D6.1b eCall Deployment enablers and opportunities and challenges: updated report
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TABLE 1: OVERVIEW OF ENABLERS, OPPORTUNITIES AND CHALLENGES

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1 Management Summary

This deliverable presents an overview of identified enablers, opportunities and challenges for eCall deployment. It illustrates the current eCall activities in political arenas, in voluntary eCall related networks and in media. In addition it details the piloting experience for the Pilot Sites involved in HeERO proposing specific conclusions and recommendations for each Member States.

This report complements and updates of the first version of D6.1 submitted and accepted in June 2012, with the file designation HeERO_WP6_D6 1_eCall Deployment barriers and enablers preliminary report_V2.2

eCall is expected to have beneficial effects on casualty reduction. The main benefits are related to safety improvements for vehicle occupants, but there are also additional beneficial effects regarded as a driver for larger service market development.

The political commitment to eCall is promoted clearly through the ITS Directive and Action Plan. European parliament gave resolution about eCall last July 2012.

eCall system would enable rescue services to arrive faster, saving lives and reducing injuries. Resolution urges Commission to propose legislative measures as soon as possible to ensure eCall system to function in 2015.

Currently 22 Member States and more than 100 public and private organisations have signed the MoU of eCall.

HeERO2 pilot started at January 2013 with new Member States in piloting eCall. Piloting includes also Heavy Goods Vehicles, two-wheelers and retrofit and mobile devices.

Legislation efforts are concentrating on PSAP upgrading, the delegated act (C2012) 8509) was published in European Journal (26/11/2012) and passed into law 20 days after publication.

The amendment to vehicle type approval directive (2007/46/EC) has now passed into service consultation and is still on time for adoption in 2014.

The ITS Directive defines eCall as a priority action, with the harmonised provision for an interoperable EU-wide eCall, and its deployment.

European eCall Implementation Platform (EEIP) is active in issues related to eCall standards, eCall location issues, handling the silent calls, retrofit devices and eCall
implementation issues. Also coupling eCall to other traffic and transport services and Value-Added Services is under its interest.

HeERO partners are actively organising and participating important common knowledge distributing and dissemination events. For example eCall interoperability testing for device and PSAP system producers was organised in May 2012 in UK, a second one is scheduled in September 2013. eCall stakeholders are invited into international seminars and workshops like the annual eCall days in Germany which gathers together vehicle industry, PSAP and device manufacturers as well as Member State representatives into common discussions.

An eCall workshop was held in UK 2012, although UK is not participating in the HeERO projects.

Japan has opened their own eCall test bed and eCall dissemination organisation to satisfy the needs of their vehicle industry and tier 1 and 2 suppliers to implement eCall fitment into cars sold to Europe. Presentations and demonstrations of eCall are held in ITS and other intelligent transport congresses (e.g. in Vienna 2012, in Moscow 2013, in Dublin and Japan 2013).

Russia has an ambitious plan for their eCall deployment (ERA-GLONASS) overseen by GLONASS UNION. All new vehicles (different vehicle types in different years, starting from M2 and M3 vehicles in 2014 and ending in 2017) in Russia will be equipped by ERA-GLONASS on, ERA-GLONASS land infrastructure is to be completed and fully deployed by 2014. Besides eCall, the service in Russia is expected to boost the development of navigation, telematics and communications markets in Russia.

Member States are still to define a national implementation plan for eCall, which complies with the stated timeline for the implementation of Pan European eCall. Therefore the piloting in HeERO and HeERO2 projects is essential.

The enablers, opportunities and challenges have been identified from the partners’ contributions collected in Chapter 4. Different Layers have been considered:

- **Policy Layer**: The European Parliament impressively supported the development of eCall and the European Commission is working according to a 3-prong regulatory approach addressing the in-vehicle system, the telecommunications networks and the PSAPs (the published regulation is detailed in Par.4.2)
• **Business Layer:** the final conclusions of the EeIP Task Force OPEN have reported. There are several discussions going on concerning additional services besides eCall and regarding the fact that fair competition in the automotive aftermarket needs to be safeguarded by EU legislators.

• **Application Layer:** eCall end-to-end process is based on a network of different organizations. Member States reported a wide range of activities for improving the operational efficiency by clarifying the rule of the different organizations.

