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NEWS RELEASE

A new reality for autonomous driving

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Drivers have always been instructed to keep eyes on the road, hands on the wheel and foot ready to brake. Improving a driver's perception of the vehicle's surroundings while performing the driving task, or when delegating these tasks in part or in full to a highly automated or autonomous vehicle, requires new ways of interaction – especially when drivers and their passengers may be uneasy or concerned about their route and safety when not being in control of the vehicle.

Alleviating these concerns is a primary goal of developers who are bringing augmented reality (AR) into vehicles. While AR is capable of addressing all human senses through visuals, sound and movement, the primary focus in the vehicle is to overlay information that augments the driving situation and surrounding objects in the line of sight of the driver. This informational, visual layer highlights objects on and near the road, reports the condition of the vehicle, and can significantly improve safety margins when drivers are in charge of a vehicle. At the same time, the very intuitive nature of AR helps build confidence in the vehicle's automated features by keeping the driver informed and aware.

The real benefit of AR is that it operates intuitively and in real time. Therefore, if vehicle sensors detect an object infringing on the vehicle's lane, AR technology can instantly alert the driver and display the safest path around it. From a convenience perspective, AR also offers many enhancements – supporting park-assist features by indicating available spaces or working with the vehicle's infotainment system to overlay entertainment or points of interest tailored to the driver's preferences – among a list of many features.

A dynamic difference for drivers

In particular, coupling AR with navigation holds particular promise for improving safety and driver confidence.

Drivers will no longer need to shift their eyes from the road to a navigation screen; the route will be projected on the road ahead with clear markings indicating turns, directions or which lane to follow.

For increased safety, AR can also be coupled with driver and passenger monitoring systems. For example, sensors will evaluate the driver's head position so that the system knows on which surface to display the information and, if the driver appears distracted, the system will issue a visual or audio alert. For advanced applications, AR can present a combined view of the road ahead with audio, light and video to create a multi-modal AR experience designed to enhance a driver's awareness of the driving situation by alerting them to potential risks that would require action.

With vehicle-to-infrastructure communications, AR can also display a countdown indicating the number of seconds until a traffic light ahead will change, allowing the driver to decide whether to stop or slow down.

The importance of AR in autonomous vehicles

Today, no automobile on the road is equipped with AR. Many employ a head-up display (HUD), but these systems use projected images, rather than a dynamic information overlay. For autonomous vehicles, however, AR will be a prominent feature.

New automotive AR features have the potential to be a standard approach for Level 3 and 4 autonomous driving when drivers are able to delegate control to the vehicle and may not observe its operations. Displaying everything the driver needs to pick up where autonomous controls left off, AR will be critical when it is time for a driver to resume control after a period of autonomous driving – drawing immediate attention to the vehicle's surroundings and any actions that need to be taken. Importantly, AR acts in a timely and contextual fashion, displaying the relevant information needed at any point in time.

To provide accurate information in autonomous driving situations, AR will need to be used in conjunction with ADAS technologies, such as short- and long-range radar and LiDAR. ADAS systems will, for example, have the ability to enable the AR system to pinpoint the location of traffic lights, walkways and roadsides.

Visteon is developing an AR solution that addresses automakers' cockpit electronics consolidation needs – enabling them to easily integrate branded human machine interaction (HMI) models and views with dynamic data from the SmartCore™ cockpit domain controller.

Incorporating driver monitoring technology, the system has the ability to observe the driver state and react dynamically to the situation. This contextual information is taken into account when fusing and synchronizing the incoming data, enabling the system to supervise the situation and decide the best output modality to respond.

Separating software from hardware, the solution can also integrate a software stack into different electronic control units to generate the content of an AR head-up display. Visteon's complete AR solution is one of the first applications integrating AR capability into vehicles.