Empowering The Mobility Revolution
Let’s Empower
the Mobility Revolution!

The transition from traditional to electrical cars will drive a redesign of in-vehicle electrical architectures. Autonomy is driving a massive investment in advanced technologies that enable our vehicles to drive themselves and will change expectations from consumers on in-vehicle user experiences. The sharing economy will drive the increased need for connected services and IT infrastructure. The mobility revolution has started now and here.

At Luxoft Automotive we co-create smart solutions that empower our clients to make the transition to sustainable mobility. Let’s accelerate together and meet at the CES 2018 in Las Vegas to match our minds. We are keen to collaborate on innovating vehicle concepts that shape the future.

Imagine a world where our transportation needs generate zero emissions, zero accidents and we have zero ownership. This does not have to stay a dream;

If we can imagine it
– We can reach it.

Explore our next generation technologies and solutions at CES! Follow our roadmap!

 CONNECTED MOBILITY  DIGITAL COCKPIT  AUTONOMOUS DRIVE
Digital transformation is becoming a bit of a cliché in many circles. Change happens. And often it’s digital, there or thereabouts, but it’s hardly heart-stopping or revolutionary.

The high road to digital transformation

Many surveys claim the next generation of would-be drivers don’t necessarily want the commitment of owning or even driving a vehicle at all – they want mobility but they prefer the convenience, the extra time and space. This represents a societal shift that ultimately will result in mass-market autonomous vehicles. And it is likely to be the battleground for automotive brand differentiation on a grand scale – and a shift from the car as a product to the car as a service. This is where approaches such as Digital Cockpit come into play, providing an enhanced human machine interface (HMI) to build up an individual relationship between driver and car.

The car as your companion

The Digital Cockpit establishes a logical, incremental environment tailor-made for the digital generation. How? By connecting with and adapting to each driver as an individual user profile, integrating the driver’s digital self into the driving experience with augmented navigation, advanced driving assistance, personalized entertainment, and on-demand digital service options.

Driving the digital ecosystem

With all this coming together, the car is becoming a truly smart platform, a secure and effective hub for a large and diverse ecosystem of connected digital services. This is an important step in establishing the connected car as the keystone of the automotive service economy. The fuel for this is data. The wealth of insight created every mile by a connected car is where brand value can be added to every interaction between driver and car – to make them safer, more comfortable, more connected and simply more convenient.

Climbing into the digital cockpit

ALLVIEW NEXT GENERATION HMI
LIVE DEMO – CES TECH SOUTH
(LUXOFT SUITE)

Putting thought into the mobility revolution

LUXOFT AUTOMOTIVE
**Hitting the road together**

Underpinning both the concept of the car as a companion and the reality of the digital ecosystem is collaboration. This is part of the digital, connected car trend that is most important for automotives to grasp. The service-led environment of the connected car requires faster time-to-market and flexibility to adapt to the latest consumer trends. This requires forging the right cross-industry alliances to easily attain expertise in diverse areas ranging from application development and security on the one hand to **Augmented Reality** and **mobile payments** on the other. Partners can build apps for new services to be incorporated into existing connected cars – the ‘product’ is no longer king. The new power for automotive brands lies in the depth and breadth of service capability their vehicles can provide. Freedom and scalability are key to continue adding value from across the digital ecosystem. Open source and shared platform development are the next step.

**One for the road**

The shift to a truly connected vehicle and on to a truly driverless vehicle is happening. Approaches such as **Digital Cockpit** will make widespread commercial buy-in to autonomous vehicles viable. They will also establish the foundations to build further service capabilities – at each step along the road to complete autonomy. Once the handover scenario from driver to vehicle is perfected, the next challenge is developing the urban infrastructure that can maximize the value of autonomous vehicles.
When it comes to how we use vehicles, we’re fast approaching a fork in the road: a big, digital-society-sized diversion caused by changing consumer expectations for highly personalized, intuitive, and completely connected devices. Why should drivers be happy with an in-car infotainment system that’s more complicated but less capable than their smartphone? Or one that needs booking into a garage for repair when their home computer can easily be fixed remotely? As technologically advanced as most vehicles on the road are today, they still lag behind the other aspects of our digitally connected, everyday lives.

Digitally transforming the car – a long journey?

As with most journeys of digital transformation, success can be achieved incrementally rather than taking a risk and going all-in at once. Simplicity is a key step, exchanging over 100 ECUs and mechanical sensors for fewer than eight microprocessors, with smart sensors and actuators fully integrated, as a centralized service-oriented architecture for the entire vehicle. This is crucial not just for better handling performance, but also for the huge amounts of data produced. A technical difference, but also a mindset change: this makes it much easier to add and improve app functionality. It also creates a ready-made collaborative environment, which is important as automotives will need to work more and more with third-party software OEMs to drive new value.

