



PHOTO: HERE Technologies

MAPPING FOR INTELLIGENT SPEED ASSISTANCE

WITH ALL NEW CARS SOLD IN THE EUROPEAN UNION NOW REQUIRED TO BE FITTED WITH ISA (INTELLIGENT SPEED ASSISTANCE), **PHILIP HUBERTUS** EXPLORES THE MAPPING REQUIREMENT OF A TECHNOLOGY THAT PROMISES A SUBSTANTIAL REDUCTION IN ROAD COLLISIONS AND DEATHS

The anticipation of safe and comfortable autonomous driving has reached fever pitch in recent years. Automakers and startups have been addressing the complex surrounding issues for more than a decade, but navigating autonomously across our extensive road networks remains a challenge. The automotive sector is making progress, and this July saw another important step forward with all new cars sold in the European Union mandated to fit Intelligent Speed Assistance (ISA) technology. This employs a forward-facing camera and the vehicle's satnav system to identify the speed limit and, if the car is exceeding it, to restrict the fuel flowing to the engine until the vehicle returns to the speed limit. Needless to say, mapping has a key role to play in enabling the technology.

Technical requirements for mapping

Firstly, let's outline why mapping technologies are a core part of discussions. The in-vehicle assistance system informs drivers of the speed limit, warns them if they exceed it, and may even prevent them from speeding. This is particularly helpful when drivers are distracted, have missed traffic signs or warnings, have impaired

WHAT IS INTELLIGENT SPEED ASSISTANCE?

1. Car receives position information via GPS and current speed limit from a digital map. Can also be combined with video camera sign recognition.

2. Speed limit is displayed on the dashboard.

Driver can override system by pushing harder on accelerator.

3. Car helps driver not to speed when speed limit is reached.

ISA COULD CUT COLLISIONS BY 30% AND DEATHS BY 20%

Cars fitted with ISA could reduce CO2 emissions by 8%

EuroNCAP awards extra points to cars fitted with ISA

78% of road users 64% of car drivers say they support in-vehicle speed limiters (SATRE 2012)

ISA is part of the 'second wave' of active safety measures – using cutting-edge technology such as on-board sensors, radar, cameras, GPS and lasers – that is being fitted to passenger cars. It should be noted that the variant of ISA that is now mandatory in the European Union can be switched off and is overridable. Source: European Transport Safety Council



What about ISA in the UK?

Although the Department for Transport was involved in pre-Brexit plans for ISA, there is currently no legal requirement for new cars on Britain's roads to be fitted with the technology and no government decision has yet been taken to follow the EU lead. However, since most cars manufactured in Europe are also sold in the UK, pressure is mounting to have uniformity across the continent.

Mike Hawes, Chief Executive of Britain's Society of Motor Manufacturers and Traders, is among those promoting uniformity: "We look forward to continuing discussions with the UK government on how these measures will be rolled out in this country. Some manufacturers have already been offering these technologies to consumers ahead of any regulations, including Intelligent Speed Assistance, and will continue to do so across the UK. With the heavily integrated nature of the UK and European automotive sectors, regulatory divergence is not advantageous for either party."

In the latest announcement from the Department for Transport in July of this year*, there is an indication that cars, coaches and lorries with self-driving features, including automatic lane keeping and speed control, could be operating on Britain's motorways in the next year. Plans have also been set out for new legislation that will see the safe wider rollout of self-driving vehicles by 2025. This is being backed by £100 million for research into safety measures that will inform more detailed legislation.

In announcing the move, the then Transport Secretary Grant Shapps said: "We want the UK to be at the forefront of developing and using this fantastic technology, and that is why we are investing millions in vital research into safety and setting the legislation to ensure we gain the full benefits that this technology promises."

* <https://www.gov.uk/government/news/self-driving-revolution-to-boost-economy-and-improve-road-safety>

new level while taking us one step toward mainstream AVs in the years to come.



Philip Hubertus is Director Product Management ADAS & Automated Driving at HERE Technologies with its global headquarters in Amsterdam, The

Netherlands (<https://www.here.com/>)



Map data that provides the speed limits and conditions for every road segment, regardless of visibility or availability of signs, weather, vehicle type and time of day is a critical part of ISA. HERE Technologies is working with nine of the top 10 vehicle OEMs in the EU to ensure that its ISA Map provides a set of data that enables an ISA implementation for all vehicles, even those with no navigation capability. Source: HERE Technologies

visibility in bad weather, or have difficulty recognising situational speed limits. However, implementing the driver aid requires a well-thought-out system that combines cameras, an electronic horizon and digital maps.

A key challenge for driver aids such as ISA and autonomous driving is that vehicle cameras cannot detect all speed limits. In some countries, signs are more explicit than in others. Some roads also have speed limits that vary depending on time of day, weather conditions and type of vehicle. As such, speed limits are not always perceptible to cameras. For advanced driver-assistance systems to remain effective, automakers should consider investing in map data that provides the speed limits and conditions for every road segment, regardless of visibility or availability of signs, weather, vehicle type and time of day.

Assessing data points

ISA systems access various data points to determine the permitted speed. Forward-facing cameras, satellite positioning systems, an electronic horizon, and map data that includes all speed limits — whether sign-posted or not — are the minimum requirement.

This takes us to the concept of a forward-looking 'electronic horizon'. The future needs a type of software that combines digital map data with information about position and road conditions from sensors to create a model of the road ahead. Data from the electronic horizon is made available to the speed-assistance system to ensure it functions without error, meeting system requirements that cannot be done purely via sensors.

HERE Technologies has been actively contributing to the ecosystem in this respect. The map data consumed by the electronic horizon is built and constantly maintained using a highly diverse mix of HERE and third-party sources. The captured field data

adds local road rules and unobservable data to the mapping with greater precision than can be provided by production vehicle sensors alone. To maintain the data and identify changes, we use a growing pool of sensor and probe data that all feed into our map-making process. Highly automated mapmaking and publication pipelines allow real-world changes to publish faster — thus creating stronger ISA solutions.

Path to autonomous driving

The technologies used in ISA can also be used in advanced driver-assistance solutions that go well beyond detecting and displaying speed. These can include displaying a warning for drivers who exceed the limit. Moving past a relatively simple driver-assistance system such as ISA and into advanced driver assistance requires ultrasonic, radar and Lidar sensors. These can provide additional information about the immediate driving environment, including distances to obstacles or other objects. Examples of applications in this area include adaptive cruise control, lane-keeping assistance, and systems that ensure greater efficiency, control systems in hybrid vehicles that switch back and forth between the internal combustion engine and electric motor, emergency braking systems, rearview cameras, and parking aids.

Many auto manufacturers outside Europe have also begun implementing ISA systems, driven by consumer safety ratings, not least in the U.S. With these systems, technologies such as camera systems and digital maps will become the new norm. They will provide drivers with accurate and reliable information on speed limits and motivate them to comply with regulations. Mapping plays a key part here, integrating data from forward-facing cameras to provide a robust and safety-driven approach to autonomous driving. This will see us raising road safety standards to a