ENTERPRISE Transportation Pooled Fund Study TPF-5 (231)

ENTERPRISE

Assessment of Telematics Service Provider Data Feeds

PROJECT SUMMARY REPORT

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Prepared by

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Project Champion

Angie Kremer, Michigan Department of Transportation, was ENTERPRISE Project Champion for this effort.

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1. Introduction

ENTERPRISE established a working relationship with General Motors OnStar[2] during the Multi-Jurisdictional Mayday (MJM)[3] project in the late 1990s to explore how automatic collision notification (ACN) technology could enhance roadway safety and traveler information if data from such systems were available to emergency medical staff and transportation agencies. In the years since, OnStar has worked diligently with the Association of Public Safety Communications Officials[4] (APCO) and the National Emergency Number Association[5] (NENA) to establish parameters around the crash data that they can provide. Using those parameters, OnStar has published a data stream for emergency services and transportation agencies to use.

In addition to the safety and convenience services offered by OnStar, similar telematics services are now being offered by other automobile manufacturers and even insurance providers. Given the evolution and potential value of crash notification technology, this project explored the data potentially available from OnStar and similar telematics service providers, assessed the value of such data for transportation operations, and worked with ENTERPRISE member agencies to understand their potential needs for this type of data. The results of this effort are presented in this summary report.

2. Telematics Landscape

There are a growing number of telematics services and providers available to enhance travel safety and security. OnStar was the pioneer in telematics services in the late 1990s and today nearly every major manufacturer offers services on their new vehicles. Offering safety and security services initially, today's services have expanded into an array of convenience and entertainment features. For example, Ford provides a service called SYNC[6] that syncs your mobile phone with your vehicle to provide various safety functions, and Hyundai offers Assurance Connected Care[7] as a standard feature for three years on most of their new vehicles. Most of today's major auto manufacturers offer similar services as highlighted in Figure 1. Insurance companies are also providing similar safety and rate reduction services such as Drive Safe & Save with In-Drive[8] offered by State Farm and the Allstate Drivewise[9] program.

Figure 1 Telematics Offerings by Auto Manufacturer

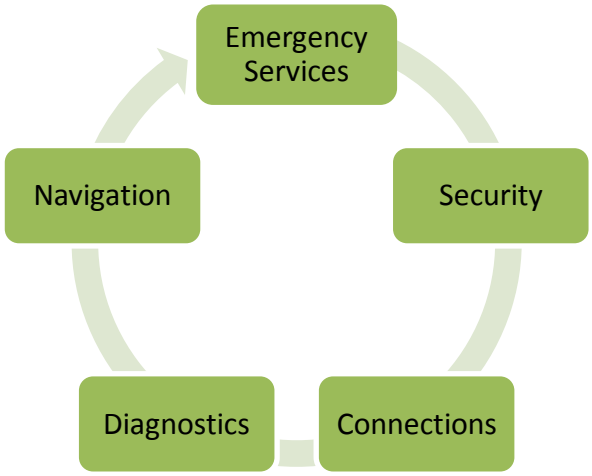
General Motors OnStar®
Ford SYNC®
Hyundai Assurance Connected Care®
NissanConnect®
HondaLink®
Mercedes mbrace®
BMW ConnectedDrive®
Audi connect®

After a decade of already dramatic change, the telematics landscape is on the cusp of being significantly changed again. In early February 2014, the National Highway Traffic Safety Administration (NHTSA) announced a decision to move forward with vehicle-to-vehicle (V2V) communication technology for light vehicles. Many of the features offered in this area focus on enhancing vehicle safety, enhancing driver and vehicle awareness to address potential crash situations such as passing on a two-lane road or detecting vehicles approaching an intersection. Following analysis of the data gathered from a year-long pilot program, NHTSA is expected to begin working on a regulatory proposal that would require V2V devices in new vehicles in a future year. This announcement will likely further encourage the market to continue moving toward greater vehicle automation. This is also bound to increase competition among manufacturers and expand the variety of telematics services offered in the vehicle. The remainder of this section highlights select telematics service providers, the features they offer and the potential for data available from their services.

2.1 General Motors OnStar

General Motors launched OnStar in 1997 to provide safety and convenience services to owners of GM vehicles. It quickly became a benchmark for in-vehicle safety, security, communication and convenience services. Today, there are over 16 million OnStar subscribers and over 200,000 crash scenes have been responded to with the assistance of OnStar advisors.

