



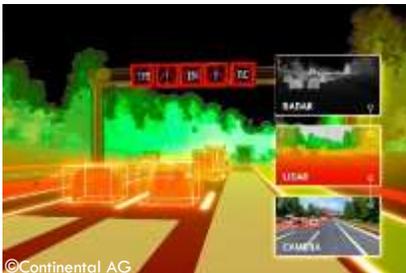
ELDIM for the Automotive Industry



What Does the Future Hold?

The technology race among the Automotive manufacturers will determine the one that will hold a significant advantage on the Automotive Market for the next decade. It is taking shape in 3 fields:

First, the in-vehicle displays, whether intended for the driver or for passengers, is the element that have been through the most transformations these last years. It will continue to be the one with ever greater developments in terms of size, quantity and quality.



The second key characteristic of the car of tomorrow will be its ability to offer autonomous driving (level 4 or 5). Autonomous driving will only be possible when the driving AI's are able to sufficiently analyze the raw data coming from their environment. Thus, the reliability, and the standardization of LIDAR systems allowing autonomous driving will be one of the major challenges of this race for the autonomous vehicles.

The third and last area of technological distinction on which car manufacturers will try to stand out will be their ability to implement safety systems using sensors from in-cabin monitoring systems & Driver monitoring systems. The ability of the latter to carry out their mission while respecting eye safety standards, such as facial recognition, will be a key issue in order to improve the safety of the driver and his passengers.



In-Vehicle Displays:

The current trend of electrification and digitalization of cars results in a concentration of all the elements usually in the form of buttons or levers to one or several screens distributed in the car.

To ensure a good experience for the driver or the different passengers, it is important to characterize the displays angularly. It is indeed preferable to make sure that a center console displaying GPS will not be completely unreadable because of parasitic sun rays. In the same way, we can imagine a screen dedicated to the front passenger, but the impact on the driver's field of vision must be sufficiently limited in order to not interfere with his driving.



ELDIM can provide different solutions depending on the end user applications such as:



CubeX systems for production line color standardization of screens thanks to their easy implementation and their maximum action time demand (takt time) speed of less than 2 second per screen. With an on-axis spectral sensor and brand new Angular spectral mapping technology, the *CubeX* can provide extremely precise color information in a FOV of +/-60°.

EZContrast & EZLite systems for the complete R&D development of screens to analyze color, spectral, polarization and reflection responses depending on the viewing angle.



THOR systems, full turnkey solutions allowing the analysis of one or more screens simultaneously under temperature stress situation between -40°C & +85°C. Those systems can be used for analyzing several displays in a fully automated way.

LIDAR systems for Autonomous driving:

One of the current challenges in the automotive sector is to reach the fully automated stage of driving (level 5 of automation). LIDAR is one of the technologies that will allow the development of autonomous vehicles such as self-driving cars, robot-taxis, autonomous shuttles...



From a common agreement, LIDAR systems for autonomous vehicles will not be widely used for ADAS systems until the price of these systems has fallen sufficiently to reach a level of mass production. Such a level of production will be more easily accessible with measurement tools allowing precise and complete R&D development and standardization.



Qualifying and measuring both efficiency and direction of the light emitter will allow the verification that your laser is calibrated to reach an excellent quality of data collection. It allows to check that your laser is compliant with your own pattern.

ELDIM can provide the *VCProbe-NIR-DSD* product range to enable R&D or standardization of LIDAR system transmitters for autonomous vehicles.

Interior Monitoring System & Driver Monitoring System:

The most recent line of innovation concerns Interior Monitoring systems & Driver Monitoring System. These systems can be based, as for autonomous driving, on a combination of artificial intelligence and sensor system, either visible (camera) or infrared (LIDAR).



While these two sensor systems both have advantages and disadvantages, infrared sensors allow greater precision in the 3D geometry of the cabin and driver. This makes it easier for a NIR system to scan the driver's face for signs of tiredness or drowsiness.



In addition, it is easy to imagine automakers including facial recognition systems such as FaceID in the starting parameters of vehicles, thereby significantly increasing the overall safety of cars. As for other laser sources, the flux emitted by NIR light sources emitter needs to comply with safety regulations. The safety standard IEC60825-1 specifies a maximum permissible exposure limit to ensure eye and skin safety. This limit applies to an aperture of 7mm corresponding to the human eye aperture at 10cm.

ELDIM can provide the *VCProbe-NIR-STG* product range to enable R&D or standardization of LIDAR system transmitters for interior monitoring systems & driver monitoring systems.