



Vehicle Safety Summit Europe
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Conference report

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1 Introduction

The HA EU Watch Project is providing intelligence for the Highways Agency on ITS developments in Europe and is carried out by TRL on behalf of the HA. The project is identifying opportunities for the HA to become more involved in Europe and summarises key information for decision makers and practitioners on activities related to Intelligent Transport Systems (ITS) in Europe.

Telematics Update organised the Vehicle Safety Summit Europe conference to provide up to date presentations on the latest vehicle safety developments, focusing on the areas of advanced driver assist programmes, driver distraction, safety communications including eCall and the new era of active and passive vehicle safety. The event was held at the Marriott Hotel in London, 14-15 May 2007.

This report provides a summary of the proceedings, focusing on the sessions with particular interest for the Highways Agency. For further information contact ha_euwatch@trl.co.uk

2 Advanced Driver Assist Systems

2.1 Digital Maps for Enhanced Active Safety

From the perspective of involvement in strategic research at Tele Atlas and as a member of the ADASIS (Advanced Driver Assistant Systems Interface Specification) Forum, Stephen T'Siobbel gave a short overview of the ADAS (Advanced Driver Assistant Systems) Horizon Concept.

Digital maps have the potential to enhance or enable preventive and active safety applications by extending the driver's horizon. A predictive sensor in combination with in-vehicle digital maps can be an important source of information, enabling ADAS applications to 'look ahead' and provide further information for on-board sensors, enhancing in-vehicle information about the vehicle's environment.

The first applications of map-supported ADAS entering the market are currently using the vehicle's navigation system as the map data source, with a proprietary interface. The advantages of using the navigation system are that it already has a stored record of the map data, and it already performs the tasks of vehicle positioning and map matching. By standardising access to map data and vehicle position by applications other than navigation, irrespective of the data provider and physical storage format, ADAS applications can focus on performing their main task without having to deal with the complexities of map representation.

Within the EC-funded PReVENT IP, the MAPS&ADAS subproject is developing, testing and validating appropriate methods for gathering, certifying and maintaining ADAS content. This will enable the provision of ADAS maps as well as a standardised interface between ADAS applications and ADAS map data sources for accessing map data on the vehicle's position.

Research Engineer for Ford Research & Advanced Engineering, Christian Ress, gave an industry view of the potential for map data to support innovative safety applications. His main focus was on the need for an improvement in predictive information for drivers; in the near-term this can be achieved by reducing camera errors and improving mapping and in the long-term by using 'memory' of previous journeys made by the vehicle.

Herr Ress ended his presentation by announcing that results of ADAS Horizon would be shown at the PReVENT IP Exhibition, 18-22 September 2007 in Versailles, Paris.

2.2 Digital Map Integration with Advanced Driver Assistance Systems

Vice President of Driver Assistance Systems at NAVTEQ, Robert Denaro, joined Bernd Rössler of Iboe Automotive Sensor GmbH for a panel discussion on the enhancement of existing and future ADAS applications by looking at map-driven ADAS applications in detail.

Mr Denaro explained the current BMW ADAS platform whereby the ACC (Adaptive Cruise Control) is made aware of the classification of the road on which the vehicle is being driven by using digital mapping; it then adjusts the vehicle's acceleration rate to suit the type of road.

Mr Denaro was keen to see an improvement in map enhancements to realise the full potential of ADAS systems. He warned that too many false warnings, as a result of poor digital mapping, would result in drivers simply switching systems off (or not purchasing them in the first place), thereby eroding any potential safety benefits.

He then explained how maps are integrated at the sensor level and described the architectures available to support map integration at a minimal cost. Currently most ADAS systems tend to be integrated with the vehicle's 'infotainment' and navigation systems. The ideal architecture would be to incorporate the GPS and map data directly into the ADAS system. This would enable stand-alone ADAS without the need for a navigation system or display, which would maximise the safety benefits whilst controlling costs.

Mr Rössler introduced the laser sensor technology which can be integrated with digital mapping to enhance the safety capability of ACC. Current systems are able to warn drivers of pedestrians up to 80 metres away and other vehicles within a range of 300 metres in all conditions.

