

Name (Last First Middle)	Address	Age/DOB	Sex	26 Seat Pos.	27 Safety System	28 Airbag Status	29 Airbag Switch	30 Eject Code	31 Trap Code	32 Injury Status	33 Transp. Code	Medical Facility
Operator/Non-Motorist	See Above	- - - - - - - -	- - -	- - -								

→= Direction [1]=Vehicle 1 [2]=Vehicle 2 = Pedestrian

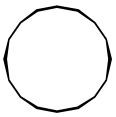
Crash Diagram: ie: → [1] → [2] →



If Crash Did Not Occur on a Public Way:

- ❒ Off-Street Parking Lot
- ❒ Garage
- ❒ Mall/Shopping Center
- ❒ Other Private Way

Indicate North by Arrow



Crash Narrative:

Witnesses:

Name (Last, First, Middle)	Address	Phone #	Statement

Property Damage:

Owner (Last, First, Middle)	Address	Phone #	34-Type	Description of Damaged Property

Truck and Bus Information:

Registration # _____(From Vehicle Section)

Carrier Name _____ Carrier Issuing Authority Code [35]

Address_____ City_____ St_____ Zip_____

US DOT #: _____ State Number_____ Issuing State _____ ICC #:_____ Interstate [36]

Cargo Body Type Code [37] Gross Vehicle Weight [38]

Trailer Reg #:_____ Reg Type_____ Reg State _____ Reg Year_____ Trailer Length [39]

Hazmat Information:

Placard [40] Material 1 digit # [41] Material Name_____ Material 4 digit # _____ Release code [42]

Police Officer Name (Please Print) Signature ID/Badge # Department Precinct/Barracks Date

Form with Map Numbers

On the following page is the Motor Vehicle Crash Police Report form filled in with Map Numbers for each data element. In the sections that follow, the Map Numbers can be used to cross reference to the XML attributes in Appendix A.

Commonwealth of Massachusetts
Motor Vehicle Crash Exchange Form

Date of Crash	Time of Crash (24HR)	City/Town

State Police ☐
Local Police ☐
MBTA Police ☐
Other:

AT INTERSECTION: < **LOCATION** > **NOT AT INTERSECTION:**

Route# Direction Name of Roadway/Street
At
Route# Direction Name of Intersecting Roadway/Street
Also at Intersection with
Route# Direction Name of Intersecting Roadway/Street

Route# Direction Address # Name of Roadway/Street
_____Feet N S E W of ___ ___ ___ • ___ or _____
Mile Marker Exit Number
_____Feet N S E W of Route# Intersecting Roadway/Street
_____Feet N S E W of
Landmark

Please Select One of the Following: ☐ **Vehicle 1** ___# Occupants ☐ **Hit/Run** ☐ **Moped**

License # _____ St _____ DOB/Age _____ Reg # _____ Reg Type_____ Reg State_____
Sex____ Lic. Class 18 18 Lic. Restrictions 19 CDL _____ Endorsment Veh Year_____ Veh Make_____ Veh Config. 20
Operator _____ (Last First Middle) **Owner** _____ (Last First Middle)
Address _____ Address _____
City _____ State_____ Zip _____ City _____ State_____ Zip _____
Insurance Company_____

According to Massachusetts General Law, Chapter 90, Section 26: If the damage to any one vehicle or property is over $1,000 or if there is an injury to any person, you are required to complete a crash report within 5 days of the date of the accident.

Please obtain a copy of the operator crash report from your local police department, Registry branch office or from the RMV Website WWW.MASS.GOV/RMV and submit the original to:

Registry of Motor Vehicles
P.O. Box 199100
Boston, MA 02119
Attn: Accident Records

Also, be sure to forward a copy to your insurance agency, the local police department where the crash occured, and retain a copy for yourself.

If you would like to obtain a copy of the police report or another operator report, please send a letter to the address above with a check for $10 for each requested report made payable to: RMV. Please specify which report you are requesting and list the date and time of the crash and city/town where it occurred along with your name, address and the registration number of at least one vehicle involved.