• **User Layer:** Considering the information provided by the HeERO Project, participants highlighted the importance of the users' awareness: HeERO dissemination activities have been promoted across the MS Pilot Sites and supported during several public events (ITS World Congress, for instance) to show the potential of the eCall.

• **Technological Layer:** detailed reports from the experiences of the 1st HeERO piloting round highlighted some issues regarding eCall implementation. To overcome the reported issues a wide range of actions have been promoted both for solving the implementation problems than to improve the available standard, by a precise reporting to the Standardization Task Force.

Considering all of the different contributions, as a conclusion, the following statements can be referred to: “Although the effort for preparation and testing was far higher than estimated beforehand according to current experiences from the pilot, eCall has proven to be a mature technology, which might be deployed. Several shortcomings which were identified were solved with additional effort from all stakeholders. Due to the number of stakeholders involved; mutual cooperation and proper technical support are critical prerequisites to success in this kind of project. This is one of the key messages that should be communicated.”
## 2 Terms and abbreviations

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<td>European CAR and driving license Information System</td>
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<td>HAK</td>
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IVS ................................................................. In-Vehicle System
KPI ............................................................... Key Performance Indicators
LTE ............................................................. Long Term Evolution (4G mobile network)
MNO ............................................................. Mobile Network Operator
MS ............................................................... Member State
MSD ............................................................. Minimum Set of Data
NENA ........................................................... National Emergency Number Association (USA)
OEM ............................................................. Original Equipment Manufacturer
P-PSAP ......................................................... Primary Public Safety Answering Points
PSAP ............................................................ Public Safety Answering Points
PSTN ............................................................ Public Switched Telephone Network
PTI ............................................................... Periodical Technical Inspection
SIM ............................................................. Subscriber Identity Module
SW ............................................................... Software
TCP/IP ........................................................ Transmission Control Protocol/Internet Protocol
TMC ............................................................ Traffic Management Centre
TPS ............................................................. Third Party Services
TPSP ........................................................... Third Party Service Provider
UMTS ........................................................ Universal Mobile Telecommunications System
VIN ............................................................. Vehicle Identification Number
VoIP ............................................................ Voice over Internet Protocol
WAN ............................................................ Wireless Area Network
YPR ............................................................. Yokosuka Research Park
3 Introduction

3.1 Purpose of Document

The purpose of this document is to gather experiences of the first round of HeERO piloting and summarise them in one report as preparation for the Guidelines.

3.2 Structure of Document

This deliverable d6.1b consists of material from the official eCall enhancement activities and from recent eCall workshops and other activities. In MS related chapters, experiences and insights regarding HeERO piloting are brought up by HeERO partners. D6.1b is part of the work of WP6 Deployment enablers. The overall aim of WP6 is to analyse eCall enablers and barriers and to then describe and/or plan the certification processes in Member States and Associated Countries. (figure 1).

Figure 1: HeERO 1 project structure
3.3 HeERO Contractual References

HeERO is a type A Pilot of the ICT Policy Support Programme (ICT PSP), Competitiveness and Innovation Framework Programme (CIP). The acronym stands for Harmonised eCall European Pilot.

The Grant Agreement number is 270906 and project duration is 36 months, effective from 01 January 2011 until 31 December 2013. It is a contract with the European Commission, DG CONNECT.

The principal EC Project Officer is:

Wolfgang Hoefs  
EUROPEAN COMMISSION  
DG CONNECT  
Office: BU 31 – 6/35  
B - 1049 Brussels  
Tel: +32 296 2188  
E-mail: wolfgang.hoefs@ec.europa.eu

One other Project Officer will follow the HeERO project:

Dimitrios AXIOTIS

Dimitrios.AXIOTIS@ec.europa.eu

Address to which all deliverables and reports have to be sent:

Wolfgang Hoefs  
EUROPEAN COMMISSION  
DG CONNECT  
BU 31 – 6/35  
B - 1049 Brussels  
Tel: +32 296 2188  
By mail: wolfgang.hoefs@ec.europa.eu

Any communication or request concerning the grant agreement shall identify the grant agreement number, the nature and details of the request or communication and be submitted to the following addresses:

European Commission  
Communications Networks, Content and Technology  
B-1049 Brussels  
Belgium  
By electronic mail: CNECT-ICT-PSP-270906@ec.europa.eu
4 eCall and current development activity

4.1 European Parliament

European Parliament gave a resolution on July 3rd 2012 concerning eCall. All new cars must be fitted by 2015 with eCall devices to alert the rescue services to road crashes automatically, using the 112 public emergency call system, the MEPs state in their resolution. "This system will enable rescue services to arrive faster, saving lives and reducing injuries". The non-binding resolution adds. "The European Parliament has given its clear support for all motorists in Europe to benefit from an emergency call system free of charge. Since the voluntary approach has failed, we urge the Commission to propose legislative measures as soon as possible to ensure the eCall system will be mandatory in all EU countries by 2015", said co-rapporteurs Olga Sehnalova (S&D, CZ) and Dieter-Lebrecht Koch (EPP, DE).

