Connected Vehicles and Telematics Integration

The Challenge of Merging Diverse Digital Technologies Into the Emerging Automobile Driving Experience

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Introduction

The Global Policy Group® defines telematics as “The convergence of wireless communications, location technology and in-vehicle electronics which is being used to integrate the automobile into the information age.” It also represents the convergence of diverse professionals and departments, including IT, networking, manufacturing, engineering, software, hardware and more – across numerous supplier industries. In short, it is a very diverse merging of specialized experts and industries attempting to integrate a new, dynamic and highly complex field.

As telematics has revolutionized the consumer driving experience, the risk of incompatible technologies, failures and consumer dissatisfaction has also risen. Auto makers are integrating their on-board systems with numerous different mobile phone models, carriers, Bluetooth technologies, GPS systems, mp3 players, touch screens, voice recognition, safety monitoring, even life-saving capabilities. It spans numerous categories, like fleet tracking, vehicle rentals, emergency response vehicles, field service vehicles and more. Each of these diverse applications has the potential to impact the other’s performance. Also, with the constant upgrades and innovations, there’s no assurance that every new situation and application is going to be compatible with every other new situation or application.

The auto industry has already suffered a few setbacks and disappointed consumers with early efforts to merge technologies into one integrated system. The Ford Motor Company is to be commended for its pioneering effort to merge technologies with their own “SYNC®
system, but they paid a price in customer alienation and brand image with its many glitches. Later it was re-launched as SYNC generation 2, then MyFord Touch. During that time, the brand fell from 10th place to 20th in Consumer Reports’ reliability rankings and likewise fell in the J.D. Power quality survey.
There’s no debate about the popularity and new revenue potential of telematics. It is also a key means for auto manufacturers to differentiate their product hierarchies. However, telematics is a new, evolving area with little infrastructure. Each manufacturer is setting up its own closed system and forging new partnerships, often without proper accounting for all the potential risks. Compatibility with 150 mobile phones is laudable, but what about the other hundreds models and their respective carriers?

As telematics, and the divergent technologies and suppliers it includes, continues to grow, one thing is certain – it is only going to get more complicated and prone to error. This document will give an overview of telematics, detail some of the cautions and processes a manufacturer must consider, and suggest solutions that can ultimately assure the driver’s positive experience, enhance the brand’s image and protect it from a perception and quality standpoint.

What are the Odds?

Presently, there are over 3500 mobile devices at play in the marketplace. They represent carriers, device manufacturers, component suppliers and more. Many have design schemes unto themselves with their own compatibility considerations. There is no one-size-fits-all since every device behaves differently in different situations – Bluetooth pairing, cross-manufacturer components, signal carriers, locality, software, environment and more. This gets even more complex with firmware updates on previously released handsets and devices. Beyond that, consider all the other coordinated telematics categories, like GPS systems, voice recognition, satellite radio and more. This is a market growth area for the automotive industry and its continued fast expansion is inevitable. As auto manufacturers attempt to design integrated closed systems and exercise centralized control, the fact is all these variables ultimately come into play and can have a ripple effect on the system’s interoperability. Generally, consumers are unaware of the complexities and numerous suppliers involved in their driving experience. If a problem occurs, they generally place the blame on the auto manufacturer. In the end, what is at stake is the auto maker’s brand and reputation for innovation.

Field Interoperability Testing and Certification

Systems can perform one way in one region or environment and differently in another due to different carriers, roaming, high-low cell connectivity, tier three carriers, different radio frequency and network conditions, weather, even rush hour traffic. Testing should involve as many conditions as possible in the field. It should include carrier-specific requirements, industry standards, system acquisition, device call delivery, voice quality, data performance and feature capabilities.
Second and Third-party Vendor Management

A telematics third party manufacturing partner often relies on other third parties with whom the auto manufacturer isn’t necessarily aligned. For example, a single mobile device often behaves differently when operating with different signal carriers because of variations in programming. So a roaming device is susceptible to changes. Worse yet, programming incompatibilities with a new signal carrier can cause operational failures. Variances can also occur across different device manufactures, platform vendors, peripheral vendors and software developers. Each may be operating under a different set of programming commands from the other. For these reasons manufacturers must have a comprehensive vendor management system in place that is constantly proactive. This can be a vertical in-house department or an independent vendor management partner. An independent firm can also function as a buffer between the manufacturer and the soliciting vendors, sparing the manufacturer from the sales calls, evaluations, verifications, dismissals and the awkward act of saying, “No.” It can also monitor smaller upstart vendors, possibly with weaker applications.