Please Select One of the Following: ☐ **Vehicle 2** ___# Occupants ☐ **Non-Motorist A** Type 14 Action 15 Location 16 Condition 17 ☐ **Hit/Run** ☐ **Moped**

License # _____ St _____ DOB/Age _____ Reg # _____ Reg Type_____ Reg State_____
Sex____ Lic. Class 18 18 Lic. Restrictions 19 CDL _____ Endorsment Veh Year_____ Veh Make_____ Veh Config. 20
Operator _____ (Last First Middle) **Owner** _____ (Last First Middle)
Address _____ Address _____
City _____ State_____ Zip _____ City _____ State_____ Zip _____
Insurance Company_____

According to Massachusetts General Law, Chapter 90, Section 26: If the damage to any one vehicle or property is over $1,000 or if there is an injury to any person, you are required to complete a crash report within 5 days of the date of the accident.

Please obtain a copy of the operator crash report from your local police department, Registry branch office or from the RMV Website WWW.MASS.GOV/RMV and submit the original to:

Registry of Motor Vehicles
P.O. Box 199100
Boston, MA 02119
Attn: Accident Records

Also, be sure to forward a copy to your insurance agency, the local police department where the crash occured, and retain a copy for yourself.

If you would like to obtain a copy of the police report or another operator report, please send a letter to the address above with a check for $10 for each requested report made payable to: RMV. Please specify which report you are requesting and list the date and time of the crash and city/town where it occurred along with your name, address and the registration number of at least one vehicle involved.

Police Use Only

Commonwealth of Massachusetts
Motor Vehicle Crash Police Report

RMV Document Number

Date of Crash	Time of Crash	City/Town	Number Vehicles	Number Injured	Speed Limit / Latitude / Longitude	
A1	A2 24HR	A3	A4	A5	A6 / A7 / A8	State Police ☐ Local Police ☐ MBTA Police ☐ Other: A9

AT INTERSECTION: < LOCATION > NOT AT INTERSECTION:

1 1

B1 Route# | B2 Direction | B3 Name of Roadway/Street

At

B4 Route# | B5 Direction | B6 Name of Intersecting Roadway/Street

Also at Intersection with

2 2

B7 Route# | B8 Direction | B9 Name of Intersecting Roadway/Street

9 9

10 10

B10 Route# | B11 Direction | B12 Address # | B13 Name of Roadway/Street

B14 Feet | B15 N S E W | of B16 Mile Marker ___ • ___ or B17 Exit Number

B18 Feet | B19 N S E W | of B20 Route# | B21 Intersecting Roadway/Street

11 11

B22 Feet | N S E W | of B23 | B24 Landmark

3 3

Please Select One of the Following: ☐ **Vehicle 1** C1 ___ # Occupants C2 | ☐ **Hit/Run** C3 | ☐ **Moped** C4

4 4

License # C9 | St C10 | DOB/Age C11/C12 | Reg # C32 | Reg Type C33 | Reg State C34

Sex C13 | Lic. Class C14 C15 | Lic. Restrictions C16 | CDL Endorsment C17 | Veh Year C35 | Veh Make C36 | Veh Config. C37

Operator C18 Last | C19 First | C20 Middle

Owner C38 Last | C39 First | C40 Middle

12 12

Address C21 | C22

Address C41 | C42

City C23 | State C24 | Zip C25

City C43 | State C44 | Zip C45

Insurance Company C26

5 5

Vehicle Travel Direction: N S E W C27 | Responding to Emergency? C28

Citation # (If Issued) C29

6 6

Viol. 1: Ch/Sec/Sub C30 C31 | Viol. 2: Ch/Sec/Sub C30 C31

Viol. 3: Ch/Sec/Sub C30 C31 | Viol. 4: Ch/Sec/Sub C30 C31

Vehicle Action Prior to Crash C46

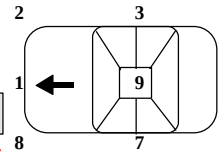
Event Sequence C47 C48 C49 C50

Most Harmful Event C51

Driver Contributing Code C52 C53

Underride/Override C54 | Towed C55

Damaged Area Code: (Circle Up to Three)



