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Draft for eCall in Sweden

This document is part of the Swedish Road Administration (SRA) commission from the Ministry of Industry, Employment and Communications to prepare for eCall and to provide the Ministry with basic decision-making data in the matter.

eCall in a nutshell

eCall is a system that sends an alarm when a traffic accident occurs. This vehicle-based unit is activated either manually by people in the vehicle or automatically using sensors. Following activation, a communications link is established for direct conversation with an emergency central alarm. At the same time, data is sent about the incident and where it occurred to the alarm centre operator to guarantee a speedy and correct alarm to the emergency services, ambulance and police. The emergency alarm centre could either be public or privately operated, authorised by an authority.

An extended system assumes the alarm signal that is automatically or manually sent from the vehicle to the emergency alarm centre includes the following information:

- Time of the incident
- Exact location and direction
- Vehicle identification
- Identification of service supplier (if relevant)
- Indication of the type of eCall (minimum requirement is information about whether the alarm has been activated manually or automatically).

Because the system is activated by crash detectors, information is also sent even if passengers are unable to send an alarm themselves. False alarms can be avoided by using a mechanism with double controls for the manually activated call or that several independent crash detectors are triggered following an automatically activated alarm. As a voice link is also set up then false alarms and unnecessary alarms should also be removed at the emergency alarm centre.

The system offers a link to private service suppliers for additional, related services such as a breakdown lorry services etc.

Aims and motives for a national project

The aim of the system is to reduce the losses caused by car accidents in terms of lives, suffering and consequently costs for society. The earlier and more precisely medical treatment can be given following an accident the greater the chance that lives can be saved and injuries treated so that long-term suffering can be reduced. In the field of accident and emergency medicine the “golden hour” is a well-known concept to emphasise the importance of early medical treatment. This means that 80 per cent of injured people with serious traumas (head, breast, heavy bleeding etc.) die within an hour if they do not receive adequate medical treatment. The survival rate increases and the long-term consequences of serious injuries are reduced for each minute gained for the emergency services.

American field trials with ACN (Automatic Crash Notification) and European studies indicate that the time between when the accident occurred to the first medical help on the scene can be reduced by up to 10 minutes (almost 50 per cent) in urban areas and by 4-6 minutes (about 40 per cent) in rural areas by using an eCall system.

In a European context, it is stressed that the concept is highly profitable and that eCall is a very efficient solution to road safety problems. As far as Sweden is concerned, there is a more cautious assessment of the potential but in total the concept is still seen as offering a positive contribution to road safety (see the evaluation section below). It is also important to take into account that the Nordic countries, in comparison with the rest of Europe, have a large portion of rural roads with little traffic and a difficult winter climate. Here, a self-alarmed eCall system could be very important to obtain help in emergency situations.

Status at a European level

The launch of eCall has been preceded by several important activities and decisions in Europe.

Activities where the Commission has participated that have influenced the development of eCall:

- The decision to introduce the single European emergency call number 112 in Europe (Decision 91/396/EEC).
- Requirements that telephone network operators in member states make location information available to emergency centres (PSAP) for calls to the emergency call number 112 (Directive 2002/22/EC).
- Exemptions from the protection of privacy for emergency services organisations (Directive 2002/58/EC).
- Recommendations adopted in July 2003 on the treatment of localisation information during an emergency alarm.

- Representatives for the EU, ACEA - the European Automobile Manufacturers Association - and ERTICO signed a Memorandum of Understanding (MoU) to implement the eCall service in Europe. Autumn 2004 a further 20 authorities, organisations and companies signed the MoU.
- Agreement was reached in February 2005 for a Commission/industry action plan to introduce eCall in Europe. The action plan aims to achieve a standardisation and specification for eCall by the end of 2005. A full-scale trial will be carried out in 2006 and eCall technology will be introduced in all vehicles in 2009.

The area has been studied in several EU financed projects, such as

- E-MERGE - enabling pan-European vehicle eCall services. The project developed a system description for common protocols and specifications for the minimum set of data sent via the emergency alarm number 112.
- GST – RESCUE - Global System for Telematics / RESCUE services. Further development of E-MERGE to incorporate emergency vehicles into the rescue chain. This included guiding emergency vehicles, accident warning systems for road users and the creation of blue corridors.
- e-Safety – Driving group on eCall, which is run by ERTICO and focuses on achieving agreement on technology and market issues.