Security, Safety, Data and Brand Protection

Every application and all of its lines of code should be tested for security to prevent any unwanted source from taking over any piece of the vehicle performance. It is vital to assure there can be no hacking or tampering with the vehicle’s system in any manner. Likewise, the manufacturer’s policies and brand should be protected to assure no inappropriate content, unwanted intrusion or tampering can infiltrate and interfere with a program. Policy testing is recommended to prevent such incursions.
Another major concern today is driver distraction. This includes the areas of functionality and driver interaction. It is vital to classify and measure any potential driver distraction in all telematics operations. In addition, e-911, vehicle assist and emergency response systems should be tested for a variety of situations, such as the actual car location, network provider and network connectivity. Likewise, vehicle diagnostic systems should be tested throughout.

**Data Mining**

Telematics provides auto makers the invaluable opportunity to track the vehicle’s usage and performance, so testing should assure that device event logging and data mining are optimal, and that there is a robust data analysis for future customized planning and design. Again, the behavioral differences cited above among vendor products and their suppliers make testing crucial across all components. Beyond vehicle performance, data mining and
connectivity have mushroomed into numerous new areas that impact today’s advanced vehicles. For example, GPS technology has evolved into a “location based marketing” tool. Retail locations are tracking the automobile and announcing themselves and their offers. That information is, in turn, linked to database systems for consumer behavioral profiles. Apple’s Siri gives drivers reminders such as picking up dry cleaning, prompted by proximity to the cleaners. Fleet management systems track movements and maximize routes. Insurance companies are using this data as a basis for premium rates. In short, the vehicle’s electronic system is now interacting with even more foreign systems along the highway. All the while, firmware upgrades are being introduced, prompting the need for regression testing.

**Divergent Life Spans**

As the lifespan of automotive electronics increases, the life cycle of telematics technologies gets shorter. Mobile phones, carriers and more will change during the lifetime of the vehicle. This necessitates post-deployment field maintenance to upgrade the vehicle’s systems. Manufacturers must be in constant communication with their vendors and partners and aware of their future hardware and software plans long before these advances go to market.

**Customization to Your Business Needs**

Auto makers are already customizing their own proprietary systems but often without sufficient involvement by vendors and services. This is the backbone of the manufacturer’s overall design direction and can lead to future compatibility problems, plus the exclusion of many available devices. Manufacturers need custom, vertical, proprietary systems, however they need to be designed to embrace the horizontal manufacturing landscape that allows growth rather than restricting it. The long-term telematics architecture will employ three core capabilities: 1) Mobile communications electronics; 2) Automotive electronics and hardware; 3) User interface. Manufacturers need to be attuned to consumer needs, technology innovations, pricing, and any new standards.
What Else to Test

Following are additional areas where testing will play a critical role. Evaluations should be for both the individual component as well as its functionality and interoperability with other components.

- Bluetooth compatibility certification for echo cancellation, volume control, and variations in how standards are implemented across handsets.
- Evaluation of each third party portable device’s overall signal to driving route performance and interaction with a host third party’s independent applications.
- Compatibility across popular mobile entertainment content providers like Pandora or iHeart RADIO.
• All verbal response and hands free performance operations and accuracy of voice applications.
• Bluetooth data transfer and performance testing with actual devices, cars or emulators for use and functionality.
• USB testing.
• Interoperability with PC.
• Interoperability with cloud based applications.

Criteria for Selecting a Testing Partner

• Comprehensive understanding of the converging trends of the automotive, telecommunications, digital and database technologies, device manufacturers, mobile carriers and more.
• Experience in putting partnerships in place like those cited above.
• Immense inventory of commercial devices and testing apparatuses for the widest range of testing capabilities.
• Size and capabilities to test all current and emerging applications as well as foresight and scale to proactively adapt and embrace future trends and technologies.
• Post-deployment field maintenance updating capabilities to keep older vehicle electronics compatible with new technological developments.
• Geographic range of testing facilities to cover all environments.
• Global reach to validate and certify standards across both the supply chain and worldwide markets.