Keeping the engine (and the app) running

With an increase of in-vehicle apps, reliability is crucial. An app problem, by its very nature, must be fixable remotely (and in near real time). How far can we apply this to a vehicle, which is a mechanical platform with relatively fixed, longer-term service schedules? The simple answer is a long way, especially in this service-oriented context. The extended vehicle is a hub for apps, one that is centralized around the car itself rather than just a single component. If, for example, a driver experiences a broken electric window, the extended vehicle concept would allow for remote diagnostics and, if the problem is software-related, an ‘over-the-air’ repair. This data can be used for ongoing development and production – to keep increasing product and therefore service quality. This approach can be extended to predictive maintenance and functional safety as well, with a complete view of vehicle performance. This equals better efficiency and better service too – as well as enhanced after-sales support and agile fleet management.
The automobile as a service

Linked to this is the autonomous vehicle, which will clearly be affected by similar trends. Initially, there will be drive-and-drop cars ready and waiting on every street, with quick and easy payment via an individual’s user profile for the convenience of an instant vehicle without the complications of car ownership. Taking autonomy to its fullest extent, driverless cars will usher in a new level of the shared economy in a way that will support the globalization of cities. The opportunities with the extended vehicle are vast and multifaceted. They can also be developed incrementally as automotives engage with the third-party digital ecosystem to perfect big data, cyber security and vehicle autonomy.

What are the security implications?

When it comes to the security of connected cars, there’s certainly enough doom-mongering. It’s an obvious target for hackers. End of story. After all, there are security implications whenever you connect a new device to a network. Hackers could manipulate entry points to the car, service history and maintenance records, perhaps even the performance. But cyber security is a major industry in itself now and there are organizations, such as our own, that have deep expertise in both cyber security and automotive. Investment will come from organizations in other sectors with vested interests in the safety and security of vehicles on our highways. Insurance firms are a good example as minimizing theft and accidents will greatly impact risk.

Data, data everywhere…

The IoC will make the extended vehicle a datacenter on wheels – creating, sharing, and adapting to myriad data streams on every journey. A big part of this pool of insight will come from the drivers and passengers themselves, allowing the extended vehicle to deliver a highly personalized experience with the driving experience tailored to journey, music and comfort preferences. This user profile approach to connected cars will be central to its success, but there are clear implications of data ownership – manufacturers must manage the risk of third-party providers in the collaborative extended vehicle environment to protect its customers’ personal data. And data ownership itself is another challenge. In China, all data is the preserve of the government, while in Europe and North America, personal data is just that: owned by the individual. These are the types of implication which Automotives and their partners will need to build into every data-driven service they provide.

MEET US

Let’s share ideas on HPC and vehicle software architecture, testing and integration for autonomous drive, vehicle to cloud connection and concepts for smart mobility from finance to data management.
Emerging driver assistance functions, in-vehicle infotainment and mobility services, as well as driver-to-car and car-to-infrastructure connectivity affect the driving experience profoundly. On the road to fully autonomous vehicles there are some key engineering challenges which have to be handled.

1. **High-performance hardware and network architecture**

Advanced driver assistance systems (ADAS) increase the software cross-dependencies in vehicles, requiring additional levels of computing performance and network communications far exceeding established vehicle electrical and electronic (E/E) systems. Massive sensor data processing is necessary for object detection, object fusion and trajectory calculation.

2. **Electronic engineering and software development skillsets converging**

Developers need to utilize machine learning and create networks to connect the parts in the car, making this complex process require C++, Ethernet and security know-how to turn electrical software algorithms into high-performance codes. They also need integrated, high-performance Systems on Chip (SoC) to collect, analyze and manage large amounts of data. To handle these new requirements, electronic engineering and software development skillsets must converge. The architecture has to change, causing a potential domino effect of issues to fix.

3. **Standardized procedures**

Since the skillsets of electronic engineering and software development are converging, the automotive supply chain is also becoming more complex. To get from design to deployment, the supply chain needs standards. Without them, an effective supply chain is impossible – it would be too slow and expensive. In response comes AUTOSAR, a worldwide development partnership of manufacturers, suppliers and others in the automotive industry that works to instill reliable safety regulations. With a collection of open, standardized software architecture and application interfaces, AUTOSAR aims to improve the performance of vehicles.
AUTOSAR – Standards enabling next-generation cars

The Classic AUTOSAR platform applies to ‘old tech’. It focuses on hardware interfaces and electronic commands, such as simple electronic control units, real-time, safety and low-level software. Things like steering, braking, embedded actuator control and making sure sensors work fall under this category.

Alternatively, the Adaptive AUTOSAR platform answers to the emerging need for software and complex algorithms. It focuses on digital code and resulting actions, addressing the requirements for having Ethernet, a hypervisor operating system, C++, cloud interaction and tight security. It’s basically the response to the need for more data processing through ultrasonic, RADAR, cameras, laser scanners and other methods. Adaptive AUTOSAR also accelerates the hardware by installing advanced CPU models, more modern software and a much more flexible software distribution model. Due to the rapid nature of the automotive market, the car must be adaptable to future connected devices, add-ons and updates.

