

Recommended Vehicular Emergency Incident Data Exchange Format (October 2002)

Introduction/Problem Statement

Currently, when Telematics Service Providers (TSPs), such as OnStar and ATX Technologies, receive location and/or automatic crash notification (ACN) data from a vehicle into their call centers, they must verbally relay the information to a single emergency response agency (i.e. 9-1-1, or police or EMS dispatch). The process today would typically involve a single phone call to a Public Safety Answering Point (PSAP), without any associated data. Emergency response agencies beyond the PSAP are generally not notified by voice or data of the incident by the TSP. However, a wealth of data exists at the TSP that can be very valuable if in the hands of the right public safety agencies. The challenge is to be able to transmit the data from the TSP to public safety.

Current generation ACN is a very valuable service for public safety, often meaning the difference between life and death for vehicle occupants; advanced ACN (predictive crash data) will be even more so. However, there is currently no system in use daily by TSPs today for electronically forwarding that location and crash data from a TSP's internal data system to the multiple agencies for which it would have value. Several things need to be in place for this to happen. TSPs need to have the capability to transmit data out to public safety. Public safety agencies need to have the capability to receive the data into their internal communications systems. These are critical issues that are being addressed, but most important, is the need for a standard format for the data that flows between TSPs and public safety agencies. Without a standard data set, best thought of as a common computer language, there can be no seamless data flow to and among multiple sources about an incident.

The nature of Mayday and ACN is that a wide variety of parties, from 9-1-1 to EMS to the hospital, should be (and could be) involved in creating, sharing and using crash and related data. Thus, multiple public safety entities, including, but not limited to the PSAPs, have indicated that they would like to receive a data notification about incidents in their jurisdiction in real-time whenever possible. Therefore, there is a critical need to develop a standardized data set for ACN and other vehicular emergencies. This was first recommended during the National Mayday Readiness Initiative (NMRI) which stated that "efforts needed to be made to develop the capability to send crash data from TSPs to multiple public safety agencies" and that a key to this is the need for a uniform ACN data exchange recommendation between TSPs and public safety agencies.

The ACN Data Set Working Group was formed specifically to address this need and has completed the final draft recommendation for this data set in XML format. It is a recommended data exchange format. It is not a data transmission protocol/standard. How TSPs decide to send data, and how agencies collect data, transmit data, link it to voice, handle it within their various agencies, etc. are all critical issues, but not ones that

were addressed in this effort. However, this common data set will enable multiple methods of data transfer and handling.

This document is a description of the background, goals, process and documentation of the recommended vehicular emergency incident data set.

Goals of the Working Group:

The goals of the ACN Data Set Working Group were to:

- Develop recommended XML-based data set for ACN/Mayday data
- Ensure input from all key affected stakeholders, public and private
- Widely publicize new data set to Medical/EMS and public safety communities, and to industry
- Discuss interface with and delivery of data to multiple destinations and utilize defined ACN data set in multiple simulations and field tests

Example Uses of the Data Set

When the process started, the data set was narrowly focused on ACN data from Telematics Service Providers (TSPs). As the work of the ACN Data Set Working Group progressed, the data set was revised to also include data from other data providers, including Commercial Vehicle Operators (CVOs), Roadside Assistance Providers, Public Safety Answering Points (PSAPs), and other public safety agencies. Thus the data set is now referred to as the recommended Vehicular Emergency Incident Data Exchange Format. Despite the semantic change, the initial goals for an ACN data set have been met.

In drafting the data set in this manner, the functionality of the data set has been expanded in several ways beyond enabling a simple one-time data feed from a TSP to a public safety agency. The data set is now designed for use by TSPs (e.g. OnStar, ATX Technologies), but it can also be used by other entities that have vehicular emergency incidents, including hazmat carriers. Also, the data set is designed to allow other entities beyond the original data provider to publish data into the “system” using the same message set. The data set allows for a data provider, such as a TSP, to submit data to one or more agencies about an emergency incident. That could be the end of the data flow, or it could be the first message of many, depending on how local agencies decide to use the data set. For example, a TSP could submit the original message into the system and a responding EMS agency could add data gathered at the scene to the same message and then add further data to the message en route to the hospital. Also, an additional private sector company could potentially add data to the message, such as a personal medical data provider that has medical data on one or more of the vehicle occupants.

