IMS
Connecting Insurance

WHITE PAPER

COMPARING SMARTPHONE, SELF-POWERED, OBD, BLACK BOX, AND OEM EMBEDDED DEVICES

Data Collection Technology Comparisons

Executive Summary

By delivering accurate, timely data about driver behavior and vehicle operation, telematics has thrived and is now an important part of the auto industry and the insurance market. As new data-connectivity solutions emerge—offering innovative ways to collect and use driving data—insurers and consumers have a wider array of selections from which to choose. Selecting the right technology solution depends on a variety of factors—some financial and some related to how well the technology meets real-world challenges and addresses each insurer's different and unique market/data requirements in daily practice. Solutions that deliver promised capabilities must also be measured in terms of cost effectiveness. Equally important, providing a positive user experience is essential to any successful solution.

Insurance telematics and usage-based insurance (UBI) have grown substantially over the last few years, and the technology choices for implementing insurance telematics programs have become more diverse. Techniques for collecting, consolidating, and analyzing the data to assess driver behavior continue to be refined as the technologies for accomplishing this evolve and improve. With so many available technology choices, one question is frequently asked by insurers: What data collection option best suits the programs we want to offer drivers?

This paper compares the relative strengths and trade-offs of five leading data collection solutions used in telematics programs: smartphone, self-powered, OBD, black box, and OEM-embedded devices. A knowledgeable telematics service provider (TSP) can explain the various options and help you select the technology to meet insurance program goals and requirements. Ideally, the best TSPs should be equipped to support the full range of options without trying to lock you into one data collection method or another. Both insurers and policyholders can benefit from flexibility in adapting to shifts in the industry and accommodating the capabilities of whatever technology best meets a given challenge.

The perspective provided in this paper draws on field research performed by IMS through pilot programs and actual deployments with customers, as well as surveys and research conducted by organizations in the telematics industry.

1. Insurance Telematics Data Collection Techniques

The insurance industry has always been data-centric, but telematics adds extra dimensions of volume, timing, and large-scale processing to the equation. A substantial challenge exists:

the workload involved in capturing, processing, and analyzing information from telematics devices on millions of vehicles. Telematics devices typically produce data records which can include G-force values, date, time, speed, location, cumulative trip mileage, fuel consumption, and more. The quality, scope, and precision of the data depend on the type of telematics device that is capturing and transmitting it. The ultimate goal is to use the driver and vehicle data collected, combined with insurance claims data and other information to perform analyses to accurately identify, predict, and influence driver risk and claims losses.

From the perspective of the insurer, particular kinds of information are vital to assessing and grading driver behavior—regardless of the equipment that collects that data. Each of the data collection solutions discussed in this paper—smartphone, self-powered, OBD, black box, and OEM embedded devices—have varying pros and cons. Rather than favoring any one approach over another, this paper discusses how each solution has certain strengths and weakness that may make it effective for one type insurance program, but perhaps not another. We recommend that you consult an experienced TSP to investigate and evaluate trade-offs and capabilities of all technology solutions – and never assuming you are forced to one or a limited number of data collection options.

Primary Data Collection Options

Brief descriptions of each of the primary data collection options follow:

- **Smartphone data collection:** Telematics solutions based on smartphones avoid installation costs while providing reasonable data accuracy and they can also provide a variety of custom features through apps. These solutions offer a straightforward path to telematics data collection through the smartphone's data transmission capabilities, including cellular data and WiFi.

  With the diversity of smartphone makes and models, as well as different sensors, algorithms must be applied to normalize the data that is collected, stored, and analyzed. Once the data is normalized and the other considerations addressed, smartphone telematics solutions can be successfully incorporated into a variety of telematics insurance programs.

- **Self-powered data collection:** Devices in this category include the battery-powered Bluetooth-enabled beacon, which is often mounted on the dashboard or windshield. Deployment costs are minimal, making this a cost-efficient choice for mid-range to mainstream insurance telematics programs. Bluetooth connectivity with devices, however, can be a challenge for some users.

  Flexible self-powered options include both devices that communicate directly with servers using their own cellular modules, in addition to devices that tether with the

smartphone and use the smartphone's cellular capabilities to get data to the server.

Tethered smartphone connections can increase customer engagement and flexibility. Vehicle identification data is captured and can be harvested later, even when a smartphone is not present in the vehicle. Data transmission can also be performed using the smartphone communication and data plan capabilities, which eliminates the need to set up separate communications through the Bluetooth hardware.