Figure 2: OnStar Services



The OnStar system is fully integrated with the vehicle's onboard computer and this allows the system to perform a variety of convenience and safety services as illustrated in Figure 2. The functions associated with these services are accessed via custom buttons on the vehicle's rearview mirror or console touch screen as illustrated in Figure 3. The three buttons provide access to hands-free calling, OnStar advisors and emergency services. Although several services may be accessed manually in this fashion, others are automatically activated under certain conditions. For example, if a vehicle is involved in a moderate to severe crash, OnStar will automatically place a distress call to the customer service center where an OnStar advisor – available 24/7 – will determine if the vehicle occupants require further assistance. The OnStar advisor will initiate a three-way telephone call with the appropriate public safety answering point (PSAP) in the following emergency situations:[10]

- Vehicle crashes with or without injuries
- Emergency medical calls
- Stolen vehicle or missing person calls

- Miscellaneous calls of an emergency nature

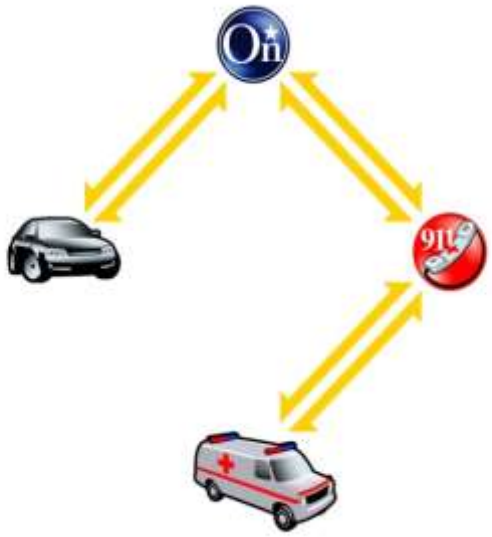
Figure 3 In-Vehicle Activation of OnStar. Images courtesy of OnStar.

OnStar verbally shares much of the information that they receive once contact is made by telephone with a PSAP. Such information typically includes incident details, whether or not there are injuries and location (X/Y coordinates) information. OnStar may also be able to provide PSAPs with information about air bag status, change in velocity, direction of impact or multiple impacts, indication of roll over and even an indication of injury severity. In 2009, OnStar announced an Injury Severity Prediction algorithm that was developed based on the findings of an expert panel from the Centers for Disease Control and Prevention (CDC). Using crash details, the algorithm determines the likelihood of a vehicle occupant being severely injured.[11] This information can be particularly beneficial when determining if basic or advanced life support ambulance service may be needed for response and patient transport or when determining what type of trauma center care may be needed.

As Next Generation 911[12] (NG911) capabilities are further implemented by PSAPs throughout the United States, OnStar will be able to share more crash information and deliver it in other ways. NG911 will enhance the 911 telephone system to create an Internet Protocol (IP)-based system that allows digital information (e.g., voice, photos, videos, text messages) to flow seamlessly from the public, through the 911 network, and on to emergency responders.[13] PSAPs having these capabilities will allow for even more information about a crash to be sent in advance of responders being dispatched to the scene which can be extremely valuable when responding to crashes in isolated areas where response times are naturally longer. After receiving crash information from OnStar, connections to further emergency services are typically facilitated by the PSAP. Figure 4 provides a general illustration of how the vehicle, OnStar, PSAPs and other emergency services work together to provide automatic crash response today.

Of the services that OnStar offers, emergency services such as automatic crash response are likely to generate the most relevant data for transportation agency use in traveler information and operations. For example, receiving notification of crash locations and potential severity would allow agencies to determine if traffic control or roadway cleanup are needed and to quickly inform other travelers of the potential impact on their travel as they approach a crash location.

Figure 4 OnStar Crash Response Process. Image courtesy of OnStar.



Data from OnStar's automatic crash response service was initially made available for this purpose in the late 1990s through pilot tests with the Minnesota Department of Transportation and several other states participating in the Condition Acquisition and Reporting System[14] (CARS) transportation pooled fund program. Through this effort, the data that OnStar receives from the vehicle describing a crash is sent to a national router for further delivery to other agencies.