He finished by highlighting the potential for future laser based scanning ACC being able to recognise and warn the driver of many objects such as road works and lane markings. The next generation of 3D mapping could potentially provide further improvements in ADAS by enabling 3D renditions in navigation systems; these would enable the driver to view exact representations of the route being travelled.

2.3 Driver Assist Perspectives

Principal Analyst at Telematics Research Group, Egil Juliussen, gave an overview of Driver Assist (the US term for ADAS), examining the latest trends and market forecasts. He then looked at which specific applications have the most potential to save lives and add value to safety systems.

The main goals of Driver Assist are to:

- Improve response times by early danger detection and notification
- Improve safety margins by warning driver of driving hazards
- Improve driver vision particularly in night, in fog, in blind spots, on bends etc.
- Improve driver skills to limit driver errors and overreaction
- Counteract distractions from 'infotainment'/mobile devices
- Improve convenience by making actions less stressful, tiring and boring
- Crash impact mitigation when needed

Mr Juliussen put Driver Assist in context by stating that 51% of accidents in the US involve vehicles going straight ahead. Driver Assist systems such as Adaptive Cruise

Control, Collision Warning and Mitigation and Brake Assist could all help to mitigate such incidents.

Current Driver Assist Systems were described as follows:

- **Electronic Stability Control** corrects over/under-steer and helps prevent skids and spins
- **Adaptive Cruise Control** has forward-looking radar to keep a constant distance from the vehicle in front and can improve traffic flow
- **Lane Departure Warning** has a forward-facing camera which tracks lane markings and warns when the vehicle is drifting
- **Parking Assist:** ultrasound or camera provides a picture or sound alert
- **Adaptive Lighting** turns the front lights when the vehicle turns
- **Night Vision** is the use of infrared lights
- **Head-up display** is the projection of information on the windscreen reducing time needed to examine instruments
- **Collision Warning** is a forward-looking radar crash alarm
- **Brake Assist** applies maximum braking force early if needed

The emerging Driver Assist Systems presented were:

- **Collision Mitigation** where the vehicle intelligently prepares for an impact
- **Activate safety devices** such as stop-go ACC using a forward-looking radar
- **Automated Parking** using front and rear cameras
- **Blind Spot Detection** using Mirror/other cameras
- **Driver Monitoring** using a camera to watch driver alertness

Mr Juliussen predicted sustained growth in the availability and uptake of Driver Assist systems, particularly in the US, where penetration is already higher than in either Europe or Japan.

Simulations in the US have shown that ACC tends to break the “wave pattern” of stop-and-go traffic congestion. Benefits are realised even if only 10% of cars have ACC.

The impacts of ACC were summarised. ACC will even out the traffic flow speed and eliminate an increasing portion of wasteful stop-and-go cycles. This improves fuel consumption. There are also cost and time savings for drivers. Thus ACC could have a substantial beneficial impact on a country’s fuel usage once sufficient numbers of vehicles are equipped with ACC systems.

3 Driver Distraction

3.1 Gesture Recognition and the future of an in-vehicle HMI

Technical Specialist HMI Technology Strategy – Advanced Driver Controls and Electronics for Jaguar and Land Rover Technical Research, Carl Pickering explained the driving task in detail to put the features of HMI (Human Machine Interface) into context. The main driver distractions identified were related to radio, vehicle controls and cellular phones. During an HMI study of 100 drivers over 13 months, driver distraction was responsible for 80% of all crashes, 65% of near crashes and 93% of rear-end crashes.

The goals are to create a distraction free user interface with the aim of reducing the duration of each glance away from the road and to pioneer greater use of voice commands for vehicle control. Current multi-modal HMIs exist as touch screens and rotary wheels. The aim is to develop a natural language interface to make voice commands viable. Work is also taking place to develop hand gesture commands which are easy to remember and have a low cognitive load. The success of HMI will clearly depend on how suitable the applications are and on user acceptance.