Self-powered devices that communicate directly with servers minimize customer interaction, however, there is a tradeoff with a smaller density and duration of data that can be captured and transferred with this option.

> **OBD data collection:** The OBD-II interface, which has been a federally mandated feature on all US vehicles since model year 1996, is one of the earliest technologies for vehicle telematics data collection. The equivalent standard in Europe is called EOBD (European On-Board Diagnostics). For simplicity, this paper will refer to OBD throughout, with the understanding that the term also includes EOBD.

As a long-running, well established solution in the marketplace, permanently plugged-in OBD devices have a proven track record and high level of acceptance. Driving data is typically transmitted directly over cellular networks for processing. This moderately priced option can be combined with smartphone connectivity to enhance driver engagement.

> **Black box data collection:** As the de facto standard for UBI programs in the UK, black box technology captures and delivers a stream of data from active vehicles using a cellular service for communication. A fixed electronic device—the black box—securely mounted inside the vehicle ensures that accurate trip and collision data is obtained and transmitted to a data center.

Popularity of this approach is especially high in regions where vehicle theft is rampant, offering a proven, tamper-resistant method for prompt recovery of stolen vehicles. However, these aftermarket devices must be professionally installed in vehicles, leading to higher installation costs.

> **OEM embedded data collection:** Data extracted directly from built-in vehicle sensors eliminates aftermarket installation costs, but a lack of standardization among OEMs has impeded market acceptance. Expect to see innovative programs developed over time to take advantage of these built-in capabilities, which could lead to highly accurate data capture, new ways to monitor driving, and integration with driver-assistance features that could improve safety and reduce crash frequency and severity.

Although this form of data collection for insurance telematics is relatively uncommon today, a TSP equipped to integrate with embedded car systems and make sense of the disparate data will be able to tap into the benefits for both insurers and their customers as the technology matures.

Data Collection Considerations

Telematics programs differ widely. Selecting a data collection solution should be based primarily on client needs and program objectives, as well as the options that best support the solution. For example, commercial programs present very different needs and requirements than a personal lines program. A telematics solution focused on lead generation and customer acquisition will, by nature, differ from a more comprehensive implementation (and might initially use a smartphone for collection and then later replace it with an OBD device or a self-powered device using Bluetooth). Other factors—such as differences in the characteristics of certain consumer segments—can weigh into the evaluation and influence the selection of the most appropriate telematics data collection approach to meet the challenges.

2. Advantages and Challenges of Data Collection Technology Options

Selecting a data collection technology that is well suited for a telematics program requires understanding the inherent advantages and challenges of the in-vehicle enablers—each of the data collection technologies—and then evaluating them against the goals of a given insurance program, as covered in the following sections.

Costs for all forms of telematics data collection are steadily declining as technologies improve. Smartphone solutions are generally more cost-effective, but the more expensive solutions often include features that are essential to a particular insurance program, such as more accurate vehicle data and theft recovery features. The most important point to remember is that cost should always be considered in terms of the types of data captured, the overall user experience, and the capabilities of a particular solution to meet insurance program demands. Choosing a data collection solution without considering these points—on the basis of cost alone—can be counterproductive.

Smartphone Solutions: Key Considerations

Smartphone popularity as a tool for telematics data collection stems from the flexibility of these devices, which are well suited to the insurance telematics business model. Current smartphones feature a number of built-in sensors and capabilities that equip them to collect data for telematics analytics. The typical, current-generation smartphone includes a precision global-navigation satellite system (GNSS) receiver, accelerometers for detecting G-forces, and multiple data connectivity mechanisms.

Smartphones can also be combined with the other kinds of data collection devices to extend and enhance program capabilities. For example, a smartphone can be combined with an OBD device to provide driver coaching, targeted communications, and reminders—direct from the insurer. This same capability can be added to self-powered and black box solutions, and to augment data from OEM embedded solutions with complementary data from smartphones.

