PANEUROPEN PROJECT ECALL – INFORMATION AND FORENSIC ASPECTS OF CAR EMERGENCY

Abstract

In the near future, your new car will have an electronic safety system automatically calling emergency services in case of a serious accident. Even if you are unconscious, the system will inform rescue workers of the crash site’s exact whereabouts, and rescuers will be on their way within minutes. The system, which has been baptised “eCall”, is going to work all over the European Union. It will soon be rolled out across the EU and will further incorporate Iceland, Norway and Switzerland.

As soon as the eCall device in your car senses a severe impact in an accident, it automatically initiates a 112 emergency call to the nearest emergency centre and transmits the exact geographic location of the accident scene and other data. With the same effect, eCalls can also be made manually, at the push of a button. This is convenient if, for instance, you become witness to an accident. Whether the call is made manually or automatically, there will always be a voice connection between the vehicle and the emergency call centre in addition to the automatic data link. This way, any car occupant capable of answering questions can provide the call centre with additional details of the accident.

This article describes the eCALL project from the point of view of car identification and in relation to car’s registration information systems; of forensic and security issues, including stolen cars.

Keywords: eCALL, EUCARIS, Vehicle Identification Number, VIN decoder, HeERO

1. Introduction: Basic Objectives and Principles of the eCALL Project Function

One of the European Commission’s main tasks called “eSafety” within the “Intelligent Car” flagship initiative for the upcoming period is the introduction of the so-called eCALL project on a pan-European scale. A general objective of this pro-
ject is to provide vehicles with automatic electronic (“e”) calling (“CALL”) to operation centres of the Integrated Rescue System (IRS, emergency call number 112) “for help” in case of a traffic accident or the endangerment of the people in the car, and to ensure the shortest possible time of arrival of an adequately equipped and prepared rescue team.

The call for help will be realised by means of special electronic units in the vehicles (so-called OBU\(^1\) or, synonymously, IVS\(^2\)), which all newly manufactured vehicles will be equipped with from 2015, and it will also be possible to install these units into older vehicles.

Every vehicle will be localised by means of GPS and the basic information about the vehicle in emergency will be transferred to the IRS operation centre in the unified telecommunication and data standard obligatory for the EU by means of so-called MSD standards – *Minimum Set of Data*, containing information about the place and time of the accident, telecommunication parameters and essential vehicle data (*VIN*\(^3\), vehicle category\(^4\), fuel used, indication of the activation method of the equipment – i.e. automatically or manually, number of seat belts fastened at the time of the accident). Every vehicle will also be automatically equipped with a voice call communication device (“mobile phone”), so the connection between the vehicle in emergency and the respective IRS operation centre will be established immediately by means of the emergency number 112. In this way any of the people in the car will be able to provide the emergency call receipt desk with additional details about the accident. Similarly, a witness to an accident will be able to call for help for another person involved in the accident from their own car.

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1. OBU – On Board Unit.
2. IVS – In Vehicle System.
3. VIN – Vehicle Identification Number.
4. Whether a passenger car, lorry, motorcycle, bus etc.
The entire project will be working on a pan-European basis, i.e. for example Czech rescue services will be able to provide assistance to any vehicle involved in an accident within the territory of the Czech Republic (and registered in the Czech Republic), as well as provided assistance to all citizens of the Czech Republic in their cars abroad.

Measures to reduce the number of victims and serious injuries on European roads are inevitable! In 1.15 million traffic accidents in the road network of the EU alone in 2009 approximately 35,000 people died and approximately 1.5 million were injured.
Immediate notification about the accident and the knowledge of the exact position of its occurrence reduces the time necessary for the provision of effective assistance by 50% outside cities and by 40% in cities. Thanks to this time saving it is expected that the eCall system will save up to 2,500 human lives in the European Union every year and reduce the serious consequences in tens of thousands injured. Every minute the professional medical assistance for the seriously injured person arrives sooner, it increases the chances of saving the person’s life by up to 10%.

Thanks to the eCall system the timely treatment of people involved in an accident leads to the faster recovery of the injured. Faster arrival to the site of the accident will enable liquidating the consequences of the accident sooner, which reduces the risk of secondary accidents, reduces traffic jams, prevents the increase of fuel consumption and, on the contrary, decreases the \( \text{CO}_2 \) emissions.

In simple financial terms it can be said that the yearly economic loss of the EU caused by traffic accidents amounts to more than EUR 160 thousand million. If all cars were equipped with the eCall system, it would be possible to save up to EUR 20 thousand million a year\(^5\).

\(^5\) http://www.heero-pilot.eu/view/cs/ecall.html
2. HeERO Pilot Project

A pilot project called HeERO (Harmonised eCALL European Pilot) is currently running in several selected European countries (Germany, Finland, Greece, Croatia, Italy, the Netherlands, Romania, Sweden) as well as in the Czech Republic. The project is scheduled for the period from 1 January 2011 to 31 December 2013. The objective is to provide the basic preconditions for the project and to test the pilot project technologies in practice. The project will subsequently be expanded to all European countries.