The data is published using the Vehicular Emergency Data Set[15] (VEDS) standard that was released in 2004 and updated in 2012 by a joint APCO/NENA data standardization work group. VEDS provides useful and critical data elements and the schema set needed to facilitate an efficient emergency response to vehicular emergency incidents. The VEDS uses the Extensible Markup Language (XML) open standard and conforms to the National Information Exchange Model (NIEM) as a common data exchange format to provide a consistent method of data exchange. The intent of the VEDS document is to establish a uniform data set for the transmissions and collection of advanced automatic collision notification data that will be used in data transfer pilots/demos by telematics service providers and target recipient agencies including PSAPs, emergency responders and medical facilities capable of providing trauma level patient care. The analysis of the data collected will assist in identifying the efficiency and effectiveness of the dataset when used by pilot participants and whether further modifications to the VEDS are necessary.[16]

In October 2013, additional information was gathered for this report from OnStar staff[17] regarding the current state of their services and the availability of their data for potential use by transportation agencies. Departments of transportation in several states have received the OnStar data at different times over the past several years. Some of their experiences will be presented in more detail in the next version of this summary report. Few states are still using the data today and there has been very little evaluation of the value of the data to transportation agencies. There have also been challenges with PSAPs receiving information from OnStar and then receiving duplicate information from the transportation agencies using the data feed. This has created confusion at times for PSAPs that may not be accustomed to receiving crash information from either source.

There have also been continuous challenges with getting more detailed crash data to PSAPs and then on to other emergency service providers after that. Emergency medical services in the field and staff at a trauma center could benefit significantly from the Injury Severity Prediction data gathered by OnStar as it would help them determine what type of equipment to dispatch on scene and what type of specialty medical staff to have available upon patient arrival at a trauma center. Although there have been pilot projects to explore how to bridge this gap, a viable avenue for sharing this information still is not available today. OnStar is hopeful that the eventual implementation of NG911 will offer greater promise.

It is also unclear how the data from OnStar's emergency services fits within the growing context of Connected Vehicle and the latest announcement from NHTSA regarding V2V communication. Vehicles are changing dramatically and in the very near future they will have the capability to not only gather but also transmit a significant amount of data about their surroundings.

2.2 Ford SYNC

Image courtesy of Ford.

Launched in 2007, SYNC has six million subscribers in the US and Canada. SYNC technology connects a motorist's smartphone with Ford vehicle multimedia entertainment and information systems to provide a variety of safety and convenience services in the vehicle, including 911 assistance, hands-free calling, entertainment, navigation and more. Ford has kept their telematics model simple. The SYNC connection with the vehicle is limited in that there are no imbedded sensors in the vehicle and data is further limited to the on board event recorder which belongs to the driver.

There is no charge to use SYNC and it is standard on essentially all Ford models and it does not utilize a third party call center to facilitate calls or process data. This dramatically lowers operational costs and allows Ford to offer 911 Assist services complimentary for the life of the vehicle. To enable the service, users simply register their vehicle online. In the event of an airbag deployment, SYNC initiates a hand-free call to 911 that allows vehicle occupants to talk directly with emergency dispatchers over the vehicle audio system. SYNC can also provide latitude and longitude via a computer generated voice. Furthermore, drivers have the option to activate additional 911 features that could send more data (e.g. medical conditions) to dispatchers in an emergency. However, most customers are still very protective of their location data.

Also in October 2013, Ford staff[18] was interviewed for additional information about SYNC. Staff explained that Ford is exploring how it might provide additional crash information, such as front or side impact or number of safety belts fastened, but their ability to send this additional data is currently limited. Some of the concepts they have considered include sending emails or text messages but there are also some limitations on the volume of data that can be transmitted via a BlueTooth connection. Ford has worked with NENA and APCO to identify additional information that would be useful from the

vehicle when responding to crashes in particular. They have participated in VEDS development and have also worked with the CDC over the years to understand emergency response needs and develop, if possible, an algorithm that would use crash data to determine trauma severity. Much of the work that has gone into developing data formats and algorithms, however, cannot be fully leveraged until NG911 is implemented.

In relation to this project, it is important to reiterate that Ford SYNC does not house any data from the vehicle. This effectively eliminates the potential for transportation agencies to leverage any data related to crashes or other incidents that may impact other travel on the road.

2.3 Hyundai Assurance Connected Care

Hyundai's telematics service, Assurance Connected Care, utilizes a call center model to deliver a variety of safety and convenience services. Blue Link is the vehicle communications system that connects the vehicle via the Blue Link mobile app, web application or in-vehicle system. Assurance Connected Care provides three years of the Blue Link Assurance package and comes standard on select Hyundai vehicles. There are additional service packages that add security and convenience services such as theft protection, navigation and much more.

Image courtesy of Hyundai.

Assurance Connected Care offers ACN, SOS emergency assistance, enhanced roadside assistance, monthly vehicle health reports, maintenance alerts, automated diagnostics and other vehicle service related features. ACN services are activated by an airbag deployment during which a signal containing vehicle and location information is transmitted to the call center where an operator will attempt to establish voice communication with the vehicle occupants and forward information to emergency services as needed.