These capabilities can be complemented with additional sensors, such as a magnetometer, proximity sensor, and ambient light sensor. Used as the core of a telematics solution, the smartphone offers the advantages and challenges shown in **Table 1.**

Table 1. Advantages and Challenges of Smartphone Solutions

SMARTPHONE ADVANTAGES	SMARTPHONE CHALLENGES
Inexpensive alternative: The solution relies on a device that the individual already has and the provider does not assume this cost. Vehicle installation is not required, so the solution can be quickly implemented with no additional hardware.	**Limitations in vehicle identification and trip detection:** Solutions must include a mechanism to ensure that the correct trip data is captured on a regular basis – with only that data used for the purposes of telematics program inclusion and scoring.
Ease of use: Consumers are accustomed with using and downloading apps. This minimizes the challenges encountered by policyholders if additional devices or service enhancements need to be installed.	**Deliberate fraud:** The possibility of deliberate fraud is a significant challenge to address. Drivers can potentially disable the app or turn off the phone to hide risky trips from the data record
Portability: Smartphones allow driving behaviors to be assessed among several different vehicles used by the driver. This differs from an OBD solution, in which several different drivers may be using the same car, but typically only the car, not the driver, is assessed.	**Regulatory approvals:** Obtaining necessary approvals for smartphone data collection from those regulatory bodies involved in vehicle insurance is necessary in some cases.

Custom apps tailored to smartphone capabilities: Custom apps offer a way to provide training, coaching, social interaction, and useful advice to drivers through their smartphones.	**Battery life:** Optimizing smartphone battery life requires balancing telematics data collection with the overall lifespan of the smartphone battery to avoid excess power drainage.
Vehicle compatibility not an issue: Smartphone solutions can be used with any type of vehicle, including some of the newer electric vehicles that do not have OBD ports.	**Lack of direct vehicle information:** No value-added services can be created that relate to vehicle information, such as maintenance tips and operational warnings, because the smartphone does not have direct access to diagnostics and internal vehicle data.

Self-Powered Device Solutions: Key Considerations

From an insurer's perspective, self-powered device solutions exhibit many of the best characteristics of combined hardware and smartphone solutions. Self-powered device solutions enhance mobile telematics by delivering more accurate trip detection and vehicle identification. This solution also helps minimize mobile battery usage. Because the insured individual contributes the smartphone to the solution and pays the costs of data transmission as part of the cellular phone contract, the insurer does not bear device costs or cellular plan expenses. As with all the solutions discussed in this paper, however, there are tradeoffs to the advantages associated with these solutions, detailed in **Table 2.**

Table 2. Advantages and Challenges of OBD-II Solutions

SELF-POWERED ADVANTAGES	SELF-POWERED CHALLENGES
Delivers consistent, highly reliable vehicle identification and accurate trip detection: Because the battery-powered Bluetooth device is used to identify a vehicle, it enhances mobile smartphone trip detection, identifying the vehicle accurately and validating the actual trips in progress.	**Requires more involvement from the policyholder:** Insured individuals must provide a compatible smartphone and then complete the steps to associate the Bluetooth device, as well as configuring the telematics app. The policyholders must also remember to bring along their smartphones whenever driving, with Bluetooth enabled, to complete the data transmissions.

Improves mobile smartphone battery consumption and privacy: With accurate trip detection enabled, smartphone trip recording can be turned off when a Bluetooth connection is not active, extending battery life. Policyholders gain assurance that only vehicle validated trips are being recorded, addressing privacy concerns..	**Uses policyholders wireless plan for data transmission:** Self-powered device solutions require that the insured individual have an active wireless data plan and maintain it in good standing over the course of the policy term.
Reduces operational costs for insurers: Policyholders, rather than the insurer, bear the cost of the cellular data plan that transmits collected data from the smartphone. Bluetooth devices are lower in cost than their cellular counterparts by relying on the smartphone for data transmission.	**Introduces a greater need for support:** Insurers will need to provide more support for insured individuals, who may need help with smartphone installations, Bluetooth setup, application use, data communication issues, and so on.
Provides collision detection data: To effectively support post-collision claims handling, self-powered device solutions capture data related to the collisions.	**Requires smartphone be present and active in collisions:** First notice of loss (FNOL) communications cannot be relayed unless the user has the smartphone in the vehicle, powered on.

OBD Solutions: Key Considerations

Telematics solutions based on OBD provide dedicated, secure connections between a vehicle and the back-office server consolidating the data (whether located at the insurer's site or a service provider). The OBD connection ensures positive vehicle identification. It reduces the possibility that the insured party will turn off the data collection at any stage and identifies those time periods when the device is disconnected. This is a necessary requirement for many state insurance regulators and insurance carriers. Table 3 shows the advantages and challenges associated with OBD telematics solutions.

