Telematics Task Force

White Paper

Telematics Data Definition

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Telematics Task Force

Defining Automotive Telematics Data

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The purpose of this paper is to begin the process of developing a definition of what telematics data the independent auto care industry needs from embedded vehicle manufacturer telematics systems in order to ensure consumers have viable and competent options for the service of their vehicle.

There are many kinds of data stored on and traveling around vehicle networks. Data types can be classified and include:

Driver personal data - includes passwords, acct #s, phone numbers, logins, geolocation data, personal history, biometrics, driver behavior, etc.

In Vehicle Infotainment – includes songs, movies, games, maps, applications and other third party copyrighted material.

Forensic information - data used by car companies, legal entities and insurance companies, etc. to determine driving parameters following a crash. It also can include any information gleaned from a vehicle following any crime where the vehicle can reveal evidence, even the driver's personal data.

Inspection data - includes emissions and safety related data and codes used for official periodic inspections.

Diagnostic data - Codes and PIDs used to diagnose vehicle faults. This also includes prognosis information including oil quality monitors and other data used to predict or communicate service scheduling.

Vehicle Manufacturer (VM) proprietary information - includes onboard software, some security related information as well as calibration information. Calibration files contain vehicle configuration data, for example, upper and lower operating limits, code setting thresholds and other data unique to a specific year, make, model and engine configuration.

Intelligent Transport Systems (ITS) Information - includes GPS, radar, sonar, yaw and accelerometer information used for Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) communications.

This is not an exhaustive list, and there are likely other classifications of data or data types not listed above.

There have been efforts to define 'Use Cases' that help demonstrate the need for particular types of data for different applications. This has been primarily to help define standards-body tasks rather than to determine a legal framework regarding data rights, but the effort is valuable in determining both.

Use cases that have been identified include:

Remote diagnostics & prognosis	DIY diagnostics	Fleet maintenance & Management	Software development access
State Emissions Tests	State Safety Tests	Motor Club Trip Planning	Local shopping
Infotainment	ITS services – crash avoidance – traffic mitigation	Teen Driver & other tracking programs	Rental Car and other fleet management
Emergency services	Insurance company good driver programs	Roadside assistance	Event data recording
VM engineering access	Remote reprogramming		

As technology advances and companies innovate the use of data from vehicles, it is likely that this list will continue to grow. However, from the auto care industry's perspective, we can help narrow the list to those items that are important to the maintenance and repair of a vehicle and therefore important to preserving competition and consumer choice.

Fundamental Right to Data

Accessing information about and from the vehicle has been a fundamental element of vehicle diagnosis and repair since the early 1980s. The Gore-Waxman amendment to the Clean Air Act of 1990 requires that a core set of emissions related data is available on all vehicles sold in the United States after January 1, 1996. These systems are referred to as second generation on-board diagnostic (OBD II) systems. OBD II systems have standardized the data link connecter (DLC), protocols and terminology related to emission-related data in order to aid in diagnosing and repair of the increasingly complex systems needed to reduce tailpipe emissions.

The core set of vehicle data required by the Gore-Waxman amendment to the Clean Air Act consists of approximately 229 standardized Parameter IDs (PIDs) and around 800 related standardized Diagnostic Trouble Codes (DTCs).

Proprietary Vehicle Data

Since the introduction of OBD-II, automakers have leveraged vehicle computer systems diagnostic capabilities by creating large numbers of manufacturer specific PIDs and DTCs that address *all* vehicle systems, not just the emissions-related items required by law. Today, there are literally thousands of proprietary PIDs, Due to the complexity of modern automobiles, nearly

16,000 DTCs have been defined by SAE, and more are being added on a regular basis as vehicle systems proliferate.

Vehicle manufacturers make some of this information available by licensing information access protocols and data to companies involved in developing service information and diagnostic tools. The Equipment and Tool Institute plays a key role in brokering these relationships and providing a single source for information. The vehicle data included in licensing agreements varies significantly between vehicle manufacturers. This arrangement allows independent repair facilities and vehicle owners to buy equipment and information needed to service the electronically controlled vehicle systems.