0 None
10 Undercarriage
11 Totaled C56
97 Other C57
99 Unknown C58

13 13

Please fill out for operato and all occupants involved Name (Last First Middle)	Address	Age/DOB	Sex	26 Seat Pos.	27 Safety System	28 Airbag Status	29 Airbag Switch	30 Eject Code	31 Trap Code	32 Injury Status	33 Transp. Code	Medical Facility
Operator	See Above	- - - - - - - -	- - -	- - -								
C59 C60 C61	C62-C66	C67/C68	C69	C70	C71	C72	C73	C74	C75	C76	C77	C78

7 7

Please Select One of the Following: ☐ **Vehicle 2** ___ # Occupants | ☐ **Non-Motorist A** Type C5 | Action C6 | Location C7 | Condition C8 | ☐ **Hit/Run** | ☐ **Moped**

8 8

License # ___ | St ___ | DOB/Age ___ | Reg # ___ | Reg Type ___ | Reg State ___

Sex ___ | Lic. Class ___ | Lic. Restrictions ___ | CDL Endorsment ___ | Veh Year ___ | Veh Make ___ | Veh Config. ___

Operator ___ Last | First | Middle

Owner ___ Last | First | Middle

Address ___

Address ___

City ___ | State ___ | Zip ___

City ___ | State ___ | Zip ___

Insurance Company ___

Vehicle Travel Direction: N S E W | Responding to Emergency? ___

Citation # (If Issued) ___

Violation 1: Ch___ Sec___ | Violation 2: Ch___ Sec___

Violation 3: Ch___ Sec___ | Violation 4: Ch___ Sec___

Vehicle Action Prior to Crash

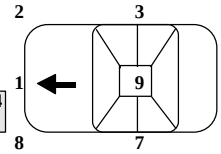
Event Sequence

Most Harmful Event

Driver Contributing Code

Underride/Override | Towed ___

Damaged Area Code: (Circle Up to Three)



0 None
10 Undercarriage
11 Totaled
97 Other
99 Unknown

Please fill out for operator and all occupants involved Name (Last First Middle)	Address	Age/DOB	Sex	26 Seat Pos.	27 Safety System	28 Airbag Status	29 Airbag Switch	30 Eject Code	31 Trap Code	32 Injury Status	33 Transp. Code	Medical Facility
Operator/Non-Motorist	See Above	- - - - - - - -	- - -	- - -								

→ = Direction [1] = Vehicle 1 [2] = Vehicle 2 = Pedestrian

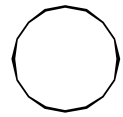
Crash Diagram: ie: → [1] → [2] →

D1

If Crash Did Not Occur on a Public Way:

- ❒ Off-Street Parking Lot
- ❒ Garage
- ❒ Mall/Shopping Center
- ❒ Other Private Way

Indicate North by Arrow



Crash Narrative:

E1

Witnesses:

Name (Last, First, Middle)			Address	Phone #	Statement
F1	F2	F3	F4-F8	F9	F10

Property Damage:

Owner (Last, First, Middle)				Address	Phone #	34-Type	Description of Damaged Property
G1	G2	G3	G4	G5-G9	G10	G11	G12

Truck and Bus Information:

Registration # _____(From Vehicle Section)

Carrier Name H1 _____ Carrier Issuing Authority Code H2[35]

Address H3 H4 _____ City H5 _____ St H6 _____ Zip H7 _____

US DOT #: H8 _____ State Number H9 _____ Issuing State H10 _____ ICC #: H11 _____ Interstate H12[36]