The resolution regrets delays in the voluntary deployment of eCall to date and the small proportion of cars fitted with it (only 0.4%). It urges the European Commission to table legislation to make the eCall system mandatory by 2015. MEPs also call on the Commission to consider extending this system to other vehicles, such as motorcycles, buses, coaches and trucks in the near future.

MEPs believe that the public eCall service should be mandatory and available free of charge to all drivers in Europe, irrespective of the make of their vehicles. MEPs point out that the necessary technology is available and common EU-wide standards have been agreed upon. They therefore call on the Commission to table legislation requiring EU member states to upgrade their emergency response service infrastructure so that it can handle eCalls by 2015.

4.2 European commission

The current situation (2Q 2013) of the eCall Memorandum of Understanding: it has been signed by 22 Member States (and two Member States who signed a formal Letter of Support), five Associated Countries and more than 100 public and private organisations, including representatives of all stakeholders in the eCall rescue chain. The number of signatories has clearly reached a critical mass, which justifies and supports the implementation of the service at Pan-European level, which will be based on the Pan European Single number for emergency calls 112.
HeERO 2 started in 2013 with six new countries: Belgium, Bulgaria, Denmark, Luxembourg, Spain, Turkey and five associated countries: Cyprus, Iceland, Israel Hungary and Slovenia, who will implement eCall with the support of the HeERO project, but without European Union financial support.

HeERO2 Objective and Aims are to extend HeERO to new Member States or Associated Countries to demonstrate the scalability of the HeERO solution and to widen the acceptance of eCall. The supporting aims include preparing the necessary infrastructure to realise pan-European "eCall", boosting Member States investment in PSAP infrastructure and ensuring interoperability of the service by 2014 (Roadmap) and a wider adoption across Member States to test the proposed solution. Also new vehicle types are involved: Heavy Goods Vehicle eCall powered 2 wheeled vehicles. The retrospective installation of eCall to older vehicles is now a topic (including nomadic devices, smart phone type devices, navigation etc.). E.g. the IMobility observers were informed of the interest in the pilot described above.

Figure 2: Member State involvement in eCall
The activity for eCall deployment involves 3 different European Commission – Directorate General: DG Communications Networks, Content and Technology (CNECT), for MNOs, DG Mobility and Transport (MOVE), focusing on PSAPs, DG Mobility and Transport (MOVE), focusing on IVSs:

- **In-Vehicle Systems (IVSs)**

  Regarding the activity for the Type Approval Regulation the following steps have been followed:

  eCall in the WP 2011 of MVWG
  
  1Q 2011: Start of drafting
  
  3Q 2011: Consultation with experts and stakeholders
  
  2Q 2012: Adoption of Proposal by EC
  
  3Q 2012: Ordinary Procedure (EP and Council)

  Currently a proposal for a decision concerning type-approval requirements for the deployment of the eCall in-vehicle system and amending Directive 2007/46/EC has been published recently. The following activities will follow:

  4Q 2013: Adoption & Publication
  
  1Q 2014: Drafting detailed rules and technical requirements

  Mandatory in 2015 New Type Approved models

- **Mobile Network Operators (MNOs)**

  Regarding Mobile Network Operators (MNOs), the Commission Recommendation C (2011) 6269 was adopted on 08/09/2011 to support an EU-wide eCall service in electronic communication networks for the for the transmission of in-vehicle emergency calls based on 112 (“eCalls”).