Still to be achieved at an international level:

- There is an agreement in principle for functional architecture and models, but a clear action plan for implementation is lacking.
- Necessary technologies exist, but there is still a need for agreement on standards.
- Socio-economic benefits and the need for investment have been drawn up at a European level, but business opportunities must be clearly identified if the market is to grow.

Evaluation of expected effects

A national eCall service is expected to lead to greater efficiency in the emergency rescue process. Assessments of the socio-economic impact in Europe have been studied in several international projects¹. These assessments are largely based on US experiences, but also on time measurements of emergency services in Stuttgart (STORM project) and in Paris. The studies also include impact analyses of early medical treatment of accident victims. Based on these findings, the following assumptions can be made:

- 5-15 per cent of the number of road fatalities could be reduced to seriously injured with eCall^{*)}
- 10-15 per cent of the number of seriously injured could be reduced to slightly injured with eCall
- No changes would be noted for slightly injured.

^{*)} Other studies from the Netherlands and the UK indicate a lower potential (2-7 per cent fewer traffic fatalities)¹

¹ E-MERGE Final report; ERTICO-ITS Europe, June 2004 and eSafety Driving Group 2004 Exploratory Study on the potential socio-economic impact of the introduction of Intelligent Safety Systems in Road Vehicles, VDI/VDE/IT/IfV Köln 2004

These estimates show that between 2 500 and 7 500 lives could be saved per year in the 25 EU member states with a fully developed system if all vehicles were equipped with eCall units. Accepting this potential, the equivalent figure for Sweden would be between 26 and 79 saved lives per year. The benefit-cost ratio for Europe is estimated at between 1.3 and 8.5.

The result of Swedish studies², which have also been discussed at a seminar with road safety experts, suggests however that the potential for Sweden is proportionately much lower. According to the study, eCall can be expected to result in an average 8 fewer road fatalities per year. A balanced evaluation assumes that the potential in Sweden is between 10 and 20 lives saved per year with eCall, i.e. 2-4 per cent of the number of road fatalities. The proportion of seriously injured with permanent problems is expected to be reduced by 3-4 per cent. An overall assessment of the benefits also includes a small contribution for reduced delays for road users resulting from speedier road clearance mainly in urban areas. A total annual benefit in Sweden amounts to SEK 550-830 million.

This cost estimate includes an annual cost for investment and operation of emergency alarm centres (SEK 3.5 million) and an assessment of how much vehicle equipment (only the eCall function) will cost when prices have stabilised after a period of operation. The cost for equipping the entire vehicle fleet is estimated in the longer term to SEK 350-500 million per year, which gives a benefit-cost ratio of between **1.1 and 4.2**. The system is therefore socio-economically profitable even using a pessimistic assessment. The calculations are presented in more detail in the appendix.

The costs for vehicle equipment (eCall function) vary depending on if the equipment only includes the eCall function or if eCall is an integrated part of a more extensive assistance service. The cost can also be expected to fall as the equipment becomes standard in new vehicles (compare with airbags). It will then be included in the total price for a car together with other functions and will not be immediately noticeable to car buyers.

² Potentialen hos ITS att öka trafiksäkerheten på kort och lång sikt, Stratega och Transek på uppdrag av Vägverket 2003-12-31 [The potential for ITS to improve road safety in the short and long term, Stratega and Transek on behalf of the SRA 31 December 2003]

Parties and their roles

EU

The EU is strongly committed to the issue and has offered financial contributions in several EU joint projects with a bearing on eCall. Through a number of decisions, including a common emergency alarm number and requirements for localisation information during an emergency alarm (see section 2), the Commission has paved the way for the launch of eCall in Europe. The Commission has also supported the setting up of a special forum³. Representatives for the EU (DG INFSO – Information Society) have in addition signed an MoU to implement eCall.

Departments and authorities

The SRA, which is under the Ministry of Industry, Employment and Communications, has in Sweden an overall responsibility for safety on the roads. As eCall is seen as a service that improves road safety, the SRA is an important party. The Ministry should clarify the role the SRA is to have in the process to introduce and operate eCall. It is also important that Sweden's official stance on the issue of the introduction of eCall is indicated as soon as possible through the Ministry and/or its representative signing the MoU.

(In Finland both the Ministry of Transport and the Finnish National Road Administration have signed the document).