Table 3. Advantages and Challenges of OBD Solutions

OBD ADVANTAGES	OBD CHALLENGES
Uniformity: Using OBD ensures that the data collected will be fair and unbiased across all demographics, vehicle types, vehicle uses, and drivers. Insured drivers within this type of program will be treated equitably, and measurements will use equivalent values.	**Limited to a single port:** Each vehicle has only a single OBD port that supports only one device at a time. Fleet providers, road-charging entities, and consumer applications have introduced special-purpose add-ons using this port. These add-ons could compete with availability for telematics applications unless a service provider can deliver both telematics and the additional service.
High reliability providing accurate vehicle identification and trip detection: Solutions based on OBD hardware are highly reliable, using proven methods to establish the necessary vehicle-to-insurance carrier connectivity. Data is transmitted to the insurer quickly and accurately.	**Higher hardware costs:** Dedicated cellular-based OBD solutions have a higher operational cost for the hardware plus cellular service. Costs can be reduced by adopting OBD with Bluetooth, but the expense is still higher than with less permanent solutions, such as smartphones. Hardware costs are diminishing as design improvements are made, but they still represent a potential obstacle for insurers seeking telematics at the lowest possible cost based on program needs.
Value-added services: Integration with internal vehicle information opens opportunities to provide value-added services, such as maintenance reminders, roadside assistance, crash notification, and more. Services can be integrated with the vehicle itself (such as automated roadside assistance or captured collision data).	**Vehicle compatibility concerns:** OBD availability is limited to light duty vehicles manufactured later than 1995 in North America, and light duty vehicles later than 2000 in Europe. There are still a few vehicles, particularly in areas outside of North America, that do not fit into these categories and may not have an OBD connection port.
Exceptional security: The nature of an OBD hardware-based solution minimizes possibilities for fraudulent acts and eliminates the potential for individuals to circumvent the monitoring system. Many solutions immediately detect the deliberate removal of the OBD device.	**Policyholder installation and adoption:** If enrollments are not managed carefully and closely, policyholders may become hesitant to install hardware into their car due to lack of familiarity with the new technology compared to consumer-accepted smartphone practices.

High accuracy: This solution delivers exceptional mileage accuracy for programs that require that tracking data.	**Requires driver ID for multi-user applications:** In scenarios where autos are shared, a driver ID mechanism must be used to accurately implement the insurance program.

Black Box Solutions: Key Considerations

Black box solutions, as the name implies, are electronic devices that are installed inside a vehicle, mounted in such a way that tampering is unlikely. Once mounted, the black box captures and transmits driving data over a cellular network to the data center. In scenarios where maximum data accuracy is important while also ensuring the integrity the of data, black box solutions offer significant benefits. **Table 4** details the advantages and challenges.

Table 4. Advantages and Challenges of Black Box Solutions

BLACK BOX ADVANTAGES	BLACK BOX CHALLENGES
Delivers solid data collection accuracy: Because the black box is a fixed device mounted in the vehicle, vehicle identification, mileage tracking, and trip detection are uncontested. Consistent standardization of data across vehicles is another benefit.	**Requires professional installation:** Because the black box must be installed by a third party professional, this option is less convenient for users, as compared to more portable devices, such as OBD and smartphone. Maintenance can also require a service appointment that customers must arrange.
Reduces tampering risks: In environments where vehicle theft is a problem or end users are inclined to circumvent the monitoring features, this solution provides reliable capabilities that are less likely to be compromised during operation. Theft recovery operations are also boosted by this technology.	**Raises user concerns:** Some users may object to having what they consider an intrusive device installed in their vehicle. User concerns and objections about black boxes voiding warranties or interfering with the onboard computer must be addressed, as well as other myths.

OEM Embedded Data Collection Solutions: Key Considerations

Auto manufacturers are increasingly adding built-in sensors and advanced driver assistance systems (ADAS) into their vehicles providing capabilities to capture data and relay it to a data center for processing. These capabilities can be supplemented through smartphone connectivity to communicate directly with the driver and support additional value-added features to enhance safety and provide convenience to travelers. **Table 5** summarizes the pros and cons.