Examples of the diagnostics and data that may be made available via specialized tools using licensed protocols and data include:

- Supplemental engine and emissions
- Climate control system
- Anti-lock braking system
- Transmission
- Cooling system
- Cruise control system
- Stability control
- Electric door and window controls
- Warning lights other than the MIL
- Tire pressures
- Vehicle lighting

If a franchise dealer has the ability to perform certain repairs using VM equipment and information, aftermarket tool and information companies must be given the information necessary to create tools and information systems that emulate those of the VM tools and information. There are some exceptions to this rule of thumb, especially pertaining to vehicle security and there are many examples where some information is being withheld even when agreements are in place.

Positive Progress

The aftermarket and the VMs have made significant progress with the ASA-Automaker Agreement signed in 2002 and the passage of the Massachusetts "right to repair" (RTR) legislation enacted in 2013. Similar to the ASA agreement and the Mass right to repair law, a subsequent Memorandum of Understanding (MOU), finalized between the automakers and the aftermarket on Jan. 15, 2014, extends to all 50 states and Washington D.C., a new system for fair and reasonable access costs for tools, information and training beneficial to the independent repair business. Additionally, the MOU provides a roadmap to eventual non-proprietary access to vehicle diagnostic systems, which is expected to lower costs and barriers for use by the automotive aftermarket industry. While most provisions of the agreement take effect immediately, the provisions to standardize non-proprietary access take effect for Model Year 2018 vehicles, or Jan. 2, 2019, whichever comes first.

Again, the rule of thumb is: if the authorized service provider gets certain information through factory tools and information, VMs must provide the information aftermarket tool and information providers need to emulate that capability. Except this time there is a caveat. Provisions in the law and the agreement exclude telematics information.

More than Vehicle Repair

The advent of telematics will provide real time access to extensive data from vehicles, making remote diagnostics and "prognostics" possible in the not-too-distant future and which will change the landscape of the repair industry.

An increasing number of automakers are equipping their vehicles with telematics systems that can transmit vehicle information wirelessly to a remote location. General Motor's OnStar is perhaps the best known of these systems, but nearly all vehicle manufacturers have some form of this technology in production or ready to debut. Many of these systems employ a dedicated mobile data link built into the vehicle, but others use the driver's smartphone as the data transmission channel. It is likely that over half of the cars on the road will be connected in this way by 2025.

Combining the vehicle data access of OBD-II with a telematics system creates some new and unique opportunities for the vehicle, customer, and service. A few examples include:

- Customer convenience/information – provide services such as remote door unlock, vehicle health reports, turn-by-turn navigation, etc.
- Customer contact when maintenance due indicator is illuminated – schedule a service appointment
- Customer contact when the "Check Engine" light illuminates – explain the nature of the problem and actions that should be taken – schedule a service appointment
- Remote diagnostics – monitor vehicle operation and contact customer when a DTC is set that does *not* illuminate the "Check Engine" light – explain the nature of the problem – schedule a service appointment
- Remote updating of vehicle software to resolve known issues or add new features – eliminates the need to take a vehicle in for this type of service
- Data analysis on thousands of vehicles to identify failure trends (prognostics) – contact customer for repairs before a breakdown occurs – schedule a service appointment

We recognize the opportunities that telematics presents to drive car owners back to franchised dealers even after the warranty has expired. We seek to have the same access and marketing opportunity that dealers have to maintain relationships and offer the same level of service to our mutual customers' benefit.

Many innovative services and features are made possible through the collection of vehicle data. Data can include everything from GPS information to vehicle speed, radio usage, and how many people are in the car at a given time.

Collection and analysis of large sets of information for useful trends is arguably the next transformative technology focus for the automobile. Business will seek to leverage vehicle data available to develop and market innovative services to consumers. Strong competition can help to improve the services offered to consumers.

Though many of the connected car functions provide convenience and safety to the vehicle owner, some of this data is very personal and owners may have concerns over who gets the information, how it is stored and how it is used. Such concerns led the Alliance of Automobile Manufacturers and the Global Automakers to issue in November of 2014 "Consumer Privacy Protection Principles". These principles required participating car companies to provide notice to their customers that certain data is being collected from their vehicle wirelessly and that the car owner has the right to "opt-in" to permitting their vehicle's information to be shared with third parties by automakers. While the notice provisions could provide important information regarding their vehicle's telematics system, it does not appear that the principles provide any control to motorists as to which third parties can receive their personal information.