Summary

Auto manufacturers are faced today with ever-increasing customer demands and expectations for an ever-evolving driving experience, enhanced with new technologies and innovations. This explosion of innovations is coming from all directions including diverse manufacturers, competing technologies and divergent protocols. It all makes the telematics transformation even more challenging in this new automotive era.

Some auto manufacturers are attempting to integrate these areas by partnering with providers, even with other competitive auto makers. Auto makers are also adopting their own proprietary protocols to gain an edge in this competitive marketplace. However, the scope of this convergence is beyond any one company or cross-industry alliance, particularly with its poor infrastructure. So, while manufacturers want to be the first with the latest, they also fear the associated risks of glitches, oversights and failures that can be devastating to the brand image.
A representative at one major auto company expressed that they don’t fully understand the functions of all the applications that they work with. Yet, they feel it is not their place to tell suppliers and engineers how their applications should work.

Beyond their own immediate resources, auto makers also need a comprehensive perspective and expertise across this entire rapidly expanding arena. This can both help prevent unforeseen incompatibilities and pitfalls they have experienced in the recent past, and help them achieve an even greater quality brand perception. While they continue their own proprietary initiatives, manufacturers should also consider a holistic partnership with an independent firm that’s immersed in industry-wide engagement and technologies.

**Intertek is Already in the Driver’s Seat**

For many, “telematics” is still just a fledgling technology. However, Intertek has already become information central for the automotive industry. Several companies are approaching and partnering with Intertek, seeking our telematics expertise and experience. Telematics has become a major business category for Intertek as well. In fact, Intertek has been immersed in telematics for years and in related fields for decades. For example, we’ve already tested 3500 mobile devices and an array of applications with over one million actual tests.

**Benefits of Working with Intertek**

With over 50 years of automotive experience, Intertek’s industry-leading testing services pave the way through the regulatory process for the global automotive industry. From product safety and performance testing to consulting and auditing services, our experts work with you to provide technical expertise and local support wherever you need it.

**Intertek Telematics Benefits**

- Accelerated testing, evaluation and approval process, understanding the importance of ‘speed to market’ in the automotive industry.
- Protection of your brand perception and reputation by assuring cross-technologies and systems are compatible.
- Systems tested on a broad geographic basis for regional compatibility.
- Assurance your current systems are adaptable to future after-market technologies.

**Intertek Telematics Experience**

- Already heavily involved in telematics as auto manufacturers are aggressively seeking the expertise and experience we’ve accumulated over several years.
- We have already tested 3500 mobile devices and millions of applications, working with Intel, Microsoft, Amazon, EA, Logitech and more.
- Experienced with Bluetooth, GPS, and related technologies.
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- We have worked with iHeart RADIO, Quick Play media and other prominent mobile and web applications.
- We have developed full app store validation programs for leading software, hardware and carrier companies, like Verizon, RIM, Motorola, and Microsoft.

Intertek’s Partnership Benefits
- Recognized for our ability to accelerate the product development process.
- In the design phase, we can help assure you are immediately on track for more expedient approval.
- Phased process keeps you constantly in the loop and in control.
- Pricing structure is broken down by phase and you are only charged for the completed phase.
- If modification is required, we can point out areas for your review and re-design.
- Systematic process cuts delays and speeds up each phase.
- You receive the most comprehensive reports, including the history of the project itself.

About Intertek

Intertek is a leading provider of quality and safety solutions serving a wide range of industries around the world. From auditing and inspection, to testing, quality assurance and certification, Intertek people are dedicated to adding value to customers’ products and processes, supporting their success in the global marketplace. Intertek has the expertise, resources and global reach to support its customers through its network of more than 1,000 laboratories and offices and 30,000 people in over 100 countries around the world. Intertek Group plc (LSE: ITRK) is listed on the London Stock Exchange and is a constituent of the FTSE 100 index. Visit: www.intertek.com.

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