It is assumed that the Ministry will name a principal for the eCall service in Sweden. Guidelines and a mandate should be issued. The principal should then together with concerned Swedish and international parties explain and establish specifications for technical solutions and transfer protocols and otherwise clarify organisational and institutional issues.

Emergency alarm centres

In Sweden, SOS Alarm Sverige AB has been contracted by local authorities to alarm the emergency services and by the County Council to direct all of Sweden's ambulances. SOS Alarm is also responsible for the emergency number service 112 and is therefore a natural body to manage eCall.

SOS Alarm sees a common European eCall service as an independent additional service. An introduction of eCall in Sweden must therefore take place within the framework of a special contract for services, for the specification, development, commissioning, and operation. SOS Alarm undertakes to guarantee that the eCall service can be implemented in Sweden by carrying out preparatory measures such as specifying and developing the service and to produce the service 24 hours a day all year round. This production

³ European Forum for officials responsible for provision and use of communications and information systems in the delivery of public safety and emergency services in Europe.

includes receiving eCall calls and MSD (minimum set of data), forwarding to the emergency service and if necessary contacting the eCall user's service supplier for an exchange of data.

SOS Alarm requires that technical specifications and other requirements are presented by the appointed principal. Embedding the service within the police, ambulance and emergency services can be carried out by SOS Alarm if so desired. Further information is available in the SOS Alarm supplement. SOS Alarm has also participated in the EU project E-MERGE and has therefore taken part in initial work with specifications and pilot testing.

Emergency services and healthcare

eCall offers a faster and better total emergency response. In addition, a minimum set of data (MSD) is sent to the emergency alarm centre with information on when and where an accident occurred, the vehicle ID, as well as the name of the service provider (if applicable) and how serious the accident is, i.e. if the alarm was activated automatically or manually, and which collision sensors were activated (airbag, collision from the side, front or rear, vaulting etc. depending on the equipment fitted in the vehicle). The emergency alarm centre can probably receive further information by interviewing the person or persons in distress or through the service provider. The service provider should also be able to provide help with an interpreter if the person in distress is from another country. This offers an early indication of the rescue and care resources that could be needed. Through this, the emergency alarm centre has greater opportunities to offer fast and relevant help provided the health and rescue services are prepared and flexible enough to supply the necessary resources at short notice.

If SOS Alarm is awarded the contract to manage eCall, then this should also include providing ambulance personnel and emergency services with relevant information received from the service as soon as they receive an emergency telephone call.

Insurance companies

A reduction in the number of seriously injured people would also lead to a reduction in payments from insurance companies. This includes in part compensation for suffering and rehabilitation from injuries and in part a reduced ability to work. This, together with less administration, offers potential savings. This should benefit policy holders through lower premiums for people with vehicles equipped with eCall.

Vehicle industry and other service providers

Sweden has a tradition of a strong vehicle industry that includes both passenger cars and lorries. The Swedish vehicle industry has for many years been a leader in high safety standards and utilisation of new technology.

The vehicle industry investments in the field include developing mobile, vehicle-based services, such as aid systems with alarms that are automatically activated by collision sensors. Several services have been developed around these concepts. Customer service centres have also been set up to deal with alarms, requests for assistance and other queries. Volvo calls its system Volvo On Call. GM (including Saab) has developed its On-Star concept.

These systems are still associated with a cost (equipment and subscription) for the user and have not resulted in the expected stream of customers. Some vehicle manufacturers have even closed down their assistance services for the time being. Instead, independent system developers and service providers have appeared on the market. These offer products and solutions that target different market segments and are independent of vehicle manufacturers (see examples in the section below).

The vehicle industry is highly interested in the implementation of the eCall service. This is in part in order to provide the safety concept that eCall offers, and in part because the eCall platform could contribute to a greater demand for other mobile services offered by vehicle manufacturers. The European Automobile Manufacturers Association (ACEA), which includes GM (Saab) and Volvo, was first, together with the EU and ERTICO, to sign the MoU. Volvo has also participated in the EU project E-MERGE and in activities such as ERTICO driver.

Vehicle manufacturers, along with independent suppliers, will ensure that the equipment developed and implemented complies with the agreed specifications and standards for eCall. This assumes that pure eCall equipment is available for users that only desire the alarm functionality (used for the socio-economic calculation).