Standards always work – rain or shine

With complex communications between various aspects of the car, there must be no room for error. For instance, there can be no time delays between visual, radar and laser sensors. But what does this mean for safety regulations? The answers are: priorities, performance, security and flexibility. New challenges are emerging, and Adaptive AUTOSAR is a key enabler in overcoming these challenges. The amount of ECU (electronic control units) in cars is increasing, making vehicle architecture shift to a structure where only a few HPCs, or ‘software on a chip’, control large groups of hardware.

Luxoft’s exceptional staff supports AUTOSAR

As an active member of AUTOSAR, we have ample experience in software architecture, embedded software and real-time data analysis. Our competences include C++, algorithms, Ethernet, Linux/Genivi, IT security, ARM, Intel, embedded OS for ASIL C/D, low-level drivers, safety, real-time architectures and hypervisors. We excel in using cross-domain mixed-criticality application integration using modern, distribution-based build chains that fit market needs in terms of flexibility on updateability (software updates over the air, or SOTA), such as Yocto. Our ongoing projects include automatic parking, object detection and our high-performance ADAS platform. We have deep knowledge in skill areas that pure AUTOSAR Classic players lack. With experts in high-technology areas such as AI, IoT and Big Data, we have what it takes to integrate large amounts of complex software both quickly and securely – bringing futuristic interfaces to life.
TRITON UI – MOBILITY ALWAYS ON PURPOSE

We believe that “mobility always on purpose” will be a logical consequence of our efforts into a future of zero ownership. Secured connectivity, safe transportation, reliable mobility and a fully connected digital environment require new approaches in HMI technologies. How do we get there? Where do we get more time for this change? Qt Automotive Suite is our common answer to challenges in the development of highly complex systems. Our automotive IVI reference implementation saves time to market, is flexible, ready for every model range specification. It gives you more time to work on new UX and technologies specific for Mobility Revolution, since Qt Automotive Suite takes care of the rest.

AUTOMOTIVE REFERENCE PLATFORM – ZERO LIMITS, ENDLESS OPPORTUNITIES, ONE PLATFORM

This Demonstrator is a modular development and prototyping platform for Infotainment and ADAS systems. Offering interchangeable SoC modules and extensive customization and expandability by leveraging the on-board FPGAs and high-speed expansion slots. The INTEL ARP places no restrictions on the platform you want to build. Fully supported by Luxoft’s GENIVI-compliant PELUX Reference Platform, the ARP offers an unprecedented pixel-to-silicon prototyping platform for tomorrow’s Digital Cockpits. The demo will consist of the ARP board running UI on the PELUX Reference Platform with Qt Automotive.

AllView – NEXT GENERATION HMI

AllView shows how a wide variety of features can be combined within one HMI system to make the act of interfacing with modern Automotive technology as engaging and seamless as possible for the driver: from social media to climate control, and from tire pressures to music. AllView is powered amongst others by Luxoft’s Populus HMI engine, which offers advanced HMI design opportunities and supports all available operating systems and automotive HMI architectures for target hardware implementations.
POPULUS – SOFTWARE TOOL FOR UI

Populus Suite is a software package that streamlines the design, development and deployment of user interfaces for distributed embedded systems. It reduces the time and cost required to create high-spec full-featured HMIs (Human Machine Interfaces). Luxoft Populus includes several innovative features that are unique to HMI development, removing the traditional barriers between system engineering, HMI design and implementation departments to deliver a speed and efficiency of development that’s unprecedented.

12th January 2018
CES TECH WEST / LUXOFT Suite (30th Floor, Room 103)
The Venetian Resort Hotel

FORD & SDL DEMONSTRATOR (SDL = SMART DEVICE LINK)

Together with Ford, we have co-created a Smart Device Link functionality empowering mobility services for corporate customers like fleet operators. Based on the SDL enabled IVI system (Ford SYNC Applink) and cloud-based translation services (Google, Yandex, etc.) the system allows the passengers to communicate in their native language without barriers and constraints. The car will manage the communication by translation without the need of any preloaded app. The passenger is smoothly connected to the car by QR code. The vehicle will enable communication through an interpreter.

9th – 12th January 2018
SDL – Livio Booth (Co-Exhibition with Ford)
LVCC – North Hall Booth #3910 (inside the N1 Entrance near JVC-Kenwood)

AUTOSAR ADAPTIVE REFERENCE IMPLEMENTATION

As AUTOSAR’s premium partner, Luxoft is at the forefront of the AUTOSAR-Adaptive reference implementation. At CES we are showing our own AUTOSAR-Adaptive demonstrator. On a reference board with a Linux Container (LXC) platform, we run both an AUTOSAR-Adaptive stack and a GENIVI SW stack in a second (HMI) container. We have a continuous integration workflow in place, including automated timing analysis with our proprietary Symtavision technology. We will show you how both stacks run in parallel and automatically generate timing traces, capturing service-oriented communication between them.

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CONTACT US
For a LIVE demo

About Luxoft
Luxoft is a leading independent software service provider for automotive OEMs and suppliers. Combining thought leadership, industry expertise, resource scalability and IP, we develop high-end automotive software solutions across user experience (UX) design, human-machine interface (HMI), advanced driver assistance systems (ADAS), autonomous driving, connectivity, Internet of Things (IoT), telematics and navigation.

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