Sending
out an SOS

As eCall looks set for Europe-wide deployment in 2015, **Louise Smyth** speaks with one of the experts driving forward the life-saving technology – and asks what impact it could have on the EU's Decade of Action targets

Illustration courtesy of Jason Cook

Following a lack of progress in introducing a European eCall system voluntarily, policy-makers in Europe have now backed plans to make the system mandatory on all cars built in the EU from 2015. At the coalface of ensuring the 2015 date is met is ERTICO, which has coordinated the research and development of eCall up until now. The association's HeERO (Harmonised eCall European Pilot) project is at the center of the drive, the aim being to conduct and coordinate a number of pre-deployment pilots that adhere to eCall's approved standards. Given the UK is yet to sign up to be part of the pan-European safety concept (citing costs reasons), it is somewhat ironic that the man leading the project is a Brit.

Prequels to eCall

Andy Rooke served as an officer for the UK's Sussex Police for many years, specializing in roads policing and road death investigations. He became aware of the potential of ITS in the late 1990s when it was in its fledgling stage in the UK. In 2002, the country's police force was involved in a European-funded research project called eMERGE, described by Rooke as "the Granddaddy of eCall". Concluding in 2004, eMERGE was superseded with GST RESCUE, in which the details of how such a concept should operate were essentially thrashed out. Rooke himself left the force in 2006 to join a traffic management company, but last October received a call from ERTICO asking if he'd head up the HeERO project. "I grabbed it with both hands as it was an opportunity to finish off something I'd already started," he enthuses.

His role as project manager sees him providing strategic direction and, in Rooke's own words, "sorting out any problems along the way". It also involves ensuring that the nine pilot sites within the HeERO 1 project continue to function and subsequently ensuring that the dissemination of eCall continues until it is ready for deployment in 2015. Now is a busy time for Rooke, as the second round of live testing for eCall is about to kick off across eight of the nine pilot sites. Rooke and his team are also in the middle of negotiations with the EC for the HeERO 2 project, for which papers for another six pilots were submitted in May.

How will it function?

By participating in all of this work, Rooke is able to offer a very accurate explanation as to how the European eCall system will function. "There are three specific elements – the in-vehicle system, the use of a mobile phone network, and then there is the PSAP (public safety answering point)," he says. "The eCall in a vehicle can work in two different ways. Firstly, you can get a manual activation (a push button inside the vehicle), which is either for a medical emergency in the vehicle or a good Samaritan call – so if you witness a collision somewhere, you push the button and make the automated 112 call.

"It can also happen automatically, i.e. machine to machine," Rooke continues. "There are a number of defined parameters within a vehicle for events that will trigger an eCall: in the simplest terms, this would be airbag deployment. You can also couple it with things such as airbag deployment with electronic brake distribution, seatbelt pretensioners going off or fuel cut-off."

Once the vehicle has determined it's been in a collision, it does two things. "It starts to make contact with the mobile network," Rooke says. In-vehicle systems forming part of eCall are dormant, an important feature that guarantees privacy. "The SIM knows where it is but it's not actually physically on the network," he explains. "Imagine when you switch your mobile off and then reboot; it can take some time to work out which network it wants and then register on it, whereas this is almost instantaneous. Once in the process of opening a communication channel, the machine starts to assemble a 'minimum set of data', which includes the vehicle's VIN, the time and date, fuel type, possibly how many passengers are on board and the three most recent geo positions."

This last point is what's known as 'breadcrumbing' and is used to provide information in case of crossover. "If a vehicle is traveling north, has a collision,

Andy Rooke says that feedback from the emergency services has been overwhelmingly positive, aside from one notable concern. "That's how the manual eCall will be managed," he explains. "If you have a push button in a car, we know curiosity alone will lead to a number of false activations, despite the fact that it's a covered button, says 'SOS' on it, and you have to press and hold it down.

"People are undoubtedly concerned about this, but the phenomenon is hardly new. The emergency services have been dealing with prank calls, pocket-dialing from mobile phones, and so on, for years already. And the Dutch police and the UK's BT in particular have some very robust systems for dealing with these types of situation. We are aware of the concern and we know we need to manage this issue and get it right."

crosses the carriageway and ends up facing to the east or the west, you can see its trajectory," Rooke says.

The other important piece of data included in the minimum set is what's called an 'eCall flag'. "The vehicle makes the 112 call and the eCall flag tells the mobile network that it is in actual fact a proper eCall and that there is data attached to the voice channel, so the communication gets priority across all networks," Rooke explains. "It picks the strongest network and switches to the PSAP, which has a machine that accepts that and sends a tone back to the car – a bit like a fax tone. The vehicle knows 'I've got a connection; I can now send this burst of data'. That then gets transmitted to the PSAP and once received, the voice channel opens and the operator can speak with the vehicle."