Figure 5: Blue Link Mobile App. Image courtesy of Hyundai.

Assistance with other emergencies may be requested by pressing the SOS button in the vehicle. This also sends vehicle information and location to a call center operators who can offer assistance based on the nature of the emergency. Similar vehicle and location information is also transmitted to the call center when the Blue Link button is pressed in the vehicle. The Blue Link smartphone app as seen in Figure 5 also provides a variety of vehicle diagnostic and convenience services to the vehicle owner.

Based on the nature of the Hyundai deployment approach, it is possible that data may be available and potentially accessible for transportation agency use.

2.4 State Farm In-Drive

The State Farm is one of the latest insurance providers to offer discounts to their customers based on safe driving. Their In-Drive service offers aftermarket telematics features along with incentives for insurance discounts. The In-Drive system consists of a communicator and visor clip as shown in Figure 6. The communicator simply plugs into the vehicle onboard diagnostics port allowing the system to monitor vehicle diagnostics such as an airbag deployment during a crash. The system is designed to work across a variety of vehicle makes and models manufactured after 1995. The visor clip provides an interface for the driver to other services and it can serve as a speakerphone to provide hands-free cell phone features.

Figure 6: State Farm In-Drive system. Image courtesy of State Farm.

The In-Drive service offers:

- Stolen Vehicle Location Assistance
- Maintenance and Service Reminders
- Recall Information
- Eco-Drive Data
- Risk Category Comparison
- Driver Behavior Tips
- Geobloc™ Display
- Miles Per Gallon Status
- Vehicle X-Ray Diagnostics
- Hands-Free Integration with Mobile Phone
- Smartphone Mobile Web View
- Monthly Vehicle Health Reports via Email

State Farm offers these features through a range of In-Drive packages for their customers. The In-Drive Guardian package also offers safety and security features that provide automated incident alerts, manual emergency services and roadside assistance. These services are provided with the support of call center agents who can assist with connecting customers with emergency services when needed.

Offered by an insurance provider versus auto manufacturer, In-Drive is one of several aftermarket products that will enhance the driving experience, as well as roadway safety. Because the system interfaces with a call center, it is possible that is retains some level of data that could potentially be used for transportation purposes.

Table 1 summarizes the telematics service providers explored through the research for this project. It presents a high-level summary of the key features provided by each, as well as an indication of the potential availability of ACN data. Those ranked as “High” already provides some level of data. Those ranked “Medium” have the potential to offer data and those ranked as “Low” are unlikely to have ACN data because of limited vehicle integration of a lack of the related safety and security features that deliver ACN.

Table 1: Telematics Service Provider Potential for ACN Data

Telematics *Service*	Safety and Security Features	Infotainment Features	Potential for ACN Data
General Motors OnStar®	X	X	High
Ford SYNC®	X	X	Low
Hyundai Assurance Connected Care®	X	X	Medium
NissanConnect®		X	Low
HondaLink®		X	Low
Mercedes mbrace®	X	X	Medium
BMW ConnectedDrive®	X	X	Medium
Audi connect®		X	Low
State Farm In-Drive®	X	X	Medium
Allstate Drivewise®		X	Low
Progressive Snapshot®		X	Low

3. Agency Experiences with Using Data

Since the OnStar service was launched in the late 1990s, transportation agencies have been intrigued with the potential of using such data to enhance the ability to detect incidents and inform travelers of potential roadway impacts. The introduction of new traveler information services like 511 in 2000 only served to further increase agency interest in how to obtain more incident data that could then be passed along to travelers and in turn help the agencies better manage the transportation network.

There were several development and operational test projects in the early 2000s sponsored by transportation agencies to develop and test interfaces between the data offered by the OnStar system and agency systems. The Minnesota and Colorado departments of transportation, along with the I-95 Coalition, sponsored such projects. In Minnesota, an interface with CARS was developed in the Mayday Plus[19] project that engaged state police, local PSAPs, Gold Cross Ambulance Service and the Mayo Clinic. In addition to the technical aspects of developing an interface between the OnStar data and CARS, the project explored institutional issues associated with third party call center operators facilitating the exchange of information between crash victims and emergency dispatchers. This project and the Colorado and I-95 Corridor demonstrations were the focus of ENTERPRISE's initial interest in ACN systems. Through the ENTERPRISE MJM project discussions about establishing common data formats and protocols began. In the ensuing years, organizations such as NENA and APCO became more involved in the issues and that eventually led to the development of the VEDS data format.