As mentioned above, the efforts of the ComCARE ACN Data Set Working Group did not focus on specific data transmission protocols or the optimal way to route the actual data to public safety agencies. The goal of the group was to determine all of the fields that could be useful within the data set, define each of the elements and their unique formats, and present the information as a recommendation. With that being said, it seems appropriate to list some potential uses of the data set from a very high level to help illustrate how the data set can be used. For simplicity, all examples below pertain to a TSP that has received an ACN notification:

Example 1: *9-1-1 ALI database is used as the delivery mechanism over the existing ALI database to PSAP trunking*

In this example, once the TSP advisor determines that emergency assistance is required, the TSP advisor identifies the appropriate 9-1-1 PSAP to notify and provides the 9-1-1 PSAP operator with the incident number/key. The TSP advisor establishes a connection with the appropriate

9-1-1 ALI DBMS Service Provider and transmits the appropriately formatted data set to the ALI/DBMS system. (This could be done using the services of a third party) The ALI/DBMS system stores the data set and awaits the request for data from the 9-1-1 PSAP utilizing the incident number/key associated with the ACN incident. The 9-1-1 PSAP operator inputs an automatic/manual request to the ALI system for the ACN data associated with the incident number/key provided by the TSP and the ALI/DBMS system delivers the TSP stored ACN incident number/key data to the requesting 9-1-1 PSAP into the PSAPs existing communications system (this could include a Computer Aided Dispatch (CAD) system). Due to limitations in current ALI database capabilities, **all** fields in the data set cannot be received into an ALI database. However, any elements within the data set that are currently in use within the 9-1-1 system for enhanced 9-1-1 (e.g. lat/lon, date, time, etc.) could be delivered to an ALI database. Additional elements within this data set could also be stored in any unused fields within an ALI database.

Example 2: *TSP pushes ACN data to a web enabled, GIS-based emergency incident web site*

In this example, once the TSP advisor determines that emergency assistance is required, in addition to contacting the appropriate local agency via teleconference, the TSP advisor pushes the data to an emergency incident web site. (This could be a direct push or routed through a third party) The emergency incident web site could be national, or it could simply display current incident information for a city, larger region, or state. The website would be hosted on a server(s) constantly checking to see if new messages have been posted, and then displaying the text of the message and the location on a web-based map. Authorized users would be able to see incidents in their jurisdiction and be able to view other incidents in the region on a common map. As the incident progresses, users would be able to publish up-to-date information and see the latest status information from other authorized users in real-time.

This web site is intended as an interim and supplementary measure to provide a relatively immediate solution to new sources of data coming from outside public agencies (e.g. Telematics, hazardous materials and other trucking incident information). Agencies would still use their existing and planned communications and information technology infrastructure for themselves and to cooperate and share information with other agencies. The website is intended to support a graphic exchange of data, not supplant existing systems. However, for agencies that currently do not have any internal system capable of receiving messages from outside sources, this option allows them to view emergency incidents in real-time as long as they have a browser and an Internet connection.

Example 3: Direct feed to internal agency communications systems (use of an intelligent message broker)

In this example, once the TSP advisor determines that emergency assistance is required, in addition to contacting the appropriate local agency via teleconference, the TSP advisor pushes the data to an intelligent message broker (IMB) using the vehicular emergency incident data set, which forwards the data directly to the appropriate local agencies who have previously configured their communications systems to receive such data feeds. For example, a PSAP could receive, parse and display the XML message directly into their CAD system via a TCP/IP link if it received the message from an IMB. A hospital or EMS or any other agency could do the same.

The IMB is a message switch that receives data from multiple external sources (e.g. telematics service providers, hazmat carriers, etc.) and routes information to and among end users (e.g. emergency response and management agencies) and applications. The IMB could also be used to route data to an ALI database (example 1) or an emergency incident web site (example 2).

Example 4: TSP pushes data to central "server" which stores data

In this example, once the TSP advisor determines that emergency assistance is required, in addition to contacting the appropriate local agency via teleconference, the TSP advisor pushes the data into a database(s) within a central server (this could be at a national, regional, or state level) that stores the data. Once the data resides at the server, public safety agencies with proper authorization can access the information and download it into their existing communications systems. For this approach to be effective, all public safety agencies that are within the jurisdiction of the incident and have the authority to access the server need to be notified that the data is available.