There also is a concern that performing some remote functions is unsafe and therefore need to be restricted. Accordingly, we will assume not all data from the car is necessary or even safe for third parties to access. Possible examples of data that might be excluded from access include:

1. Data generated by an event data recorder as defined in 49 CFR 563.5:
2. Non-repair-related bi-directional communication with or reprogramming of vehicle control modules, including, but not limited to airbags, roll over sensors, anti-lock braking systems, traction control or any other modules that are configured by a supplier or at the vehicle manufacturer's production facility and pair that component to a specific nameplate;
3. Actuation of vehicle components while a vehicle is in motion
4. Direct memory access to vehicle computers
5. Non-repair-related erasing information from vehicle systems or components
6. Access or control of vehicle safety systems in such a way as to disable the vehicle or alter the operation of vehicle components or systems to endanger a driver, vehicle occupant or other road users
7. Other data to be defined and described after further discussion

Solutions

Solutions for accessing vehicle data are both near and long-term. Two options have emerged as likely paths to success.

- **Software Development Kit (SDK)** – A near-term option is to utilize existing software development kits as a proof of concept. Several VMS, (GM, Ford, Honda, and BMW) have made SDKs available to third parties. While the existing SDKs do not address all use cases (like full diagnostics for repair), a proof of concept that the VM can and will share vehicle data beyond infotainment applications is important
- **Continued exploration of a common vehicle gateway** – Engaging with aftermarket partners and VMs in the development of a standardized vehicle data format. This is a long term solution involving SAE, ISO and the vehicle production cycle.

The "if the dealer gets it we should get it" rule of thumb has served the industry well, and there is no reason it cannot be continued into the telematics age. In fact, for the most part the rule does not have to change at all except for the addition of two new concepts.

1. There is no fundamental difference between the diagnostics the VMs have agreed to provide, hooking a scan tool to a vehicle connector, and remote diagnostics, hooking up to a vehicle via radio signal, whether that signal travels 3 feet or 3,000 miles.

2. If the dealer has VM access to prognostics through telematics. Aftermarket suppliers need to have access to the same information so that it can be provided to aftermarket repair facilities. Prognostic data includes things like diagnostic streams or reports, odometer, oil change indicator status, fuel usage, and many more.

Conclusion

The data needed to diagnose vehicle systems is the same whether accessed through traditional cable connections or wireless connections. In addition, wireless connections can be either local (in shop) or remote (Telematics). In any case the information the aftermarket needs is the same as what VMs have already agreed to provide through a wired connection with one exception.

Telematics brings with it prognostics, a kind of diagnostic process based on vehicle data that can only be gathered using telematics. The MOU that was signed one year ago states: "with the exception of telematics diagnostic and repair information that is provided to dealers, necessary to diagnose and repair a customer's vehicle, and not otherwise available to an independent repair facility via the tools specified in… above, nothing in this agreement shall apply to telematics services or any other remote or information service." We submit that prognostic information derived from telematics is diagnostic data not provided through the vehicle diagnostic connector. In the final analysis we find that the definition of the telematics data we need includes any data provided directly or indirectly to a car owner or a new car dealer through telematics systems for

the purpose of performing maintenance and repair on vehicles. This includes any diagnostic, prognostic, or maintenance related information generated by a telematics transaction.

It is our desire to look for productive ways to work with VMs to continue to raise the level of service offered to our mutual customers. We feel that telematics is the natural evolution of this process. In addition to augmented diagnostic abilities we also recognize that prognostic, diagnostic and maintenance warning capabilities built into these vehicles should be such that vehicle owners can decide who will receive this data and ultimately who will service their vehicles.

About the Telematics Task Fore

The Task Force is committed to empowering vehicle owners to direct the service of their vehicles to locations of their choice, and to ensuring that those locations have complete access to fully documented vehicle diagnostic data supplied via current and future data portals, including hard-wired connections such as the SAE J1962 connector and on-board or hand-held device telematics systems. For additional information on the Task Force, email telematics@autocare.org .