HERE HD Live Map – more than a sensor for Automated Driving

The role of location technology in overcoming key challenges of automation

Carsten Hurasky, HERE Technologies, Frankfurt

The current state of the industry and challenges

After high expectations that fully autonomous cars will make the human driving redundant, followed by a period when the complexity of replacing drivers at scale become evident, the industry is now in a phase where human and machines are sharing the driving tasks.

To successfully master this step from driving assistance to automated driving, the underlying technology must ensure maximum safety, reliability and predictability for the driver. This requires redundantly designed systems that collect, evaluate and process real-time information from various sources and allow the vehicle to understand the environment even in places not driven before.

The role of location technology

High-definition (HD) maps play a central role in this context. They provide the vehicle with the "logical structures" to position itself in a lane with centimeter precision and they support to plan vehicle control maneuvers beyond sensor visibility. We see HD maps acting as a geospatial data memory for Automated Driving, providing knowledge of the road even in places that the vehicle or the driver have never driven before, hence much more than a sensor.

To provide reliable and consistent information, the maps must be correct in space and time. For the map to be of HD-quality, conditions such as road layout, lane information, positions of signs and traffic lights, lane markings or other objects must be recorded precisely and in high details. There are also instances where changes in the road environment (speed limit changes, temporary restrictions) need to be promptly updated.
HERE uses a wide range of data sources, including own fleet of survey vehicles to record and update this information. The vehicles are equipped with state-of-the-art data-collection sensors. These include high-resolution cameras and LiDAR-based rangefinders that provide 360-degree views and high-precision positioning. The LiDAR-based sensors provide high-quality, accurate information for modelling complex, urban environments and road networks. By fusing them with the car’s position and orientation, a fully geo-referenced 3D point cloud is created that captures different perspectives and precise details of the environment. Some road features are changing frequently, while for others a different perspective may be needed. For these situation we leverage sensor data from vehicles and devices, satellite imagery and probe data. Last but not least we collaborate with 3rd parties to expand our coverage and through our platforms we allow them to monetize their data and expand their reach. AI based technology makes it possible to automate the complex processes surrounding the generation of an HD map and make them more efficient.

The benefits of our way of creating and maintaining HD Live Map are:

- Semantic consistency with the other location data for IVI and ADAS which OEMs will be using
- Accuracy for the use case – some use cases require lane level precision others centimetre precision
- Reliability – to be correct in space and time
- Global coverage – products that can scale where our customers are enabling automated driving.

In conclusion we enable the industry with deep location technologies to support key industry needs around automated driving and a location technology platform that allows our customers to develop own automated driving solutions from ADAS to HAD at a Global scale.