Table 5. Advantages and Challenges of OEM Solutions

OEM ADVANTAGES	OEM CHALLENGES
Delivers exceptional vehicle data accuracy: Because the sensors and capabilities are integrated directly into the vehicle, OEM solutions deliver a high degree of data accuracy and detection of vehicle health events during vehicle operation. This provides a desirable option for end users without the need to install additional hardware. It also provides access to information not always available in aftermarket options like true odometer readings.	**Lacks standardized data types and formats:** Until manufacturers agree on standards for the data collected and transmitted, OEM solutions will be difficult to implement for insurers. TSPs with experience in data normalization and standardization will likely be in the best position to provide viable solutions in this sector.
Supports multiple driver communication modes: Smartphone connectivity can be coupled with in-vehicle communication equipment, including the driver console and interfaces that generate voice alerts or failure warnings, enhancing driver engagement and supporting richer communication.	**Applies only to the newest vehicles:** Programs based on OEM data collection can only be used with the latest vehicles that have integrated capabilities. Older vehicles will still require retrofitting with another aftermarket form of data collection—black box, OBD, smartphone, or self-powered device—to be supported by an insurance telematics program.
Increases opportunities for value-added services: By linking to ADAS connections within vehicles that are so equipped, insurers will be able to provide additional information and guidance for drivers, opening rich opportunities for innovative, value-added services.	**Presents uncertainties in certain areas:** The timeline surrounding OEM data collection solutions is uncertain with many questions remaining about what the actual data costs will be once this approach matures. Privacy issues and data ownership questions are also areas of uncertainty.
Helps with claims remediation and improves loss ratio performance: By capturing rich, high-fidelity collision data, the black box solution captures vital information to aid in claims remediation, resulting in improved loss ratio performance.	**Represents a higher cost option:** Ongoing support and maintenance for the black box, as well as the accrued installation expenses, boosts this option over the cost level of the other data collection technologies.

OEM Embedded Data Collection Solutions: Key Considerations

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3. Factors to Consider When Comparing Data Collection Solutions

When weighing the merits of data collection solutions, consider these factors:

- **Data requirements**
- **Continuity of the data record**
- **User experience**

These factors are discussed in the following sections.

Data Requirements

To meet the data requirement standards for a given program—whether a smartphon e, self-powered, OBD, black box, or OEM embedded solution—continuous, calibrated measurements must be captured from the smartphone or vehicle sensors. For in-vehicle, cellular-based OBD solutions and Bluetooth-based OBD this is achieved by the direct connection to the vehicle's engine control module. In mobile applications, the use of data fusion techniques can enhance the quality of collected sensor data, as well as exclude poor quality data that cannot be verified or validated. In some instances, data fusion techniques have also been applied to OBD solutions to enhance data results.

Vehicle speed can be determined precisely with solutions consisting of an OBD device, based on data from the Vehicle Speed Sensor (VSS) in the automobile and GPS-based speed. In smartphone solutions, vehicle speed is calculated based on the GPS signal, which requires that a strong GPS signal is being received. The VSS data values can also provide insights into certain types of driving behavior by detecting indications of wheel spin and loss of vehicle traction.

Positional and speed data collected from smartphone-only solutions can come quite close to the quality of positional and speed data from OBD-equipped options (including Bluetooth), for capturing data relevant to crashes. Because the smartphone is typically not physically secured, the data collected can be affected by movement within the vehicle, such as the phone sliding off a seat into the footwell during hard braking, which creates potentially confusing data.

As shown in **Figure 1**, in dense urban areas with strong GPS signals, positional data accuracy is very good. In marginal areas with lower signal strength, positional accuracy is less precise. The degree of accuracy also depends on the quality of the GPS receiver, which can vary from device to device.

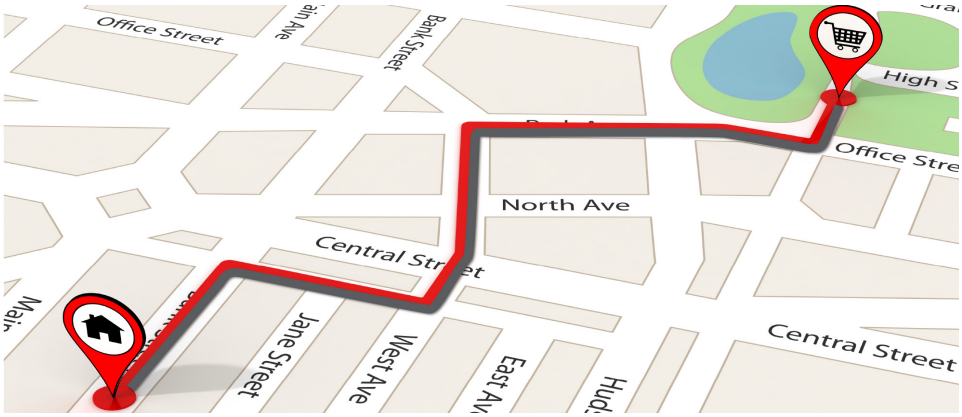

Figure 1. Degree of GPS Accuracy Can Vary.