OnStar has also maintained a data feed from their service that has been used on a very limited basis by transportation agencies. Based on the relationship established in the Minnesota Mayday Plus project, OnStar has continued to work with Castle Rock Consultants, the developers of CARS, to make their data available to transportation agencies. Castle Rock established a server that receives data from OnStar. At that point, a polygon is applied to the data to sort it geographically and send it on to those states that choose to receive the data. For those states receiving the data through CARS, the CARS-Mayday module further processes the data to create a CARS event that can be displayed for dispatchers to confirm and

then release to various traveler information systems. For other states receiving the data outside of CARS, Castle Rock only applies the geographic filter to distribute data to the relevant state in the same format it is received from OnStar. This remainder of this section highlights the experiences in Oregon and Idaho as they have continued to use or pursue the OnStar data through this data feed.

3.1 Oregon Department of Transportation

The Oregon Department of Transportation (ODOT) has used the OnStar data since 2008, primarily for managing incident clearance.[20] Although the data is received from the feed supported by Castle Rock, ODOT has integrated it with their computer aided dispatch (CAD) system. They have developed filters to receive data about incidents involving airbag deployments on state highways only. When such an incident is received, it goes into a queue and when an operator opens it, the incident goes live as an unconfirmed event. Once the operator acts on it, the event can be confirmed and further shared with the Oregon State Police CAD system.

In 2011, ODOT reviewed the OnStar incidents logged by their system to determine how many OnStar incidents had been received. There were approximately 80,000 incidents in the log and of those 86 came from OnStar. Automated notifications from the OnStar data feed made up 54 of those incidents while the remaining events were phone calls from OnStar call center staff or customers reporting something along the road.

When asked about maintaining integration with the OnStar data feed, ODOT staff shared that there had been occasional changes to the data formats that have caused their CAD system to temporarily lose their connection to the data. The most recent data disconnect lasted for nearly six months, during which there were no complaints received from the ODOT operators. When staff was further asked to share their impressions of the value of the OnStar data, they primarily noted that very few calls are received and many of the incidents are not on state roadways. There were also comments about false alarms or situations when staff had been dispatched to check out an incident only to discover that a response was unnecessary. Some dispatchers felt they were getting more OnStar customer button pushes for non-emergencies than notifications of true incidents. The general consensus was that the data could be useful if incidents could be more accurately filtered to those that truly needed response and if the incidents could also be more accurately located on roadways in relation to jurisdictions. Staff further commented that the system should not be expanded unless these issues can be addressed.

3.2 Idaho Transportation Department and Idaho Department of Health and Welfare

The Idaho Transportation Department (ITD) works with the state's Department of Health and Welfare (DHW) to provide transportation dispatch services and their partnership created a unique interest in the OnStar data.[21] Beyond using the data to address transportation needs, DHW saw potential for the data to be used in managing emergency response and even medical care following a crash.

In 2007, the agencies began working with Castle Rock to further develop an interface between CARS and the OnStar data that would allow them to use additional crash information (e.g. change in vehicle velocity) included in the data feed. The CDC also released a report in 2008 on the benefits of ACN for

triaging trauma patients. Advanced Automatic Collision Notification and Triage of the Injured Patient notes that ACN "…shows promise in improving outcomes among severely injured crash patients by:

- predicting the likelihood of serious injury among vehicle occupants,
- decreasing response times by pre-hospital care providers,
- assisting with field triage destination and transportation decisions, and
- decreasing time it takes for patients to receive definitive trauma care."[22]

Idaho wanted to use the crash severity data in conjunction with an urgency algorithm originally developed by The William Lehman Injury Research Center at the University of Miami School of Medicine.[23] The crash data and algorithm could help dispatchers identify crashes most likely to have time critical injuries and then determine the level of response (e.g. air med, trauma facility) that may be needed. The CARS-Mayday module was envisioned to further process crash data and apply the algorithm to determine injury severity. The agencies also wanted to implement a connection between CARS and the Idaho Trauma Registry[24] which exists to collect data needed to analyze the incidence, severity, causes, costs and outcomes of trauma in Idaho. Information in the registry is used for emergency medical system improvements, prevention programming and research, as well as prioritizing health resource allocations. Figure 7 illustrates the mockup emergency response screen that dispatchers would have used to view additional crash data.