  The following activities have been promoted:

  **A) Member States**
  
  - Define Emergency Call infrastructure to receive the eCalls
  
  - Meet MNOs to jointly agree on deployment roadmap
  
  - Report to the EC on the implementation status by 31 March 2012

  **B) Mobile network operators**
• Handle eCalls like any other 112 (TS12 emergency call recognised by 3GPP networks) call:
  • Free of charge
  • Priority in the networks
  • “national roaming” if applicable
• Meet MS to jointly agree on deployment roadmap
• Implement eCall flag in their networks before end 2014

• Public Safety Answering Points (PSAPs)

The European Commission published on the Official Journal of the European Union (03/04/2013) the Commission Delegated Regulation (EU) (No 305/2013) of the 26th November 2012. This delegated act, supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision for an interoperable EU-wide eCall, constitutes the part related to the Public Safety Answering Points (PSAPs) infrastructure of the Commission strategy on eCall, based on a 3-prong regulatory approach addressing the in-vehicle system, the telecommunications networks and the PSAPs.

The Commission wants the life-saving eCall system to be fitted to all new models of cars and light vehicles from 2015 and therefore this measure establishes the conditions under which the emergency call response centres will be capable of properly receiving and handling of 112 eCalls.

Commission Vice-President Siim Kallas’ comment clarifies the content of regulation: “These measures are the first adopted under the Intelligent Transport Systems Directive. They address the upgrading of emergency call response centres, to receive and process 112 eCalls, including calls from vehicles registered in any EU country. Together with my colleagues responsible for Digital Agenda and Industry Vice Presidents Neelie Kroes and Antonio Tajani, I will pursue our joint efforts to ensure that by 2015 the introduction of the eCall service in the whole European Union will be effective.” The Commission’s aim is for a fully functional eCall service to be in place all over the European Union (as well as Croatia, Iceland, Norway and Switzerland) by 2015. The common measures for emergency call response centres (also known as Public Safety Answering Points) will ensure the proper handling of 112 eCalls and the EU-wide interoperability and continuity of the service. A legislative proposal will follow on the deployment of these measures as well as a proposal for a Regulation to require eCall devices to be fitted to all new models of passenger cars and light vehicles from 2015 in order to obtain EU-wide type approval. (EU Commission 2012)
A proposal for a decision on the deployment of the interoperable EU-wide eCall COM (2013) 315 has been published the 13 June 2013.
4.3 Status of the Standardization

In the table below the status of standardization of eCall within ETSI and 3GPP is illustrated.

**ETSI eCall specifications stable**

Proposal for an ETSI Special Task Force (STF) on migration of eCall transport

Technical specification – 3GPP; last versions available from www.3gpp.org from 8th April 2011

Conformance testing – 3GPP

eCall Network Access Device testing - ETSI STF399

3GPP specifications; The following eCall related TSs (Technical Specifications, normative documents) and TR (Technical Report, informative documents) are approved in Release 8:http://www.3gpp.org/ftp/Specs/latest/

- TS 22.101: Service aspects; Service principles
- TS 24.008: Mobile Radio Interface Layer 3 (incl emergency call set up procedures)
- TS 26.267 eCall Data Transfer - In-band modem solution; General Description
- TS 26.268: In band modem ANSI-C Reference Code
- TS 26.269: In band modem Conformance testing
- TR 26.969: In band modem Characterisation Report
- TS 34.123: UE conformance specification (UMTS)
- TS 51.010: MS conformance specifications (GSM)

**CEN eCall Application level Standards**

- CEN Standards approved:
  - EN 15722 MSD
  - EN 16072 eCall Op. Reqs
  - En 16062 App. Protocols
  - CEN TS 16454 eCall End to End Conformance Tests - voted

- eCall via TARV successfully tested
  - ISO 15638-10 (Telematics Applications for Regulated Vehicles- emergency Message system)
  - 1 of the messages is MSD
  - Including HGV eCall Optional Additional Data
  - Tested using 2G,3G,5G, Mesh Wi-Fi (from vehicle to Application Service provider) using CALM/CVIS protocols
  - At InnovITS Test track output to UK and Australian IP addresses.

- Upcoming eCall CEN TC278 WG15 meeting
  - 16454 comment resolution process
  - Revisions proposed by HeERO 1
  - ERA GLONASS Request for an OID (Object Identifier)
4.4 European eCall Implementation Platform (EeIP)

The European eCall Implementation Platform (EeIP) is the coordination body bringing together representatives of the relevant stakeholders associations and of the National Platforms supporting the implementation of a pan-European in-vehicle emergency call in Europe. It aims to guide, coordinate and monitor the progress of the implementation of the eCall service across Europe to ensure a timely, effective and harmonized deployment of the European-wide eCall service based on 112.