3.2 Anders Edlund – Bluetooth and Vehicle Safety

Marketing Director for Bluetooth SIG, Anders Edlund spoke in detail about developments in Bluetooth communication technology. He explained how reliability and stability have improved, whilst power consumption for remote devices has been reduced. There was little reference to how these developments would benefit vehicle safety.

4 Safety Communications

4.1 The European Commission's view on progress with the eCall initiative

The Deputy Head of Unit, ICT for Transport, EC DG INFSO, Juhani Jääskeläinen gave a European Commission perspective on progress with eCall. He started by outlining the revised plan for implementation. The EC is hoping to that eCall will be available in all newly type-approved vehicles by 2010. He expressed concern at the lack of support by stakeholders and the low number of Member States, particularly the highest contributor states, which have signed the eCall Memorandum of Understanding (MoU). He mentioned that a 'high level' meeting would be taking place in Germany on 6th June 2007, at which a decision is likely to be taken on whether Germany will sign the MoU.

The work currently under way to establish standards was mentioned, including how it is being divided between the standards organisations. CEN is working to establish the Minimum Set of Data to be transmitted in eCall messages, ETSI is working on standards for communications technology while ISO is looking at standards for system architecture.

Mr Jääskeläinen then discussed the issues for the telecoms industry, vehicle and device manufacturers and service centres.

He mentioned that the telecoms industry had been slow to get involved but is now starting to show greater interest. Privacy is still a considerable issue which will need to be resolved. Safety and security issues mean that Bluetooth technology is not a viable option at this stage. Overall the telecoms industry is undecided, and without a clear business model there are issues with the opportunities for possible additional services versus the additional cost of providing an eCall service. This situation is further complicated by the need to plan for any likely post eCall telematics services such as internet multimedia.

For manufacturers, there is concern that future bought-in nomadic telematic devices will eventually require access to the vehicle's CAN-Bus for full functionality; vehicle manufacturers have been shying away from dealing with this problem. There is also the problem of nomadic devices not being robust enough, creating safety concerns. It is likely that an embedded system will be required. There has been considerable discussion around whether or not to make use of SIM cards and this has not yet been resolved. Unfortunately the device manufactures have been reluctant to engage in open forums to address these issues.

For service centres, one of the standards will need to be revised before the eCall 'Flag' concept can be implemented, enabling the call to be identified as an 'eCall'. This would then make possible the service centre concept for eCall, as proposed by Germany. A final agreement is required on the standard for MSD transmission, either as an in-band or proprietary SMS (as preferred by the French). There are also issues to be resolved within Member States concerning the PSAP (Public Service Answering Point) workload, such as the use of service centres to act as filters for calls.

4.2 How Volvo re-invented OnCall: Bundling eCall with other telematics applications

The Extended Offer Manager at Volvo cars, Joost van den Bosch explained Volvo's vehicle-embedded wireless two-way voice and data communication system called OnCall. The system enables delivery of existing services with capability for the addition of value added services.

A five tier safety/security package can be purchased in addition to the integrated phone system. This enables automated notification to emergency services following a collision. Manual activation is also possible without airbag/seatbelt tensioners being deployed. The security features enable tracking of the vehicle following alarm activation, and remote vehicle access should there be a problem with the vehicle's keys.

The On Call system is currently available in 11 EU member countries and has cross-border capability.

4.3 eCall Deployment and Emergency Assistance

Telematics Director at SBD, David McClure introduced his view of what should be the guiding principles for eCall. These were:

- eCall is a safety system and therefore any design architecture must be robust and reliable.
- There is no business case for stand alone eCall and without the addition of values added services, stakeholders will not be able to recover the cost of development and deployment.
- There is no chance of meeting the current EC timetable for eCall by 2010 and the plan should be updated so that it is realistic.

Mr McClure looked at the technical considerations for an eCall system to operate effectively and be able to meet the first of these guiding principles.

He suggested that eCall should include a SIM card, enabling the PSAP to make a call to the vehicle should there be a disconnection. A SIM card would also enable additional services and allow eCall to work in all EU countries without changes to GSM standards. However he suggested that the SIM should be 'dormant' to avoid network capacity issues and overcome privacy concerns.