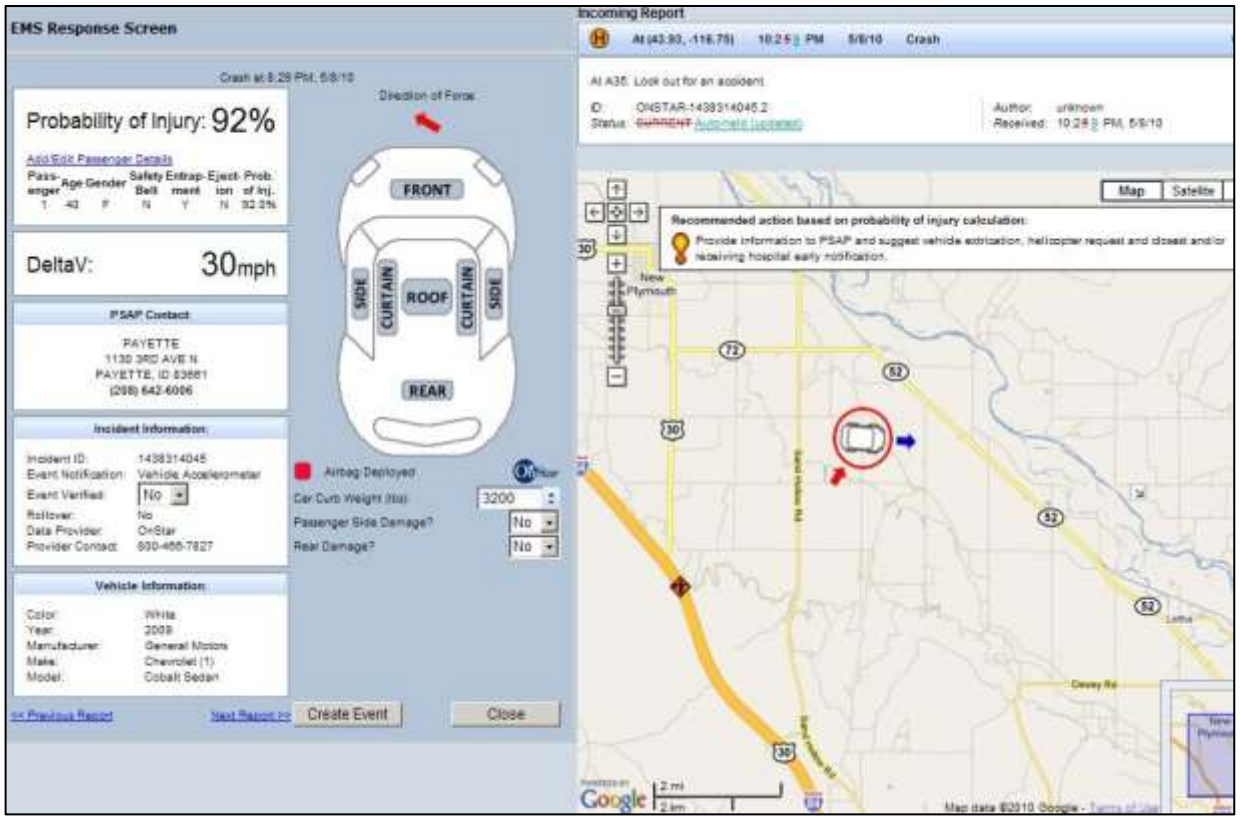


Figure 7: Mockup of Idaho EMS Response Screen with ACN Data

In September 2012, Idaho discovered that they were not receiving vehicle make, model and description data. OnStar confirmed that they had changed their vehicle description coding and estimated that it would take several months to further modify it. In early 2013, OnStar requested a meeting with Castle Rock and Idaho to discuss recent staffing changes and how their data was being used or planned to be used in Idaho. During the meeting, OnStar expressed significant concerns over the use of their data in the University of Miami injury prediction algorithm because it had not developed with General Motors vehicle systems and they requested that Idaho discontinue using the OnStar crash data in the algorithm. Idaho concluded that there was limited value in simply receiving the OnStar incident notification through CARS without the crash data and the ability to estimate a severity of injury score. As a result, Idaho has discontinued their efforts. They do, however, remain interested in the potential availability of crash data from the growing number of telematics service providers and they continue to see tremendous value in the application of such data to further enhance traveler information and emergency response.