Cargo Body Type Code H13[37] Gross Vehicle Weight H14[38]

Trailer Reg #: H15 _____ Reg Type H16 _____ Reg State H17 _____ Reg Year H18 _____ Trailer Length H19[39]

Hazmat Information:

Placard H20[40] Material 1 digit # H21[41] Material Name H22 _____ Material 4 digit # H23 _____ Release code H24[42]

I1	I2	I3	I4	I5	I6	I7
Police Officer Name (Please Print)		Signature	ID/Badge #	Department	Precinct/Barracks	Date

The Process

The following scenario illustrates the steps typically taken under the current process. The crash data is collected and entered by each law enforcement agency into a system at their site. After the data is entered, it is printed out and mailed to the RMV. Once it is received by the RMV it again goes through a manual data entry process. If errors are found then it is sent back to the agency for correction. As it might be noted, this process involves significant manual intervention including multiple data entry steps which can lead to errors being introduced at several points during the process.

To help reduce some of this manual process and hopefully eliminate some of the potential for errors, a method for electronic submission has been introduced. The electronic submission process allows the data that has been entered by the police to be transmitted directly to the RMV in an electronic format bypassing the need to print out and mail the forms as well as the step of reentering the information once it reaches the RMV. The format that was chosen is called XML, which is an industry standard format for transmitting data electronically. XML is explained in the next section.

The following scenario maps out the new process as it is envisioned by the RMV. The data would still be collected and entered by the law enforcement agency into their local system. After the data entry process is complete and verified, they would click a button and the electronic submission of the crash report would be handled automatically for them. Behind the scenes, a file containing the crash data and a separate file containing the crash diagram image would be produced. These files could either be immediately transmitted to the RMV, or they could be saved and transmitted as part of a larger batch at a scheduled time.

As can be seen, this would eliminate the redundant data entry. It would also eliminate the manual effort needed to print out each crash report and mail it to the RMV. Because of the savings that will result from this process and the potential reduction in errors, the ability to submit crash report electronically should be a great benefit for law enforcement agencies as well as for the RMV.

XML Overview

What It Is

XML stands for Extensible Markup Language. Initially designed solely as a means to transfer data across the web, the designers were so successful that it is quickly becoming the corporate standard for all data transfer. One XML author sums it up well - "As with most technology revolutions, the concept behind XML is deceptively simple - to provide a standardization for specifying the meaning of information exchanged over networks".

XML was created because of the limitations of HTML. HTML allows only a predefined set of tag names and attributes. For example, to make something bold in HTML you would use the tag like this:

This is bold

While excellent for displaying information on a web page, it does not provide the flexibility necessary to effectively represent business data. Using XML, user defined tag names are permitted. These tags are referred to as elements in XML. In addition to the name, an element can contain attributes, which provide more information about the element. Again, where HTML has only a limited number of predefined attributes for each element, XML allows users to define their own attributes which dramatically increases its usefulness for describing business data.

An example of a partial representation of witness information might look like the following:

```
<WITNESS
        WITNESS_PHONE_NUMBER="(617) 555-1212"
        WITNESS_STATEMENT_CODE="1">
        <PERSON
                DATE_OF_BIRTH="01/01/1950"
                SEX="M"
                PERSON_FIRST_NAME="John"
                PERSON_MIDDLE_NAME="Robert"
                PERSON_LAST_NAME="Doe">
        </PERSON>
</WITNESS>
```

It's easy to see how a format such as this has uses beyond just the Internet. XML data is nothing more than formatted text. However instead of using delimiters or positional fields, XML uses tags. A structure file is used to define the format of the data including nesting and cardinality for each element, which greatly simplifies the interpretation of the data on the receiving side. This structure file is called a Document Type Definition (DTD). The DTD is used to specify which elements and attributes are allowed, the order that they should be found, and whether the elements and attributes are optional, required, or can occur multiple times. One common use of a DTD is to help ensure that the XML created by one system can be understood by another system.