Under optimal conditions, data collected from GPS speed calculations compares favorably to captured data from OBD vehicle speed sensors, as shown in **Figure 2.**

For example, the smartphone may be lying on the seat beside the driver or loosely resting in a cup holder so that during a collision, the accelerometers may not provide precise data. Secure mounting enables better calibration of the positioning of the unit and better data results.

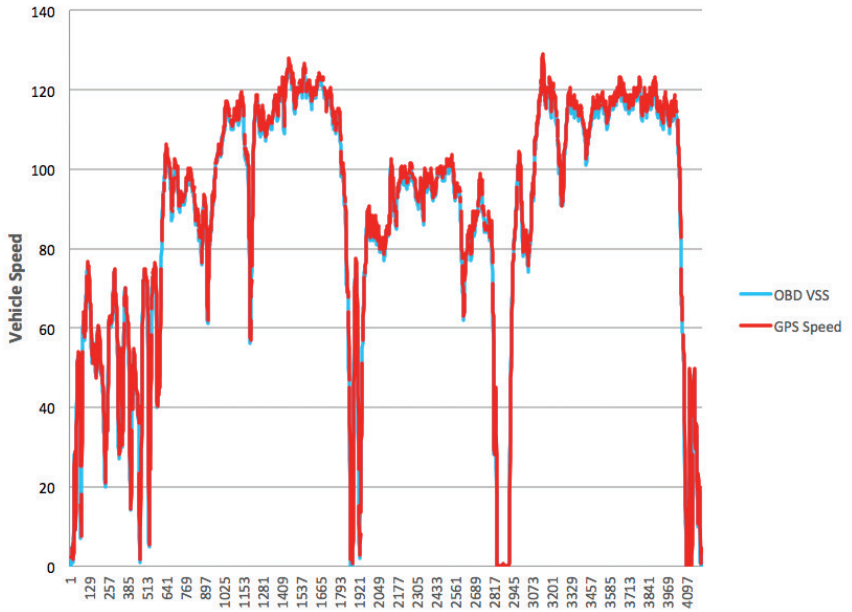

Figure 2. GPS Positional Data Accuracy in Urban Settings

By nature, a smartphone-only solution—in most instances—cannot deliver the same degree of precision when providing crash data as a permanently mounted black box or other device firmly attached to the vehicle. Depending on the insurer's needs, however, smartphones return a level of data accuracy that is well suited to a wide variety of program requirements.

In comparison, OBD-based solutions (including those with Bluetooth connectivity), OEM embedded solutions, and black box solutions capture data from a telematics device mounted in a permanent position within in the vehicle. This provides a high degree of data fidelity from the accelerometers. Overall precision and sensitivity to low-energy impacts offer a level of data useful in assessing crash scenarios. As shown in Figure 3, the data fidelity provides a deeper view into the nature of the crash and generates a much better picture of the incident.

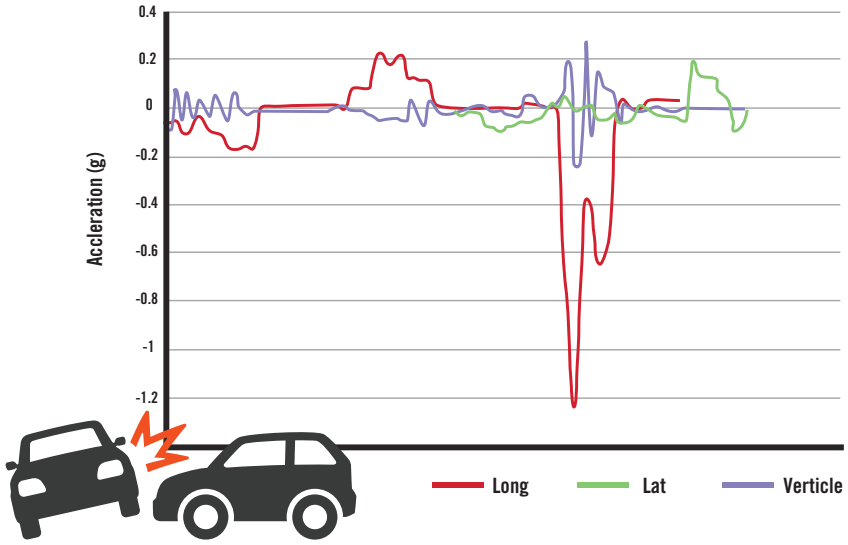

Figure 3. Data Values Support Construction of Vehicle Incidents

Continuity of the Data Record

Data that is captured continuously and is accessible as needed improves the value and utility of the driver evaluation.