The EeIP builds on the previous work achieved by the eCall Driving Group, PSAPs Expert Group on eCall and the European Standardisation Organisations - ETSI-MSG and CEN TC 278 WG 15.

The EeIP activity is organised around a number of Task Forces, as detailed in the following paragraphs.

[As an example of EeIP’s work: report from the last EeIP Meeting in 22nd November 2012, gave relevant information about the status, barriers and facilitators of eCall deployment. The agenda includes: The European Parliament Resolution on eCall, EC report: progress with the regulatory actions, Status of eCall standardisation, report on EeIP Task Forces and Implementation status of eCall.

EC report: progress with the regulatory actions was following Concerning IVS segment: report on CEN standards which are available and proposal for regulation under the vehicle type-approval legislation (amending Framework Directive 2007/46/EC). Concerning MNOs Segment: The eCall Recommendation C (2011) 6269 to MS targeting MNOs, support of the eCall like any 112 call, implementation of the eCall discriminator with ETSI standards, reports by MS of the status of eCall flag implementation showed that 21 MS submitted the report, in 4 MS there a MNOs refusing to implement the eCall flag in the absence of clear regulations and 7 MS declare that recommendations are not sufficient. PSAP segment: CEN and ETSI Standards available, upgrading of the PSAP infrastructure in the framework of the ITS Directive - Common specs adopted. (EU Commission 2011)

4.4.1 EeIP Task Force GUID

The Task Force GUID (chair: iCar Support and EC-DG CNECT) has dealt with and gathered the relevant aspects in the context of pan-European eCall deployment. It has provided guidelines addressing the national implementation platforms and different stakeholders on
the design and planning of the infrastructure needed to implement the pan-European eCall service in the European Union and countries associated to the initiative.

The pan-European eCall implementation guidelines address in particular the main involved stakeholders in the pan-European eCall implementation like the national platforms, PSAP organisations, mobile network operators, vehicle manufacturers and in-vehicle system suppliers. Not limited to the pure eCall service chain, the guidelines also consider potential (positive) effects of eCall on road operation and traffic management. Furthermore, the possibilities of the use of the eCall system for other value-added services and the use of private third-party services supported eCall (TPS eCall) were covered.

All available data related to the implementation of the eCall service have been gathered into one single document and the different parts of the value chain have been separated in order to facilitate the implementation.

The pan-European eCall implementation guidelines were approved by the EeIP members in 2011 and are publically available.¹

4.4.2 EeIP Task Force PILO

The aim of the Task Force is to report the progress of the pilot at every EeIP platform meeting this specifically includes HeERO 1 and 2. It will stay active until the end of the HeERO Projects.

4.4.3 EeIP Task Force VIN

The aim of this task force is to define tools and procedures to extract relevant information from VIN decoder. A study regarding the activity of this Task Force has been presented at EeIP meeting of 19th October 2013 and the use of EUCARIS network has been confirmed as preferred solution. The activity of this Task Force has been completed.

4.4.4 EeIP Task Force EXCH

The aim of this Task Force EXCH is to support the sharing of best practices for eCall deployment. New best practices will be available as results of the eCall Pan-European pilot projects HeERO 1&2. The activity of this Task Force has been completed.

¹ See http://www.icarsupport.eu/assets/Uploads/Documents/eCall/eCall-Implement-Guidelines.pdf
4.4.5 EeIP Task Force CAMP

The aim of the Task Force is related to the design of awareness and education campaign. Several eCall demos have been proposed done for decision makers in several European Member States. This Task force is on-going.

4.4.6 EeIP Task Force CROSS

The aim of this Task Force is the definition of cooperation procedures/protocols for the allocation of calls from places near the boundaries of PSAPs area. The activity of this Task Force has been completed.

4.4.7 EeIP Task Force DISC

The aim of this Task Force was related to the eCall discriminator implementation guidelines. The activity of this Task Force has been completed.

4.4.8 EeIP Task Force INC

The aim of this Task Force was to explore the possibility of using incentives. The final report was presented at EeIP meeting of 19th October 2012. The activity of this Task Force has been completed.