Benefits

Simplifies the program - With delimited or positional data files, the application developer has to write potentially complex code to validate and parse the data. With XML, the structure of the data file is defined and provided to a parser, such as one provided by Microsoft or Oracle. The parser uses the DTD to validate and parse the XML. Since this is usually the most complex and error prone aspect of data transfers, XML data transfer is cheaper to develop, easier to understand, and more accurate.

Simplifies data transfer - An XML specification comes with a defined structure. This structure can be provided to anyone using any programming language or environment. Since XML is just text, the structure file facilitates data transfer easily. XML is an environment and language independent means for data transfer.

Provides industry standard structures - Most industries are now publishing their XML standards on a central web site (see www.w3c.org for more information). This even further advances the standards movement because rather than just standardizing across one organization, entire industries are sharing standards. What better way to communicate with third parties than using a common "language"?

Simplifies the display and reading of the data - Parsers and style sheet languages are readily available for viewing XML data in a variety of ways.

Its Use At The RMV

At the RMV, the format for the XML has been structured so that the major divisions of the report are represented as elements, and the specific pieces of data are represented as attributes of those elements. This has been done so that the main divisions are instantly distinguishable and so that the relationships between them can be easily discerned. The individual pieces of data are then kept in context of the element to which they are most closely related.

When an XML file is received by the RMV, it will be parsed to make sure that it meets the basic requirements necessary for it to be considered valid XML. It will also be validated against the DTD. For this validation to succeed, it is required that all of the elements and attributes found in the XML exist in the DTD and that they are in the same order. The nesting of elements within other elements and the cardinality of the elements must also be correct. Only after the XML has been parsed and validated will it be stored in the database at the RMV.

Creating The Data

The XML is one of two pieces of data that should be produced for the electronic submission of crash reports to the RMV; the other is the diagram of the crash. The XML represents the detailed information that has been collected about the crash. The crash diagram is an electronic image file containing a graphical depiction of the crash. These two files should be sent to the RMV at the same time in two separate files. The specifics of each file are detailed in this section.

The XML

The XML should be created and transmitted by the vendor software. Since it is text-based, XML can be created either directly by the software or with the help of an XML parser.

References to use while constructing XML

Reference	Use
Main sections of this document	Overview, context, central source for all electronic submission information
Appendix A of this manual – Mapping of Police Form to XML attributes	Identifies XML elements, attributes, tagnames and data types
Appendix B of this document – the DTD	Defines structure of XML
Appendix C of this document – Sample XML	Visualize desired output

The XML for each crash report should be generated into a separate file before being transmitted to the RMV. These files should be uniquely named within the submitting agency. Therefore both the Boston Police Department and the Cambridge Police Department can name a crash report 12345.xml, but Boston Police Department should not have two different crash reports named 12345.xml. All XML files should have a .xml extension so that they can be easily recognized as XML. It is strongly recommended that all XML be validated against the DTD before being transmitted to the RMV. For more information concerning the DTD, see Appendix B.

The RMV is using the MSXML parser from Microsoft. RMS vendors are free to choose any parser they desire or none at all. However if other parsers are used by the vendors, then differences may exist in the implementation of the XML specifications for the parsing and validation of XML. Some parsers, called non-validating parsers, do no validation at all. Also the same information may be formatted in different ways in an XML document but still represent equivalent views of the data. For these reasons, final testing with the RMV is required before actual reports can be submitted electronically to the RMV (see Testing Procedures section below). Samples of XML for different crash reports can be found in Appendix C. It might be helpful to use information similar to these scenarios for testing before beginning testing with the RMV.

The Crash Diagram

Image files should be produced and transmitted in JPEG format. JPEG is a compressed image format that was developed by the Joint Photographic Experts Group. It is considered a “lossy” format since the compression does somewhat degrade the image, but usually in ways that are not easily detectable by the human eye. This format was chosen because it produces a much smaller file than many other formats and any details that might be lost should not have a significant impact on the overall quality of the diagram.