An OBD- or black box-equipped solution, as well as OEM solutions, essentially connect a vehicle to the data collection mechanism (rather than the actual driver of that vehicle). In comparison, mobile device solutions rely on the owner of a smartphone bringing that phone along in whatever vehicle is being driven.

There are pros and cons to each approach. For younger drivers without their own vehicle, the use of a smartphone can track that driver's performance regardless of whose car is being driven, letting them establish a driving record that can help keep premiums low. Success of this approach depends on whether the mobile application being used can automatically activate in driving situations and minimize ways that the driver might circumvent the monitoring process. The more contiguous the data record tracked for the driver, the more precise the ratings based

on driver performance. If the solution depends on the driver selectively turning the app on or off during trips or travel, the potential for fraud is much greater. Authentication models for smartphones can be used to keep track of when the ignition is turned on or off, so insurers have a reliable means to determine how frequently drivers are using the software.

OBD solutions and self-powered device solutions can provide a more consistent, stable solution that cannot be turned off without detection. These solutions are mounted in place and ready to detect trips and validate vehicle identification from the moment the car moves. However, they typically lack any mechanism for identifying individual drivers in situations where more than one person often drives the vehicle. If, for example, a father lets his son drive the family car on a daily commute, the data collected during the trip cannot determine whether the father or son is driving unless there is additional input to identify who is the passenger and who is the driver.

User Experience

Solutions that are simple to install and use on a daily basis provide the best experience for drivers and have the greatest chance for adoption and long-term use. Positive engagement with the users, making it easy to understand current status of the policy and receive relevant communications from the insurer, is an essential part of most telematics insurance programs today. Engagement that helps a user become a better driver and offers incentives for safe driving practices are an important aspect of the overall user experience.

Different user demographics have different expectations of an insurance telematics solution, and insurers should be aware of these differences when crafting solutions. Younger drivers, particularly those in the millennial generation (born between 1982 and 2004) are highly adapted to smartphone use. They are digital natives and use social networking heavily. They are open to new technologies and would be likely to respond positively to a smartphone app that highlights metrics that determine the driver's premium while offering tips on how to improve one's behavior.

The social aspects of smartphones could also be used by the insurer in innovative ways to create a dialog with the drivers. Incentivized programs or gamification could be used to influence driving behavior, encouraging safer practices and generally creating greater engagement from the drivers. Active use of smartphones to make calls while driving, for example, could be discouraged, depending on the insurer's policies. Using transparent algorithms to assess driving behavior and encourage better driving practices would likely be positively received by this generation. Other age groups could be responsive to these incentives as well.

Older drivers may not own smartphones or may prefer OEM solutions that are built into the vehicle and require no interaction from them. Older drivers may also be less inclined to engage in incentive programs that offer only slight improvements in their rates and prefer solutions that operate completely in the background, not requiring their engagement or interaction in any way.

For mobile applications, power management is another critical aspect of the overall user experience. If the sensors are active continuously and drain the smartphone's battery so that it is not available for use when needed, most users won't be inclined to use this solution over the long term. Developing algorithms to selectively engage sensors and manage power use proactively can extend the smartphone battery life and improve the user experience.

Self-powered device solutions offer a more flexible approach to the user experience by developing the program features to enhance a smartphone-based telematics program, but they also place greater demands on the user, who must successfully complete the Bluetooth association with the accompanying hardware, install the required application, and ensure that cellular communication is available on a regular basis to complete the data collection cycle.

4. Summary: Data Collection Trade-offs

By all indications, vehicles are quickly advancing beyond their primary role as transportation devices and are now becoming full-featured mobile communication platforms. As a part of this trend, drivers can voluntarily transmit information about their driving behavior and they can also receive real-time feedback to reinforce positive driving habits and minimize risks during travel. Numerous other benefits result from improved communication, including maintenance reminders, social media interaction, weather and road-condition warnings, crash reconstruction, theft recovery, and more.