He also recommended that eCall must be embedded in the vehicle; he did not consider that the alternative solution based on a mobile phone/bluetooth is sufficiently robust to operate as a safety system.

A cautionary note was made concerning the continued availability of GSM technology in 10 years time. This is similar to the current problems being experienced by the US with moving from an analogue to a digital network.

The debate is continuing over the best communication solution. There may have been a perception that In-Band Modem (IBM) was being imposed with insufficient debate regarding the optimum solution. The IBM solution is making slow progress through CEN with some Member States preferring the two chances of successful communication offered by a combined voice call and SMS solution. Mr McClure highlighted that one of the main reasons why the current timetable was in jeopardy was that five years on since the inception of eCall, the communication situation is still no nearer to being resolved.

The lack of a business model to support a stand-alone eCall system means that stakeholders such as the telecoms and vehicle manufacturers will need to investigate value added services such as remote diagnostics, if they are to justify the cost of equipping vehicles.

At the moment there is a lack of signatories to the eCall Memorandum of Understanding (MoU). The MoU is perceived as a letter of intent, with limited support from the Member States which make the higher contributions to the EC.

- Currently no mobile telecoms companies have signed up or offered any great support.
- The European Automobile Manufacturers Association (ACEA) originally signed the MoU but support has not been unanimous.
- Germany is expected to make a decision about signing the MoU on June 6th and this may act as an opinion former for other Member States.
- Italy has signed but has offered little support subsequently
- Spain is reluctant to sign, possibly due to the poor performance of an emergency call system trialled by taxi drivers
- The UK is taking a cautious approach but is expected to follow Germany's lead
- France is supporting the PSA Peugeot Citroën solution

As the situation stands Mr McClure believes that the September 2010 target for eCall equipment in all newly type-approved vehicles is not achievable with there being no standards, no testing or certification that a system works and limited commitment from stakeholders. He offered three scenarios for the future of eCall.

- Optimistic – all parties sign the MOU, standards agreed and follow the current timetable
- Pessimistic – abandoned due to a lack of support (but eSafety support by EU remains)
- Realistic – a compromise made by stakeholders with early adoption by Finland and Sweden in 2010 and a phased roll out across Europe between 2010 – 2012.

Mr McClure concluded by noting that the key success factors still needed to achieve the more realistic scenario offered above require that the separate groups such as ACEA, CEN, ISO, eSafety, GST and DG INFSO focus on the issues and re-form a group of decision makers to take eCall forward. He stated that if eCall remains a research activity then it is unlikely that it will succeed. Instead, key players need to get around the table and reduce the options available, in order to achieve a workable system.

4.4 Intelligent Infrastructure and Intersections

Research Department for Ibeo Automobile Sensor GmbH, Bernd Rössler introduced the INTERSAFE project aimed at reducing and ultimately eliminating fatal collisions at intersections. An intersection driver warning system has been developed to deal with a number of scenarios facing drivers. Problems associated with left turns (right turns in UK), right of way and red light running are addressed by a laser-sensor based early warning system which can notify the driver, both audibly and visually, if it detects that there may be an imminent collision.

The first approach involved a simulator demonstrator to investigate critical situations without endangering life. The second demonstrator concept consisted of a vehicle fitted with laser scanners to detect objects and landmarks and a camera to detect lane markings in the field of view.

Initial results show that laser scanners are able to identify other vehicles up to 200m away, and motorcycles up to 150m away. The left turn system gave 10% false warnings when a collision was not imminent, but did warn of all imminent collisions. The danger at the moment is that too many false warnings will encourage the driver to disable the system or not purchase such a system in the first place.

5 The New Era of Active and Passive Vehicle Safety

5.1 Active Safety and Telematics Outlook

Automotive Department Head at Oliver Wyman (Formerly Mercer), Dr. Jan Dannenberg gave an up to date analysis of the opportunities and challenges facing various parts of the automotive value chain as the industry becomes ever more focused on in-car electronics.