Telephone operators

The role of telephone operators is to provide the mobile communications link for the emergency alarm number 112 and simultaneously to use a voice connection to send a minimum set of data from the vehicle in distress to the emergency alarm centre. A proposal has been drawn up for how this could be achieved and has been sent to telephone operators for consideration. Work to standardise the interface is underway.

There is an urgent need to reach agreement with telephone operators on this issue as soon possible.

Added value created by the eCall service

The development and implementation of systems for the automatic transfer of data about vehicle status between vehicles and centres have been ongoing for many years. The vehicle industry has led this development but there is now a need for other, independent alternatives.

The functional basis is knowledge about the vehicle position and sensors that monitor status or authority. The technology can be used to automatically send an alarm or manually call for help. When the system is activated, information is sent to a centre that is contracted to the supplier, in the case of Volvo On Call this is Falck. The centre takes the necessary measures depending on the type of alarm, usually following confirmation from the vehicle owner. For instance, alarm calls that require an emergency response (eCall) are forwarded to SOS Alarm if these are not sent directly to SOS Alarm.

In addition to the eCall service other services can be offered using this basic platform. One such could be theft protection using a system that sends an alarm if the car is moved by an unidentified driver. There are also a number of services that are designed for business. These could concern information on vehicle performance for managing, following-up and optimising but also data for transport planning in real time.

The services above are associated with a cost for the customers, partly for investing in equipment and software, and partly for access to assistance (subscription). Equipping and fitting eCall and anti-theft equipment would, during the build up phase, cost about as much as a traditional alarm. In addition there would be a monthly subscription fee of about SEK 200. This price level is expected to fall as larger series are manufactured.

Through the positioning and communication system (GPS/GSM) incorporated into the eCall equipment, there are also opportunities to connect other applications where positioning and communication are central functions. These applications could be

- ISA, which is regulated with data on speed limits from a digital map (positioning) and where data can be updated via a communications link (GSM).
- Navigations systems, which can be made cheaper without GPS.
- Travel time measurements, where position, coded identity and perhaps speed are regularly sent to a collection point (database) where this is used to assess the condition of the road network.
- Semi-automatic or automatic reporting of dangerous conditions/incidents on the road network. Data can be sent to the centre (TIC) either by pressing on a button or automatically, e.g. slippery roads that the vehicle's friction meter registers. Position and identity is automatically attached to this data.

It would be positive for interested parties in the business sector if the authorities sign the MoU and support the eCall concept. This could help certification of the equipment and as a result insurance companies could reduce premiums for eCall owners. This type of incentive is an important precondition if the technology is to be attractive for the majority of motorists.

The availability of the eCall service on a large scale could offer added value for businesses, such as vehicle manufacturers, as

- the road safety profile of the vehicle brand is strengthened

- the market value of an equipped vehicle will probably rise more than the costs of the equipment
- additional services can be developed and marketed based on the standardised platform that eCall is based on
- knowledge about causes/results of accidents can be increased through the impact speed and force data sent via eCall. This is important in work to increase road safety.

For equipment manufacturers, a new market will probably become available for older vehicles in particular if equipment and subscription sales can take place via public authorities or insurance companies.

Recommendations for Swedish response

Based on the reported material, it is recommended that Sweden officially participates in work to create a European eCall service. This can take place in two stages. The first stage, which can begin immediately, comprises the following points:

- The Ministry of Industry, Employment and Communications names the principal for the eCall service in Sweden.
- The Ministry and/or its representative/s sign the Memorandum of Understanding (MoU).
- SOS Alarm Sverige AB is instructed to draw up a quote for the task to develop and run a service receiving eCall alarms in Sweden, as well as collaborating with emergency services, healthcare and service suppliers.

The second stage is dependent on developments in Europe. By signing the MoU, Sweden has an obligation to contribute to the introduction of a pan-European eCall system. Sweden should therefore aim to follow the agenda established by the signatory parties. Measures in the second stage could include:

- The appointed principal develops a plan for the introduction of eCall in Sweden including specification, implementation, commissioning and testing of equipment, communication and organisation.
- Sweden participates in international efforts to draw up an action plan for implementation, standards for interface and communications solutions, and to find business opportunities for additional services.
- Guidelines are produced for certification of the eCall system.
- eCall is launched in Sweden, initially on key markets. To facilitate rolling out the service, incentives need to be considered, such as discounted insurance premiums or other incentives. When the system

has been in operation for some time, it is evaluated and used as a basis for a decision on full implementation. The implementation of activities is adapted to the European agenda.