*The above examples are listed simply to provide a better picture of how the data set can be used from a very high level. There are surely additional ways to transmit the data as well. The Vehicular Emergency Incident Data Set is designed to allow multiple transmission methods to be used. In fact, it is quite possible that a combination of two or more of the above methods will be used simultaneously to route data to multiple public safety agencies in a given region. The ACN Data Set Working Group acknowledges that

there are multiple ways to use the Vehicular Emergency Incident Data Set, and in no way advocates one method over another.

Process

The ACN Data Set Working Group met via teleconference on an as needed basis and was open to individuals and companies with experience or knowledge in ACN or the standards setting process. Typically the full working group met monthly during the initial phase of the effort. Once subcommittees were formed and the workload increased, each subcommittee met an average of two times per month.

Input was requested from all participants to define a data set with optimal data fields and to best interface with multiple users. All efforts were made to reach out to groups who have already defined standards that may apply to the work being done by this group. Wherever possible, existing data formats were taken into consideration and incorporated into this effort.

The first phase of the process focused on developing a comprehensive list of data elements for the data set. The group formally published the initial list of data elements for comment and incorporated such comments into an XML dtd (document type definition) file. The XML dtd was a list of all elements within the data set, but it did not indicate specific formats and units of measurement that are required for each element. The next phase of the working group was to define specific data formats and relationships among the elements and move the document from a dtd file to an XML schema.

To that end, the ACN Data Set Working Group formed three subcommittees to address particular sections of the data set. The subcommittees were as follows:

Incident Data Subcommittee- This group addressed general incident information, such as latitude and longitude, source information, and public safety agency information. Barb Thornburg, NENA Data Committee Chair, chaired this subcommittee.

Vehicle Data Subcommittee- This group addressed vehicle data of all types, including commercial vehicles, such as vehicle type, license number, airbag data, seatbelt data, etc. Jasmin Jijina, General Motors/OnStar Senior Engineering Associate, chaired this subcommittee.

Medical and Crash Data Subcommittee- This group addressed the medical and crash data elements of the data set, such as occupant breathing, occupant age, delta velocity, crash pulse, personal medical data, etc. Dr. Greg Mears, EMS Medical Director for the State of North Carolina and board member of the State EMS Directors chaired this subcommittee.

Each of the subcommittees met numerous times to revise data elements within the section of the data set the subcommittee was addressing and to define the specific data formats for each element. Once each subcommittee was done with their section, the three

sections were combined into a complete data formats/data dictionary document and presented to the full working group for approval. An XML schema was then created using the data formats document. The detailed data formats and XML schema are provided in this document.

Next Steps

As the initial work on a draft vehicular emergency incident data set has been completed, the ACN Data Set Working Group is now in the process of presenting the work to numerous other public safety and medical organizations, government, and companies that are interested in the topic and/or the standards setting process. The Working Group plans to work with these groups to get their input and endorsement of the data set and begin discussing implementation.

While the efforts to date have focused solely on developing a draft data set recommendation, there are numerous other activities that need to occur as well that are related to, and hopefully enhanced by this data set. For example, while there is a broad list of elements in the data set, which are the critical elements that public safety agencies want to receive today? This of course may differ based on the type of agency that answers the question as the data needs of police, fire, EMS and a hospital may vary within the same city, let alone across the country. Also, while the data set enables the transmission of data in a standard format, the Working Group did not discuss the infrastructure and technological needs within the public safety community to receive and share the data from private sector companies and amongst themselves. This certainly is being addressed now and will continue to be by many different groups. The ComCARE Alliance plans to continue facilitating discussions among the many different groups that are interested in the subject.

As companies and public safety agencies begin implementing the data set in various tests, simulations and field trials, the ComCARE ACN Data Set Working Group will play an organizational role in bringing together the different groups that have structural, implementation or any other issues with the data set. In the near future, the Working Group will facilitate discussions to update/revise the data set on an as needed basis. However, in the future, the goal is to find a permanent home within a formal standards setting body.

About the Extensible Markup Language (XML)

The Vehicular Emergency Incident Data Set has been developed in XML format. XML is the most widely accepted format for exchanging structured data between different computer systems in the world today. It is an open, non-proprietary standard shared by all major software providers. Recommendations for XML are developed and refined by a consortium of users and maintained by the World Wide Web Consortium (W3C).

(<http://www.w3c.org/xml/>)