5.2 Integrating Active and Passive Safety Technology

Head of Technology Placement and Benchmarking - Automotive Systems division at Continental, James Remfrey introduced the many passive safety systems which Continental are bringing to the marketplace as an OEM. The main focus was on how the cost and weight of systems are constantly being improved and that technology such as ACC and Brake Assist will eventually become a standard fitment, as Anti-lock Braking System (ABS) has already become.

5.3 Post Crash Services – A National Emergency Contact Registry

President/CEO for Roadside Telematics, Lawrence E. Williams, gave an up to date report of how technology innovation enables emergency response personnel in the US to gain instant access to vehicle owner emergency contact information after a traffic accident.

Road traffic accidents cause the highest number of unconscious hospital admissions in the US. Post crash services are currently taking 6 hours on average to identify and notify the next of kin. This has in some cases meant that valuable medical history of the patient was unavailable to assist in treatment.

Roadside Telematics are working with US motor manufactures to operate a National Emergency Contact Registry to speed up the time it takes to notify relatives of an incident and gain immediate access to important medical history for the casualties.

5.4 Tackling Freight Safety – Local Authority Plans, Mapping and Satellite Navigation technology

Senior Product Manager, Product and Programmes at Ordnance Survey, Gavin Jackman, gave an insight into the improvements being made in the data content of Ordnance Survey digital maps. These are enabling satellite navigation vendors to include vehicle specific features in their systems.

Previously no accurate data has been available on road restrictions on weight, width and height of vehicles. Ordnance Survey have collected data across the UK, incorporated it into their base mapping and are now making it available to satellite navigation vendors to build commercial systems. As the technology becomes more commonplace there should be fewer cases of HGVs travelling on unsuitable roads in rural and urban areas, increasing safety of freight transport and for the general public.

5.5 The Future of Vehicle Insurance

Director for World Motor Insurance Consultancy and Chairman of the CEA prevention and Road Safety Committee, Jack Brownhill, gave the insurance industry view on ever evolving vehicle safety and telematics technology.

6 Recommendations for the Highways Agency

The event was a valuable and worthwhile opportunity to enable HA EU Watch to update the HA on the latest developments in vehicle safety systems.

It is recommended that the HA should consider attending the PReVENT demonstrations and associated events in Versailles on 18 – 22 September 2007.

ADAS systems continue to evolve and developments in both active and passive safety systems should continue to be monitored; the benefits which are now being claimed for some systems - especially ACC - in terms of improved safety and smoother traffic flows, have direct links with two of the HA's goals: safe roads and reliable journeys.

The HA should note the issues faced by the various groups of stakeholders in taking forward the eCall initiative: the lack of a business model, the on-going discussions on communications and the relatively small number of Member States currently committed to the eCall MoU are key issues. eCall developments will continue to be monitored by the research project on implications of eCall for the Highways Agency.

7 Glossary

ABS	Anti-lock Braking System
ACC	Adaptive Cruise Control
ACEA	Association of European car manufacturers
ADAS	Advanced Driver Assistance Systems
ADASIS	Advanced Driver Assistance Systems Interface Specifications
CAN-Bus	Controller Area Network serial bus for in-vehicle data transfer
CEN	European Standards Organisation
COMeSafety	FP6 eSafety support programme
DG INFSO	Directorate General Information Society and Media in the European Commission
eCall	Emergency Call
ETSI	European Telecommunications Standards Institute
GPS	Global Positioning System
GSM	Global System of Mobile Communications
GST	Global System for Telematics
HGV	Heavy Goods Vehicle
HMI	Human Machine Interface
IBM	In-Band Modem
IP	Integrated Project
ISO	International Standards Organisation
ITS	Intelligent Transport Systems
PReVENT	Preventative and active safety applications
PSAP	Public Service Answering Point
MAPS&ADAS	Digital Maps for ADAS
MoU	Memorandum of Understanding
MSD	Minimum Set of Data
NAVTEQ	Navigation Technology Company
OEM	Original Equipment Manufacturer
SIM	Subscriber Identity Module
SMS	Short Message Service