THE SMARTER HMI

In the early days of automotive history, Human Machine Interface (HMI) was limited to changing gears, applying brakes, knowing the vehicle speed, reading battery status and fuel level. Mobility expanded with improved infrastructure, better vehicle engineering and increased connectivity. The advent of GPS, focus on safety and relevant vehicle deployable technology features in the automobile created HMI that was compact and more user-friendly. With cross technology pollination from other domains, the number of gizmos and features in a vehicle came within the reach of the driver, while driving brought a different paradigm in HMI development.

The switches on the steering wheel, the multi layered instrument panels, rear view mirrors, reverse sensing mechanisms, switches on the door panels and gear change levers were some of the popular human interfaces in vehicles. The simplest of fuel level display to traction battery charge availability, ABS and ESC activation, TPMS, seat belt activation, door closures, gear shift information, voice guided road maps, climate control, engine control and temperature, infotainment, acceleration and brake pedal interfaces, switches for powered window control, seat adjust-

ment switches were many more of the interfaces competing for space and visibility around the driver and occupants in a vehicle. To ergonomically integrate them for easy operation and access at high vehicle speeds became a high priority for safety and comfort.

Additionally, the aesthetics of HMI became important to blend with vehicle interiors and branding themes of OEMs. Catchy displays and background lighting became important parameters, the tactile feel of the switches on the door, shift levers and steering wheel gained importance too. The poka-yoke within switches to ensure driver comprehension became an advanced area of ergonomics for mobility engineering. With the growing need for connectivity, information access and its rapid display through HMI, innovation of multi layered displays and high speed microprocessors with embedded software made it easy to integrate multitude of features during vehicle development.

Newer HMI deployments enabled easy and safe access to tremendous data power on the finger-tips of occupants while they were on the move. These also gave birth to projection displays, fusion type screens, night vision and Bluetooth interfaces that were com-

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pletely integrated in the vehicle operating ecosystem.

INNOVATIONS GALORE

Innovations in telematics and infotainment created more complex but intelligent interfaces on board. Intelligent Transportation Systems and Vehicle to Vehicle communication further increased the remote interactions with the environment and its corresponding features in HMI on-board implementation. With every launch or refresh of a vehicle, irrespective of the price range and brand, the comfort level and ergonomics got enhanced. Higher speeds and better infrastructure increased the focus on occupant & pedestrian safety with more active interfaces in the vehicle.

This evolution over decades has made HMI, its articulation and need for intelligently packaged features a domain of smart HMI engineering.

Since an automobile is used by the larger masses, smart engineering for user friendliness of HMI is one of the topmost priorities. Cost and brand representation are important too, in creating a disruptive impact on the consumer psyche. Today, consumers spend more time in a vehicle and look forward to continuing their living room but safer experiences on the road. Multiple occupants in any vehicle expect to have their own space, displays, interactions, thermally-controlled seats and ambient temperature controls to emulate their personal comfort zones.

Innovations in HMI smart engineering have expanded from basic knobs to fancy tactile switches, driverless vehicles, multi layered graphic displays – manual or remote operated features, night vision cameras, voice-activated interactions and unquestionably more connectivity for a safe and amicable driving experience.