Automotive
In-Vehicle Experiences

Designing the cabin of the future
The vehicle of the near-future will make driving easier, more enjoyable, and safer. It will help drivers stay focused on the road, even as they perform online searches, add appointments to their calendars, or connect to their smart home systems. It will have more screens, too—bold, bright displays for HD content, augmented reality features, and interactivity. The car itself may even be intelligent, learning how to provide better responses to the driver’s voice commands or recognize who is in the car at any given moment. And all of these new experiences will increase the demands on in-vehicle compute, sensors, and software.

As vehicles become more intelligent, there will also be a greater need for cockpit awareness—the car’s ability to sense its occupants and efficiently communicate with them. That job falls to the vehicle’s human-machine interface (HMI), which must relay messages clearly, quickly, and with purpose.

Consolidating in-vehicle systems
With these new features come additional complexity and cost. The automotive market is already trending toward the consolidation of digital instrument clusters, heads-up displays, cameras, and mirrors—a strategy that can help control costs and simplify design. These systems will run on safety-critical clusters that can handle ISO 26262 ASIL-B use conditions. Running non-safety-critical systems on the same cluster will require virtualization technology for graphics, audio, and imaging to ensure priority for safety-critical workflows.

To support an increasing number of displays and sensors, designers are looking to maximize compute performance and power efficiency in systems. They’re also considering the benefits of scalable architecture, which allows them to reuse hardware and software investments across fleets and brands. This helps reduce development costs as well as speed time to market for new solutions.

Personalized and secure experiences
The need for personalization is becoming more important as ride- and car-sharing networks gain traction. The vehicle should have an immediate way to identify the passenger and call up his or her favorite destinations, content, playlists, and settings. As more screens become available to more passengers, the vehicle should be aware of who is sitting in which seat. Finally, any personal details must be secured and kept private from other riders who use the vehicle.
Safer, more enjoyable, and productive trips

With high performance, power-efficient compute in the vehicle, automakers can add a wide range of exciting new experiences to the cabin. Natural language recognition will allow passengers to communicate with the vehicle’s HMI through casual, everyday speech and enable vehicle “personal assistants.” An interactive, high-definition dashboard can stretch across the entire front of the vehicle. A full-color heads-up display will show maps, alerts, and other information intuitively on the windshield. Rear-seat entertainment becomes an extension of the passenger’s mobile device or serves as a virtual office.

Sensors in the vehicle can trigger actions when an occupant has spilled a drink, left something behind, or is within reach of a control. The more the vehicle knows about what is happening inside its cabin, the better it can provide instructions or react when making emergency maneuvers. All of this leads to safer, more enjoyable experiences for drivers and passengers.

Technology to power new experiences

Intel is powering the experiences that will redefine the vehicle’s cabin. We’re developing technologies that will enable natural voice interaction, making communication between a vehicle’s HMI and its occupants seamless. Each year, Intel invests millions on research to understand and improve HMI design. For example, we’re exploring how to best convey information to passengers in various situations, finding the right blend of screens, mobile devices, and voice. These insights inform our product road map, which in turn helps the automakers and suppliers we work with stay ahead of market trends.

Scalable, flexible Intel® architecture

A platform based on Intel architecture delivers several components that are key to enabling the best experiences with in-vehicle infotainment (IVI), digital instrument clusters, and ADAS visualization.

Intel® processors are power efficient and offer the substantial compute needed to support the next-generation cabin. Intel architecture-based platforms are highly scalable and can accommodate a wide variety of designs while offering impressive graphics capabilities and hardened security features. They include Intel® Virtualization Technology, which drives the consolidation of systems while ensuring key safety functions get priority access to the processor.

Where to get more information

For more information about Intel-powered in-vehicle experiences, please visit intel.com/automotive.

1. Intel automotive data.
Intel technologies’ features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer, or learn more at intel.com.
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