4.4.9 EeIP Task Force OPEN

The scope of the Task Force OPEN (chair: ARC Europe and ADAC) was to examine whether the in-vehicle platform for eCall can be used for other services (private and public). The aim was to define a positive business model through the common use of the eCall platform. The work was conducted in two stages: The first step was a questionnaire among different stakeholders of eCall, both private and public. The second step comprised of the analysis of replies from the stakeholders and the preparation of a final report with the results, a conclusion and recommendations.

The work of the task force has received a great deal of attention from several parties. This is due not only to the rich possibilities that the eCall ecosystem provides to both areas of application, in-car provision of other services and potential enhancements of public services – but also due the fact that there is great potential for using the eCall in-vehicle system for other services. This concerns not only the car manufacturers and their business partners but the automotive aftermarket as a whole and naturally the users as well.
The conclusion of the final report shows that there is no business case for stand-alone eCall, except for the national economies of the supporting states. Value-added services, either free of charge or commercial, can potentially be added to in-vehicle systems initially designed for pan-European eCall. Some services will be new, but some existing services will come into the vehicles by new access means. The report states further for the moment proprietary in-vehicle systems dominate the market and it explains why open in-vehicle platforms provide a higher service variety, more innovation and more choice for customers.

The report recommends that the development and dissemination of open in-vehicle telematics platforms should be fostered by all stakeholders and the findings of the task force will be used in HeERO and other related European projects. The report has been approved by the EeIP members in 2011 and is publically available.

Following the OPEN final report there are several discussions going on concerning additional services besides eCall and regarding the fact that fair competition in the automotive aftermarket needs to be safeguarded by EU legislators.

### 4.4.10 EeIP Task Force PTI

The aim of this Task Force is related to the procedure to check the operation of the eCall system throughout the lifetime of the vehicle. The activity of this Task Force is now completed and the recommendations were discussed during the EeIP meeting in May 2012, however the GSMA have now requested that this final report be re-opened for comment.

### 4.4.11 Task Force: SILENT

The objectives of the Task Force are to analyse the causes of Silent eCalls, to propose solutions on how to reduce Silent eCalls, to produce recommendations on procedures for handling of Silent eCalls. Recommendations are:

- Link in the MSD (optional field) to additional set of data (if available and if requested by the PSAP)
- Equip the PSAP with appropriate software to aggregate calls from the same accident
- Promote the coordination among different actors receiving notifications of the accident (i.e. PSAP, police, medical, fire brigade, road management centres)
- In case of doubt, request a new MSD

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- Conduct awareness education on eCall to inform citizens

- Promote the use of pairing the eCall in-vehicle embedded system with mobile phones to allow vehicle occupants to communicate when outside the vehicles

- Design the Human Machine Interface to avoid misuse and unintentional triggering of eCalls

The activity of the Task Force is now completed.

4.4.12 EeIP Task Force Location (LOC)

LOC have published a report which contains the location requirements for eCall, list of relevant location technologies, their benefits and costs, GNSS buyer’s guide and GNSS performance and trials (optimum GNSS location performance and at no extra cost to users or industry). The contents of this TF report will be approved and its findings and recommendations incorporated into the overall EeIP implementation guidelines as soon as possible. All EeIP participants should note that according to the LOC recommendation the emerging GNSS capability is available from commercial products and that such capability is available for no extra cost to the vehicle manufacturing industry. Member States and PSAPs should therefore note the performance advantages of these new capabilities and the need to deliver maximum benefits to PSAPs and citizens. Vehicle manufacturers, when specifying system requirements, should consider the incorporation of these emerging capabilities into early generation eCall products.

The activity of the Task Force LOC has now been completed.

4.4.13 EeIP Task Force RETRO

The creation of this Task Force was approved in November 2012. The Task Force focuses on the following activities:

- Identify core areas for development - thematic title Safety and Security

- RETRO focused on 112 based eCall incl. specified MSD

- Observatory on technical development in this area

- Investigate and define opportunities in-line with published standards

- link with the current standards refinement work within HeERO

- Examine how certification should be regarded with retrofit devices
- Coordinate with existing TF – LOC. Silent, PTI and PILO

The activity of this Task Force is on-going.

4.4.14 EeIP Task Force TPS

This task force has been recently formed at the request of the Netherland EeIP representative. The purpose of the TF is to examine and refine existing and future TPS eCall activity with a view to harmonizing the impact on each MS from the TPS providers, in both the approach the transfer of data, and methods of contact. Whilst this TF is not strictly within the ToR of the EeIP the issues raised have a direct impact on the effectiveness of the PSAP in eCall operation, this TF is ongoing.