In the past, telematics solutions based on installed devices were ubiquitous, leading the market in Europe and North America, but other solutions are now rising in popularity. Smartphone technology has advanced substantially and is fulfilling many different market requirements. Self-powered devices are also gaining popularity because of their ability to enhance smartphone telematics while offsetting hardware costs. Black box and OBD solutions continue to gain favor for data accuracy and tamper-proof operation, while OEM prospects look bright once standardization issues are resolved or when combined with a TSP that can manage the disparate OEM data effectively.

Ultimately, it's essential to work with a telematics service provider that understands the full range of options and can help you assess the trade-offs in choosing the most appropriate in-vehicle technology to meet the specific segmentation goals of your program. OBD-based options, smartphone options, OEM embedded, self-powered devices, and black box solutions are not necessarily in opposition to each another, but can be complementary in meeting the diverse needs of a comprehensive behavior-based assessment program. Cost savings can be a valuable consideration, but providing extended capabilities, satisfying data requirements, and delivering flexibility are important factors as well. All of the different data collection options have a place in the market, depending on the needs of the insurers and the preferences and habits of the insured. Continuing growth in each of these sectors seems assured.

Geographical considerations are also a factor. Regulatory bodies in the insurance industry set the standards by which a given technology will be accepted or rejected in each region. Legislative and regulatory bodies in some regions prefer one approach over another. For example, in the European market, mobile solutions are less restrictive and fit within the regulatory frameworks in many regions. The US market is still in flux with some states not supporting mobile solutions yet. Solutions using aftermarket installed hardware devices are supported by insurance regulatory bodies in both the European and US markets.

5. Choosing an Insurance Telematics Partner

The selection of a technology and developing a strategy to deploy an insurance telematics program can be a fairly complex process. The options are numerous and the technology features required are closely linked to the type of product that the insurer wants to offer. The insurer's program goals will often determine the optimal hardware platform and software components, so each insurer should have a clear picture of the insurance product at the very beginning of the planning process.

If you select solution components before evaluating the capabilities of the product to be offered, you may discover too late that the choice of data collection technology does not suit the objectives of the program. An experienced telematics partner with a platform and strategy that is fully data agnostic will be able to provide services and facilitate your project goals, supporting whatever combination of technologies you select.

Partner Integration

Partner integration is an important part of the mix as well, and this factor hould be included when making a selection. Look for solutions that are modular and flexible with well-defined interfaces and an automated process for performing machine-to-machine integration. Ideally, the solution infrastructure should integrate data collection from both mobile applications and telematics hardware mounted in-vehicle, favoring simple, straightforward deployments and minimal maintenance.

Overall Program Objectives

Technologies do not need to be considered in isolation, but should be evaluated as to how well suited to overall program objectives they are. In many cases, these technologies can be used in complementary ways that strengthen the objectives of the program. For example, an insurer can initiate a customer acquisition or trial program based on an easy-to-implement smartphone solution to gather data or UBI leads. This trial period can then be upgraded to a more permanent OBD or self-powered device solution after the trial period ends. Opportunities to integrate smartphone-based solutions with embedded OEM telematics data and features in automobiles will also increase as these technologies mature and become increasingly available in the future.

Ideally, the selected partner should be able to support a number of different program types without the need to re-engineer any part of the solution. For example, specialized programs supported by one TSP and offered by the same insurer could include:

- Programs to support young drivers and encourage teen driver safety
- Customer acquisition/lead generation telematics solutions that offer a free trial period to get started
- Different forms of incentivized telematics packages designed to appeal to different groups, such as seniors, daily commuters, or occasional vehicle users

Ongoing Technology Innovation

While this paper has contrasted and compared the capabilities of the leading data collection options for telematics programs—smartphones, self-powered devices, OBD, black box, and OEM embedded—new, innovative approaches that are being introduced combine the best ideas from emerging technologies to create solutions that meet customer expectations and improve the insurer's book of business. Knowledgeable TSPs should stay abreast of these developments to be ready to take advantages of the latest technologies when the time is right.

About IMS

IMS, headquartered in Waterloo, Ontario, Canada is a leading connected car solutions provider delivering services and analytics to insurers, governments and other enterprises.

IMS' award winning platform-oriented approach drives more revenue and higher average revenue per user (ARPU) by future-proofing investments so customers can target specific segments or their entire customer base with different services at the same time. From insurers and governments, to fleets and everyday drivers, IMS' platform-based solutions and services are used across industries worldwide.

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