

EUROTECH ISIS HELPS MOTORCYCLISTS RIDE SAFELY

SAFERIDER is a major international project designed to improve safety and comfort for motorcyclists through advanced technology. Eurotech have been working with MIRA on one of the key elements, the Advanced Rider Assistance Systems (ARAS)

CASE STUDY



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Launched in January 2008 by the EU as a 3-year research programme, SAFERIDER has been a major international project designed to improve safety and comfort for motorcyclists through the use of advanced technology. Cooperating closely in the UK with global engineering consultancy MIRA, Eurotech is contributing to SAFERIDER via its ISIS single board computer, which is a vital component for controlling Advanced Rider Assistance Systems (ARAS) technology.

Motorcyclists are among the most vulnerable road users. The latest publicly available statistics from the EU Energy and Transport 2009 state that a motorcycle rider is 20 times more likely to die in a crash than the occupant of a passenger car.



Funded by the European Union under the EC Framework FP7 Research Programme, SAFERIDER has aimed to bring advances in automotive technology that have revolutionised safety for cars and other four-wheeled vehicles into the arena of powered two-wheelers (PTWs). Using innovative and imaginative strategies, the project has identified ways to increase protection for motorcycle and scooter riders through providing real-time data to the rider relating to the journey, road conditions and how the vehicle should be handled. The scope of this collaborative venture has been ambitious and impressive, involving a consortium of 21 leading companies in motorcycle manufacture and component production as well as other vital accessories such as crash helmets.

SAFERIDER delivers in two major areas - direct warnings for riders (ARAS - Advanced Rider Assistance Systems) and journey information/communications (OBIS - On-Board Information Systems). The Eurotech ISIS fanless single board computer, based on the Intel® Atom™ processor and offering exceptional high performance at ultra-low power consumption, has proved the ideal solution for MIRA's ARAS Control Module (ACM) to process

warning algorithms. The ISIS is compact and exceptionally robust, enabling it to operate fully and reliably in the wide range of external conditions that can affect the motorcyclist on the road.



Eurotech ISIS Single Board Computer

Tim Edwards, Senior Engineer at MIRA, explained that pilot schemes had been taking place in the UK, France, Italy and Greece, with ARAS and OBIS applications being successfully developed and tested on eight demonstrator bikes and three riding simulators. *"We applied our experience of Advanced Driver Assistance Systems (ADAS) used in passenger cars and found that the main challenges for ARAS were dealing with the inherent instability of the vehicle, compensating sensor measurements for the pitch, roll and yaw of the bike, and positioning the vehicle on the road, since you cannot assume it will stay central in its lane. Calculations for the warning systems were very processor intensive, which was a major reason for our selection of the ISIS, with its high speed Intel® Atom™ CPU, as the main ARAS platform."*

ARAS works on information received by the ACM via CANbus (controller area network), from which it updates vehicle, obstacle and road models. The four ARAS applications run by the ISIS are:

- Speed Alert (SA) – developed by MIRA, with the severity of the warning determined by the amount the speed limit is exceeded
- Curve Warning (CW) – comparing the rider's manoeuvre with an alternative complying with system dynamics, trajectory constraints and safety criteria. If there is a mismatch, a warning is activated
- Frontal Collision Warning (FCW) – similar to CW, this detects a dangerous obstacle ahead and provides the appropriate warning

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- Intersection Support (IS – fusing SA, CW and FCW functions - it is worth noting that the Motorcycle Accidents In-Depth Study - MAIDS -records that 54.2% of accidents involving motorcycles happen at road intersections)

The ways that the ISIS is involved with driving the HMI (Human Machine Interface) for the ARAS warning functions is ingenious, based on a modular strategy that is wholly different from counterpart safety measures in passenger vehicles. On-screen information is not sufficient for alerting a rider driving a motorcycle at speed and the need to minimise weight of any on-bike technology is also a vital factor. Warnings and information are therefore spread through different contact points: audio and haptic (vibration) signals in the rider's crash helmet and haptic warnings via the glove, handle, throttle and seat. For instance, the haptic seat will simulate a rumble strip in order to warn the rider to slow down!



ARAS is complemented by OBIS (On-Board Information Systems) to complete the exceptional technology being made available to the motorcyclist. These functions include:

- Navigation and route guidance
- Tele-diagnostics
- Weather, traffic and black spot information
- E-call, generated when an accident occurs

Tim Edwards commented that producing the kind of technology available in cars sized down to be feasible for motorcycles has been a major challenge. *"We built a custom operating system for the hardware based on Linux From Scratch. Eurotech was helpful in the selection of hardware - with The PC 104 form factor of the*

ISIS being an important consideration, because the board is small and light enough not to interfere with motorcycle safety.

There are eleven different SAFERIDER applications and some will require a further period of refinement and testing, but there are very few hurdles to market. The SAFERIDER Final Event and Demonstration at MIRA in November 2010 was a successful conclusion to an exciting and important road safety project."



For more information on Eurotech please visit our website www.eurotech.com or contact our sales team on +44 (0)1223 411200 or email sales.emea@eurotech.com.

Images courtesy of MIRA.