The image files should use the same name as the XML file with which they are associated, but they will use the .jpg filename extension to designate them as JPEG files. The images themselves may use any color depth, but they should not exceed 120Kb in size. It is important that the image file, if it exists, be transmitted to the RMV together with the XML file. Image files will only be processed if there is a corresponding XML file. If the XML file is processed before the image file is received, then it may be difficult to associate it with the XML at a later time.

Encryption

Since these files will be sent over the public Internet, the option of encrypting the files for their transmission is currently under consideration. The details concerning the type and method of encryption is still under investigation. An addendum to this document will be distributed once these have been determined.

Data Mapping and Edits

The mapping of XML to Police Form fields is attached as an Excel file for ease of manipulation in Appendix A. The datatype required for each XML attribute is listed after each attibute. While all XML is in string form, the expected datatypes show what will be inserting into our database. Also contained in Appendix A is a listing of state and town codes to be used.

All XML attributes that correspond to codes on the police form overlay should be taken from the overlay. By using the codes directly from the police overlay it will help ensure consistent data.

Since the RMV's system is not used directly by the law enforcement officers, we omitted many potential edits that simply would not make sense for us to catch. For example we do not flag an error when we receive a crash time of 2am and a weather condition of "sunny". The best time to catch an edit like this, a cross edit, is at the point of entry. In the interests of receiving the best possible data, we encourage RMS vendors to include any additional edits or cross edits they deem appropriate.

Below is a list of element and attributes required by the DTD:

- DTD_VERSION_NUMBER
  This attribute will be used to maintain backwards compatibility and to allow the system to determine which version of the DTD the XML was created using. The value of this attribute should initially be set to "1", and the Crash Data Support team will send out notification if it needs to be changed in the future. It is important that the value of this attribute is set properly to ensure that the XML documents are processed correctly.
- CITY_TOWN_CODE
- CRASH_DATE
- CRASH_TIME
- POLICE_OFFICER_FIRST
- POLICE_OFFICER_LAST
- POLICE_AGENCY_TYPE_CODE
- POLICE_DEPARTMENT

Below is a list of data edits not enforced by the DTD but required by the RMV.

- Must have at least one vehicle involved in crash
- Must have location information
- Should have both the owner and operator information filled

Electronic Submission Procedures

How and Where to Send Data

Once the crash data has been collected and the XML and JPEG files have been created, they should be sent to the RMV via FTP. Each department will be given a unique login ID and password, as well as their own directory in which to put the files that are transmitted. This will allow the RMV to easily identify the originator in cases where files are received that cannot be processed for some reason.

The FTP site to which files should be transmitted is located at **crashdata.rmvpartners.com**. It is necessary that the XML be transmitted in ASCII format and that the JPEG files be transmitted in binary format. This is to ensure that unwanted conversions are not made to the files by the FTP process that might result in corruption of the files.

Error Reporting

During the electronic submission process, there are still areas where errors may occur while trying to accept the files into the system. Examples of these errors would be if the XML is not well-formed, if the XML is not valid according to the DTD, if the image file is invalid, etc. In these situations, there needs to be a means to report these errors back to the department that submitted the report.

Individual departments have a choice to receive report errors by either e-mail or FTP. During the integrated testing phase (see Testing Procedures below) the department should determine which notification method best suits their needs. If they choose e-mail, an address will be collected from the department and all e-mail notification will be sent there. If the FTP delivery option is chosen the error report will be placed into that departments directory on the RMV FTP site. This is the same location where the departments upload the electronic reports for RMV processing. When an error occurs while processing an electronic crash report, an error notification containing the name of the file that contains the error and the nature of the error will be sent back via the delivery method chosen. For reference, the original file will also be included as an attachment. When an error report is received, the department should correct the error or contact their vendor to have the error corrected. The report should then be resent with the correction at which point the RMV will attempt to process it again.