In addition to the Idaho emergency dispatch integration, a demonstration project was also conducted in Missoula, Montana in 2012 by the University of Montana and CUBRC. It examined the context of routing ACN messages from OnStar into the emergency response system and demonstrated the successful receipt of simulated ACN information by the Missoula PSAP and the sharing of that information with emergency medical and hospital staff. Additional information about this demonstration is available in the report, "Automatic Crash Notification Project: Assessing Montana's Motor Vehicle Crash and Related Injury Data Infrastructure."[25]

As the availability of data from vehicles continues to grow, it is natural for there to be sensitivity around how the data is used, especially if crash survivability is dependent upon it. With the continued growth in telematics and progress with initiatives like V2V safety applications through USDOT's Connected Vehicle program, these issues will need to be further examined in the US. In the meantime, a June 13, 2013 press release from the European Commission announced that they have "…adopted two proposals to ensure that, by October 2015, cars will automatically call emergency services in case of a serious crash. The "eCall" system automatically dials 112 – Europe's single emergency number – in the event of a serious accident. It communicates the vehicle's location to emergency services, even if the driver is unconscious or unable to make a phone call." Their estimates suggest that eCall could speed up emergency response times by 40-50% and save up to 2,500 lives a year.[26]

4. Potential Value of Data for Transportation Operations

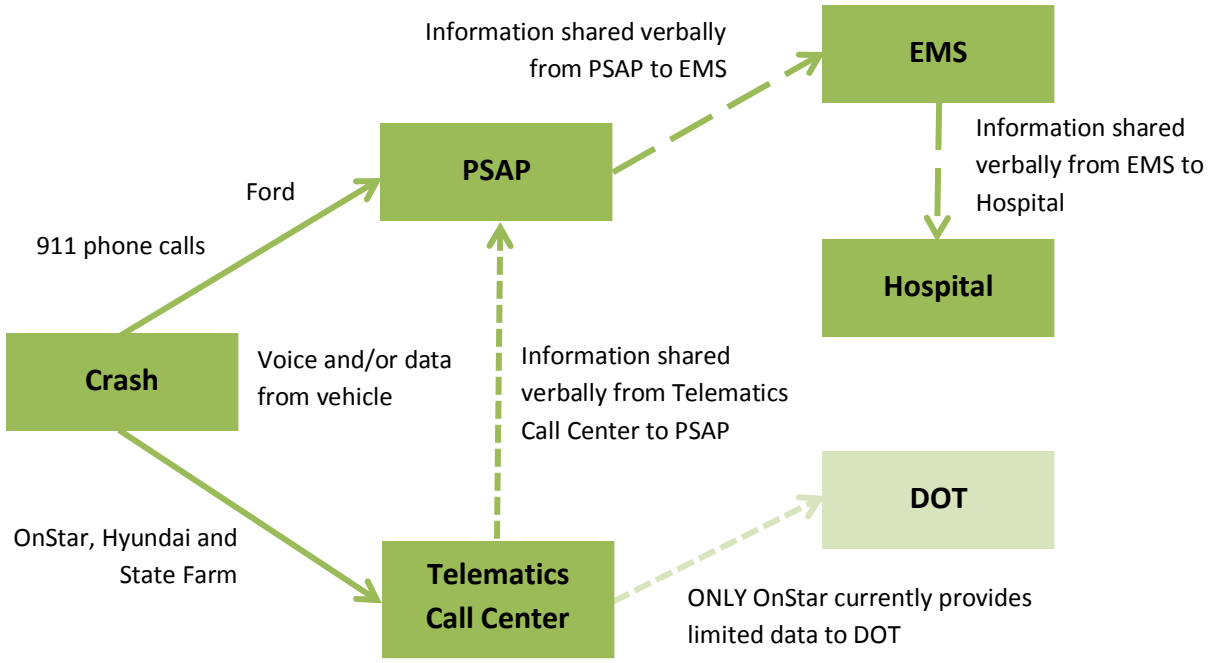
The CDC and others have released studies confirming the value of ACN in triaging injuries and managing emergency response for the care of crash victims. The increased crash survivability resulting from improved patient care positively impacts the value of ACN as it relates to transportation safety programs. However, it is more difficult to estimate the value of ACN-related data for other transportation operations such as incident management and traveler information. Value to these operations can be estimated to some degree based on the limited experiences of those agencies highlighted in this report. Availability of the data, a provider's capability of sharing it and an agency's capability of receiving it also factor into the potential value of the data. Although the featured providers in this report offer ACN-related services to their customers as illustrated in Table 2, only OnStar can currently provide data such as change in vehicle velocity and indication of a rollover that could be used for emergency response or other purposes.