System integrity

But while all the above is fine in theory, how robust is the system? "We're getting good results but that's not to say it is without refinement," Rooke says with an air of cautious optimism. "We're working to published CEN and ETSI standards. What hadn't happened prior to HeERO was getting these standards tested in the real world, so now we are in discussion with the relevant bodies and are able to say 'These parts of the standard need a little tweak'."

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Andy Rooke, project manager of HeERO at ERTICO, Belgium

One would also suggest that more 'tweaks' will be on the cards in the short-term, with a move away from the seemingly archaic 2G communications that the current system relies upon. Not so, according to Rooke. "The decision has been made that it will remain with 2G. All sorts of discussions are going on about 3G, 4G, etc., but for the near-term, we will be sticking with 2G."

Aftermarket devices

However, Rooke does reveal that while the current focus is on an in-vehicle eCall system for all new type-approved vehicles, he's also investigating the issues surrounding aftermarket eCall devices. "In the new HeERO project, discussions on this issue will take place," he says. "It's already been done in the USA, with GM's OnStar system, and you only have to do a Google search to find a retrofit eCall solution that's included in the rearview mirror."

Systems such as these sound like an ideal way to equip an entire vehicle fleet far more quickly than waiting until drivers upgrade their cars, but Rooke has a big concern about going down the

aftermarket path: "You have to ensure that what you buy is fit for purpose," he warns "HeERO 2 will look at this because although there are published standards, there's nothing that actually says 'This is the service you should provide and this is how you should install'. If we get to a situation where aftermarket-type devices are the way forward, there needs to be a robust certification process, in a similar vein to the one taking place for cell phone handsets."

Whatever the future path, eCall's life-saving potential is evident. It's been estimated that a pan-European system could save around 2,500-3,000 lives a year, although Rooke admits it's a tricky figure to calculate. "The number of lives saved is a very difficult question to answer, but if I approach this from my policing background – that if you can dispatch the right emergency resource to the right place at the right time – your chances of success in terms of achieving a good outcome go up exponentially. We're looking to reduce the number of fatalities to serious injuries and serious injuries to slight.

"A fatal crash is essentially a random event with so many diverse circumstances converging to make it happen that you need to look to the point where you can influence the outcome," he continues. "If you know you can dispatch an emergency response to the right place and en route the emergency services know what vehicle it is, everyone is better equipped to manage that event, to ensure the best possible outcome.

(Above left) **HeERO is delivering a set of reports on eCall implementation and best practices to accelerate the deployment of the service in the EU**
(Above right) **Getting an immediate alert in the event of an accident and knowing the exact location of the crash site cuts emergency services' response time by 50% in rural and 40% in urban areas**

Knowledge is power

"I was talking to the Czech fire service recently and they said that just knowing exactly what car it is would help them immensely. If we can tell them 'It's a Ford Mondeo manufactured in the first quarter of 2010', they then know exactly where to cut that vehicle. Modern vehicles are like bombs on wheels – if firefighters cut into the wrong place, they can potentially trigger an explosion. So with a system that informs them where to cut, extraction times tumble. Likewise, knowing how many occupants there are in a vehicle means the ambulance service knows how many ambulances to send. The more sophisticated systems will tell what type of accident they've had so you can predict the types of injuries you could potentially be dealing with, which could subsequently determine which hospital victims might need to be taken to in order to receive the very best specialist treatment."

Rooke is keen to make such a vision a reality – and then some. "If I could do anything, it would be to firstly get eCall successfully completed in Europe with all member states signed up and equipped, ready to go for 2015," he says. "My next goal is then to extend this to the more vulnerable road users – cyclists and PTW riders.

"Ultimately, though, the lasting legacy I hope eCall leaves is that in the future there are fewer instances of police officers getting out of their cars to take that long walk up a path to knock on the front door of a next of kin to tell them the person they thought was coming home isn't. I've had to do it and it's horrific, so that's a massive driver for me." ○

Added value to the service

Dealing with road accidents quicker has obvious knock-on effects for traffic management, and Andy Rooke explains that ERTICO is slowly making members aware of such benefits. "When I first took on the project, one of the things was to look for value-added services," he recalls. "The way it was couched in the proposal was aimed at a commercial environment – so what money can be made on the back of it? In reality, not a huge amount. But if you look at it from the point of view of managing a strategic road network – and from the perspective of those companies that gather vehicle probe data – you now know you've got an event at an exactly defined point, you know at least one vehicle is involved, and even if it's not a true crash you know the car isn't moving anywhere as its airbags have been activated. All of this being automated will make a huge difference. You can predict how long delays will be, set the VMS to re-route traffic and inform drivers, turn cameras to look at the reference point, and disseminate information via traffic message channels. eCall has huge merits for road operators."