

Automotive Innovations Paving the Way to a Unique Driving Experience >

The automotive industry is one of the most exciting and dynamic segments of technology today. With so many innovations maturing at the same time, the architecture and design of the car of the future are poised to change forever.

Electric Vehicles

The electric vehicle (EV) is not a new concept, but with the latest developments in battery technology and energy distribution, customers will see significant transformation in the way cars are powered. From humble beginnings, the latest generation of EVs now rivals the performance of conventionally powered cars. In addition, highly efficient motors and fast-charging vehicles deliver the convenience required for widespread EV adoption.



The next generation of EVs is predicted to soon become a presence in most households. As more consumers adopt renewable sources such as wind and solar, batteries will be increasingly embraced as an important and reliable way to store energy. The EV will emerge as part of that new energy strategy as companies and households increase their reliance on renewable energy.

Electrification is just one element of the revolution that is happening now in vehicle design. The ways that owners interact with their vehicles are changing too. The in-vehicle experience is growing in importance, and manufacturers are starting to define cars as a “third living space,” an environment just as important for people’s welfare and health as their homes or workplaces.

Manufacturers are imagining a future in which drivers choose their vehicle not only for its performance or fuel economy, but also for its personal suitability. Buyers will assess cars not just as a means of transport, but also as a safe environment in which they can interact. Operating a car will be an immersive experience, offering intuitive controls and seamless integration with personal devices.

Autonomy and ADAS

Drivers will also benefit from the latest innovations to keep roads safer. Advanced driver-assistance systems, or ADAS, will collect data from a constellation of sensors arrayed around the vehicle. Using technology from simple reversing cameras to advanced light direction and ranging (LIDAR) systems, ADAS will employ artificial intelligence to analyze data and identify potential road hazards. This data will be provided to the driver in integrated displays incorporating the latest in augmented reality.

The rise of autonomous or self-driving cars will offer users several choices in how they use their vehicle. To fully realize the level of safety required for roads, autonomous vehicles will use the data collected by existing ADAS and combine it with information provided by other road users. Cars therefore will require network connectivity that includes vehicles, pedestrians and even the roadside infrastructure. High-speed and high-bandwidth connectivity will be necessary to manage the volume of information being shared.

These new technologies will define the automotive industry. The pillars of electrification, in-vehicle experience, autonomy and connectivity will profoundly affect how cars are designed and built. Also, the volume of information the next generation of vehicles will employ will effectively qualify them as data centers on wheels.

In the design world, notable innovations generate challenges. These automotive innovations are certainly no different, creating

a host of new challenges for vehicle designers. Traditional vehicles use a domain architecture in which systems are grouped by similar function, resulting in a multi-layered design with complex cable harnessing requirements.

This complexity can only be managed by a collaborative approach where various companies with different expertise come together to test and validate their innovation on a common platform. Arena2036 is one of those initiatives and the message is clear—complexity needs collaboration to find standard solutions.

In the Zone

Zonal architecture replaces this complex network with a simplified structure. The systems of a vehicle with zonal architecture are grouped by location instead of by function, including lights or sensors, motors or controls. Each location is qualified as a zone and is controlled by a gateway placed close to the components for which it is responsible. In this way, the individual cables that link components to the controller are kept short, keeping the complexity and weight to a minimum.

The zonal gateway is a practical example of edge computing in action. Each gateway will connect to the central computing cluster at the heart of the vehicle. As a result, interzonal communication can take place over a small, high-speed networking cable that significantly reduces the quantity and size of the cables that must be installed around the vehicle.

The zonal architecture will enable other revolutions in automotive power, communications and autonomous driving, making it the biggest change in the manufacturing of vehicles for generations. Conventional designs simply will be unable to deliver the performance and reliability that modern vehicles demand, but zonal architecture provides the solution that the automotive industry will need.

An additional advantage will take place on the production line for manufacturers—a simplified zonal approach in the harness development will contribute to using automation to integrate the wire harness in the vehicle. The first concepts have been developed and this will open the door to a more cost-efficient and accurate assembly at the automotive plant.

Molex—Your Zonal Partner

This innovation will have a profound effect on connector design, and Molex stands ready and capable to meet the challenges of the new zonal architectures. For example, the change from complex, multi-layered cable harnesses to a zonal structure will increase the use of hybrid connectors as functions are combined within a single housing, including power, signal, video and data.

The future of vehicle design is zonal. This new architecture is replacing traditional techniques to provide wiring and connectivity within cars and vehicles. Many companies in the automotive industry will be affected, from the largest manufacturer to the specialist subcontractor. Learn more about [zonal architecture](#) to ensure your readiness for the new zonal challenges.

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