Table 2: ACN-Related Data by Featured Telematics Service Providers

	On-Star	Ford Sync	Hyundai Assurance Connected Care	State Farm In-Drive
Automatic Collision Notification (ACN)	**X**	**X**	**X**	**X**
Basic Vehicle Data				
• **Make/model**	X	X	X	X
• **Location**	X	X	X	X
After-Crash Data				
• **Air bag status**	X	X	X	X
• **Number of safety belts fastened**	X			
• **Change in vehicle velocity**	X			
• **Indication of rollover**	X			
• **Direction of impact or multiple impacts**	X			

OnStar is also the only provider at this time that has developed a process for sharing their data with other systems, including the systems used by a DOT. Even so, there are currently very few agencies capable of accessing or choosing to access this data. As illustrated in Figure 8, any ACN-related data that may be available is currently transmitted verbally from telematics call centers to PSAPs, and any data that may be further shared with EMS or hospital staff is also shared verbally. Formats for exchanging crash data have been developed by leading emergency response organizations to support information sharing but those exchanges are not yet happening among those directly involved with emergency response, let alone DOTs. It is possible that the continued growth in telematics service providers and ACN data, combined with the evolution of NG911, will eventually make it possible for this data to be shared more directly with dispatchers, emergency medical services and trauma room physicians, as well as transportation agencies.

Figure 8: ACN Data/Information Flow Today



The availability of data and the capability to exchange it certainly impacts the potential value of ACN data for transportation operations. To further speculate on value, two broad transportation needs for this type of data were identified – incident management (IM) and traveler information (TI). Transportation agencies often provide maintenance and traffic control services during an incident, particularly in high traffic areas where quick clearance is critical to maintaining both mobility and safety. Transportation agencies also provide information to travelers about potential delays caused by crashes, stalled vehicles and other conditions that impact travel. Agencies could potentially use ACN-related data to identify crashes for both traveler information and incident management purposes. Table 3 provides a summary of how current and potential future data from telematics service providers could apply to these particular DOT needs. Automatic notification of a crash and its location are the two most valuable

data points that could be directly used by an agency for both needs. The other data could be valuable but would require additional analysis to make it useful for traveler information and incident management. An operator could use data regarding direction of impact or multiple impacts, for example, to get a general indication of how severe a crash is and that could further indicate how long the crash may impact traffic. Although no providers currently offer photos or videos from a crash scene, if such information were available in the future it could also be used by operators to determine how long an incident might last.

Table 3: Applicability of Data to Meet DOT Needs

Automatic Collision Notification (ACN)	**IM, TI**
Basic Vehicle Information	
• **Make/model**	IM
• **Location**	IM, TI
After-Crash Data	
• **Air bag status**	IM
• **Number of safety belts fastened**	
• **Change in vehicle velocity**	IM
• **Indication of rollover**	
• **Direction of impact or multiple impacts**	IM, TI
Potential Future Information	
• **Likelihood of injuries**	
• **Indication of injury severity**	
• **Photos**	IM
• **Video**	IM

Agencies have also viewed telematics services as a potential source of data to support maintenance related needs. In theory, knowing if windshield wipers are on or if anti-lock brake systems are activating could provide a general indication of road conditions. Two important factors influence the potential availability of this data. First, telematics service providers are protective of their customers' privacy and understandably so in light of public sensitivity to data abuse and misuse. If certain data is not directly necessary to provide a customer service in the vehicle, it is not as likely that providers would entertain the possibility of providing such data to other parties. The second factor to consider is, the growing market for third-party data and the precedent that has been set by agencies paying for such data. It is reasonable to assume that telematics service providers recognize the marketability of selling data from their vehicles and are carefully weighing that against their need to protect customer privacy. As with crash related data, there are still relevant issues with availability of the data, a provider's capability of sharing it and an agency's capability of receiving it that would also need to be addressed.

5. Conclusion

This summary report presented the results of ENTERPRISE research of the data potentially available from telematics service providers, agency experiences with using the data for transportation operations, and the potential transportation needs and value for this type of data.

Telematics have evolved significantly since ENTERPRISE first became interested in ACN back in the late 1990s. During that time many new services have launched through auto manufacturers and aftermarket services have also be introduced by insurance companies. The CDC, NENA, APCO and other health and emergency service associations have also acknowledged the value of ACN data for enhancing crash response and patient care.

Despite the growing market and support for using ACN to improve emergency response, very few agencies are equipped to accept and leverage such data. NG911 offers some prospect of changing that in the future but still has a long way to go before implementation is complete nationally.

Although there has been some limited use of ACN data for incident management and traveler information purposes, the value of it is uncertain. This is especially so when considering the variability of data available from the providers and their capability and willingness to consistently share it.

Appendix A: References

[1] ENTERPRISE Transportation Pooled Fund TPF-5(231) Program. http://www.enterprise.prog.org/.

[2] General Motors OnStar. http://www.onstar.com/.

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[18] Ford staff included: Tom Artushin, tartushi@ford.com; David Hatton, dhatton5@ford.com who manages the global assistance services group; Mark Cuddihy, mcuddihy@ford.com; Wendy Hause, whause@ford.com.

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