It is a great honour for our republic to have been selected for this pan-European project as a country having one of the best integrated rescue systems (IRS – phone No. “112”) in the world, with a developed automotive market and, last but not least, with relatively high quality information systems in general, including the administration. All countries for the pilot project were selected as a statistically representative (mixed) reality for the conditions of the project. It is no secret that many car brands are already technically prepared for a project of this kind, or very close to its implementation, so the health and life saving effects may be quite quick and significant.
3. Connection with Information Systems and Vehicle Issues

Besides the determination of the vehicle position (which is displayed on the “digital map” in the operation centre) the system should be connected primarily to state information systems, i.e. specifically to national (central) vehicle registers (soon, again, by means of the pan-European project and EUCARIS\(^6\) technologies – *European Car Information system*) at home as well as in the EU countries. This will make additional supplementary technical data about the crashed vehicle accessible, so the operating officer will be immediately informed e.g. about the type, category and additional technical data (dimensions, weight etc.) of the vehicle, and it will in no way matter what territory the vehicle comes from. The available information will then be utilised for the optimisation and higher efficiency of emergency units (technical equipment, its quantity, specifics etc.), so the solution of e.g. mass accidents, chain accidents, accidents at night where there are, for example, no witnesses available to call for help for the seriously injured or stressed people involved in the accidents etc., will be automated, i.e. the vehicle will be able to call for the adequate rescue service on its own at the activation of airbags or after pressing the emergency button on the dashboard. The information and communication technologies will also help to eliminate language barriers, seeing that many people have died on the roads in the past only because they were not able to explain their position. For more information see, for example, the website of the project: http://www.heero-pilot.eu/view/en/home.html.

4. Crucial Role of the Vehicle Identification and Consequences for the Work of Safety and Rescue Services, Investigators, Forensic Engineers

One of the decisive factors for the technological solution of the entire eCALL project, besides telecommunication and data transfer technologies, and special SW (equipping the IRS operation centres with special SW, such as emergency call receipt and answering, graphic visualisation of the site of the accident in maps etc.), is the vehicle identification according to the VIN (*Vehicle Identification Number*).

The VIN identifier enables determining the basic type-identification data of the vehicle (the brand, basic model, engine type and capacity, power, body shape, year of manufacture, manufacturing plant etc.).

\(^6\) https://www.eucaris.net/
At the same time, in the IT terminology, the VIN is the only primary identification key for the access to additional follow-up vehicle records, from where it is possible to get additional needed data – the registration number of the vehicle, its colour (which is a very important visual identifier for the rescue unit when they arrive at the site of the accident), dimensions, weight, transport area capacity (to provide adequate recovery equipment or necessary capacities for the safe reloading of the transported material from the crashed vehicle and its haulage from the site of the accident).

**5. Conclusion**

The automatic and subsequent follow-up of the eCALL project to additional information systems will bring further positive aspects:

Firstly, this involves the possibility to connect the VIN information on the crashed vehicle with the special type documentation about the vehicle (pictures, diagrams, drawings, text information). Thanks to this, the rescue units will know, even before they arrive at the site of the accident, where the critical construction elements of the vehicle are that may define or limit the “technology” of the rescue action. The documentation states, for example, where the given vehicle type has safety struts in the body structure (usually the doors), which must be avoided when cutting people free from the vehicle, and the location of the fuel tank and fuel supply shut-off valves, batteries, electronic equipment, control systems, airbags gas generators (some airbags may have not been activated during the accident and could injure the rescuer if handled inexpertly, etc.).
Another positive is the connection between central vehicle registers in each country, and further with EUCARIS. IRS bodies will have information as to whether or not the just crashed vehicle is marked as stolen or missing (or otherwise troublesome). This enables, on one hand, immediate co-operation with the police in finding, and subsequently securing, a stolen vehicle that has been involved in an accident. On the other hand, rescue units (fire brigade, medical service) will be informed in time that the vehicle has been stolen, and that it is therefore possible for the people in the vehicle to behave in a “non-standard” manner during the event, i.e. they will try to escape from the site, will not cooperate or will even endanger the rescuers.

Records from the “black box” of the vehicle may tangibly help with the investigation of the traffic accident. Besides the position (coordinates) and time of the accident, they also store detailed specific information about the kinematics of the accident process, as well as on the operation of all key systems and/or components of the vehicle (turning of the steering wheel, intensity and time
of braking, pressing of the gas or clutch pedal, activation of the ABS, ESP systems of the vehicle etc.).

The data about the time and place of the accident, the method of rescue system activation (automatically after the activation of airbags or manually upon pressing the call button) may also help the police and the insurance companies in the investigation of car insurance fraud. Many traffic accidents nowadays are feigned and happened elsewhere at another time than stated by the insured person during the fraud. The archive information may also help to systematically disentangle such facts.

If the open information policy is adopted, the data from the accidents (that will be archived) may also give the purchaser of a second-hand car the information as to whether or not the car has been crashed (and hence repaired) in the past and thus evaluate the price of the car. The information about whether the airbags opened during the accident may help to create the most essential idea that there has been an accident. Many heavily crashed vehicles are repaired now, but in fact an inexpertly repaired vehicle may not correspond to the original construction characteristics from the operational and safety view, thus endangering other road users. The information that the vehicle has been involved in an accident should be crucial for the STK, so that they can focus on these facts during the inspection.

The archive of traffic accidents, including the data from the eCALL project in each country (especially the exact position of the vehicle, date and time of the accident, VIN – i.e. the basic type identification of the vehicle at least on the level of the vehicle model) also provide unprecedented possibilities for computer statistics of vehicle accidents related to particular highways (visualisation on maps), and thus contribute analytically and very quickly to the optimisation of dangerous traffic locations, etc.

6. Bibliography


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8 Electronic Stability Programme.
9 Technical Inspection Station.

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