If an XML file is readable, contains well-formed XML, and is determined to be valid using the DTD, then it will be accepted into the system. If an error is found in the information after the point when the file was initially stored in the RMV CDS system, then it will be sent back using the regular send back procedures. An example if this would be if the location information was blank.

Testing Procedures

When a vendor has completed the programming necessary for submitting electronic reports, it should contact the RMV (see Contact Information) to begin integrated testing with the RMV systems. This is the final step necessary before actual electronic crash reports can be submitted to the RMV.

When a request is received to begin integrated testing, the RMV will send paper crash report forms containing specific information to the vendor. The information from these crash reports should be entered into the vendor system and the XML and image files should be created and electronically transmitted to the RMV FTP site. The files will then be validated and feedback will be provided. This feedback will include information regarding the validity and completeness of the data found in the files that were received. Any adjustments can be made, and the files submitted again if necessary. Once the generated files are approved, the vendor software can begin to be used to submit actual electronic crash reports.

The vendor software should also be tested at each site after installation to ensure that the site is properly configured to handle the creation and transmission of the XML and JPEG files. At this time the department will be given its private login ID, password, and directory for accessing the FTP site. The department may also be required to provide an email address for error reporting purposes (see Error Reporting section above) depending on the delivery method chosen. Things to check for at each installation include having the correct FTP address, generation of uniquely named files, connectivity to the internet, correct FTP login ID and password, etc.

There is no intention to make this procedure any more complicated than is absolutely necessary. The RMV will work with the vendors as well as the individual departments throughout the entire process to make sure that the implementation of crash report electronic submission is as successful as possible.

Contact Information

For any questions about Vendor Electronic Submission Guide please contact the RMV using one of the following means. If you would like to speak to someone, please provide your phone number in an email or letter and someone will contact you.

Email
Karen.Perduyn@state.ma.us

US Mail
Registry of Motor Vehicles
Karen Perduyn, Accident Records Supervisor
One Copley Place
Boston, MA 02116

Appendices

Appendix A – Mapping of XML To Data Dictionary/State-Town Codes

The Mapping of XML to Police Form fields is attached as an Excel file for ease of manipulation. This mapping can be used to link the paper form to the XML.

The columns in the mapping file are defined as the following:

Map #	The number of the field on the paper police form
XML Element	The tag name for the element in the XML
XML Attribute	The attribute name from the XML
DB Data Type	The expected date type of the value
Comments	Miscellaneous information out the XML element

A list of the State and Town codes used for XML generation are also provided.

Appendix B – The DTD

The DTD is attached in electronic format. This is the actual DTD that is being used by the RMV. It is strongly recommended that the DTD be used to verify the XML that is created for testing purposes as well as to validate each XML file before it is transmitted to the RMV. This will find any errors in the XML formatting and reduce the time and effort involved processing send backs.

Appendix C – Sample XML

Several sample XML files have been attached in electronic format to be used as examples to better understand how the XML should be structured in different situations. They can also be used as a basis for creating some of the various test scenarios to validate that the XML is being created correctly. Please note that different XML can be created from the same data and still be valid and equivalent. This is primarily due to the different ways that empty elements can be formed using XML.

The sample XML files have been included in electronic form. The major features of each of the samples are described below.

Sample 1
cdssample1.xml

- occurs at an intersection
- 2 vehicles
- 1 with driver and passenger
- 1 with driver and injured passenger
- 2 non-motorists
- 2 witnesses

Sample 2
cdssample2.xml

- occurs at an intersection
- 2 vehicles
- 1 with driver and passenger
- 1 truck with trailer, hazmat, and driver
- 2 damaged property

Sample 3
cdssample3.xml

- occurs not at an intersection
- 3 vehicles
- 1 with driver and 3 passengers
- 1 with driver only
- 1 moped
- 3 non-motorists
- 3 witnesses
- 3 damaged property

Sample 4
cdssample4.xml

- occurs at an intersection
- 1 vehicle with driver only and citation