Electric Vehicles (EV) are here. OEMs and suppliers alike have set aggressive timelines to electrify their entire fleet. Fuel tanks, engines and exhaust lines are now being replaced by battery packs, electric motors and power electronics. To keep pace, automotive engineering teams are adopting an increasingly digital mindset and deploying innovative concepts at an unprecedented rate, while continuing to meet or even exceed performance requirements.

While most OEMs have moved away from the traditional trial-and-error methods and managed to reduce the number of physical prototypes necessary to achieve designs that match their requirements, the “Zero Prototype” journey is no easy task. Engineering departments try to mitigate the lack of available experience at hand with digital solutions to control the risks associated with innovation.

Using the most advanced simulation methodology – Virtual Prototyping – some engineering teams are fully replacing physical tests with virtual ones, speeding up the development process, and anticipating potential issues earlier in their development cycle, thereby counterbalancing the risks associated with innovation. From Virtual testing to in-scenario simulation, ESI can accompany you in the design, manufacturing and testing of your vehicle.

High-Performance Batteries that Go the Distance

There will be no compromise on safety: the car industry is committed to making “Vision Zero” a reality.

There are many concerns rising around batteries including their optimum location inside the vehicle, their integrity for various road conditions, or in case of crash, the protection provided by their housing. The challenge for OEMs and their suppliers is to keep up with evolving requirements: the ability to test all sorts of circumstances – virtually – is more than ever the key to ensuring the successful development of an electric vehicle with a global mindset.

Reach Optimal Passenger Comfort and Energy Consumption

In the wake of flexible and, sometimes revolutionary, interior layouts, interior climate systems have to be rethought to be consistent with cabin configuration and the demand for individualized comfort.

Engineering teams face an arduous challenge as they are called on to reinvent the cabin design while maintaining occupant safety & comfort and deliver high performing vehicles.

With virtual interior engineering, test as many layouts and scenarios of your new innovative car concept before design freeze. Ultimately gain a global view of the cabin and manage trade-offs, from human comfort, cabin energy consumption and associated car range, to passenger safety.
Experience, Validate and Communicate on the Production Process

As design sets the stage for manufacturing and service, it is critical for engineering teams to recognize the interactions of people with their proposed products and processes to assure ease of production and assembly. With Virtual Reality, engineering teams experience, validate and communicate on the assembly requirements all while taking into consideration the human-centric process interactions. This ultimately allows them to significantly reduce future assembly risks, increase efficiency, all while ramping up production to meet key product targets.

Manufacture Lightweight Designs Enabling Long Ranges Without Sacrificing Cost

Lightweight body structures, engines and drives are key to obtaining an optimal EV performance and maximum range. However, when manufacturing car designs with lightweight materials, meeting tolerance requirements and obtaining a high final perceived quality are a challenge for OEMs. Additionally, this often leads to significant over-spending in the try-out phase. To meet customers’ high demands, minimize risk, and keep cost within specifications, OEMs must ensure leading craftsmanship and operational performance of manufacturing processes. With manufacturing process & assembly simulation, you can virtually manage key manufacturing & assembly processes, inspect perceived quality, securing the entire fabrication process. It is the enabler to manufacturing attractive, lightweight, flexibly assembled electric vehicles and ultimately providing the highest quality possible.

Sensing, Connecting and Reporting for a Safer Driving Experience

To reach the highest levels of safety, autonomous vehicles must have a 360° view to ensure they make the right decision by interpreting the data from sensors (camera, radar or lidar). With Virtual Prototyping and physics-based sensor models, verify the reliability of the autonomous systems and develop the safest autonomous vehicles while reducing the time and cost of the testing phase.

“HONDA R&D has been using ESI’s Virtual Performance Solution for over 20 years. Today, we are leveraging the capacities of the single-core model on a full car for our latest vehicle platform development. [...] It enables us to ensure the right levels of product performance for lightweight design, and to face challenges related to evolving regulations.”

Mr Eisei Higuchi
Chief Engineer
HONDA R&D Co. Ltd

“ESI Virtual Performance Solution saves us time and money. We are able to validate the performance of our innovative composite vehicle virtually before even manufacturing the first real prototype.”

Gaël Lavaud
CEO
Gazelle Tech

To learn more, go to: www.esi-group.com/Innovating-Future-Mobility