4.5 1st eCall Interoperability event

The first open Interoperability event for eCall Plugtests, aimed to test the interoperability of Pan-European eCall equipment from all key vendors, the event was held 22-24 May 2012, at InnovITS in Nuneaton (UK). It was organized by ERTICO and ETSI.

Eight companies participated in the event testing 14 devices (9 IVS and 5 PSAP).

The goal of interoperability tests is to verify the interoperability between different manufacturers of solutions for eCall IVS devices and PSAPs from different countries, checking that devices resulting from protocol implementations are able to work together and provide the functionalities provided by the protocols.

The implementations were connected using a private GSM network provided by InnovITS Advance. A Plugtests guide was produced by CTI, containing 28 interoperability tests, including 7 mandatory test cases and 21 optional ones. ETSI provided the interoperability tool suite of wiki, scheduling and test reporting tool.

The test sessions have been mainly executed between 2 devices (IVS and PSAP eCall modem-server) from different vendors. In addition to the 7 mandatory interoperability tests, 21 other 'optional' tests have been specified, and these may be used to help diagnose basic call set-up problems and high level application protocol (HLAP) timing issues that may be encountered during the interoperability testing phase.

The activity and results of the First open Interoperability event for eCall have been reported in the following report: “ETSI CTI Plugtests Report 1.0.0 (2012-06)”
546 interoperability tests have been executed with a success rate of 88.8% which is excellent, considering it is a first Interoperability event and given the fact that prototype and mature implementations attended.

The organisers and participants considered the testing very useful and especially the debriefing sessions were fruitful. The event participants brought up interpretation issues with EN16062 and contributed the needs for refinements for standards.

4.6 2nd eCall Interoperability event

Following the success of the 1st eCall Interoperability event, a 2nd eCall Interoperability event will take place from 09 to 13 September 2013, in Essen, Germany. This event will be organised by ERTICO in collaboration with ETSI, in cooperation with CETECOM and the HeERO projects. This interoperability event will offer participants the ability to check their implementation during test session, based on the latest standards and standard updates submitted. Participants can join to test their IVS and/or PSAP implementations. Currently at the early stages of registration interest is high.

4.7 eCall workshops

4.7.1 Germany

ITS Niedersachsen as the German team coordinator organises an annual conference entitled eCall Days Germany. This conference is held in Berlin and takes two days. The focus of this event is not only the national but the international implementation of eCall.

The first eCall Days Germany were held on 21 - 22 September 2011 in Berlin. The organiser ITS Niedersachsen gathered more than 20 presentations held on two days with different scopes. The first day focussed on the EC driven HeERO project and the Czech-German pilot cooperation as a part of HeERO. Moreover the car manufacturer BMW and Peugeot Citroën presented their systems and opinions on the pan-European eCall from a third-party-provider point of view. The second day dealt with technical aspects of the implementation. Both the car manufacturer supplier and the PSAPs showed the current status of eCall development and implementation.

More than 130 participants from 16 European countries attended the event and documented interest in all relevant sectors such as OEMs, Tier 1+2-supplier, PSAPs, governance and political actors. The participants spent a good portion of their time in the conference
exhibition area where companies like BMW, Deutsches Zentrum für Luft- und Raumfahrt, NXP Semiconductor, Pramacom or CeBIT presented their hard-/software and services.

The host country Czech Republic supported the event under the guidance of Deputy Minister of Transport Jíří Zák who took part. The Czech-German cooperation aimed on the cross-border interoperability of eCall.

After the successful launching of the first eCall Days the second conference was held on 27-28 September 2012 in Berlin. This event was organised the same way like the first conference and had about 140 participants. However, the topics reflected the ongoing process in the HeERO project and shown some first views on the test results of the first phase. Different aspects of eCall and TPS eCall, the business models, benefits, interoperability issues, IVS technology and its use in other services were discussed. Moreover a further focus was the PSAP’s viewpoint and the combination of pan-European eCall with Third Party Services.

The 3rd eCall Days Germany Conference is already scheduled for 26-27 September 2013. The location is still open – eCall days are also open for the new members of the HeERO2 project which started at the 1st of January 2013.
4.7.2 **UK**

eCall Technical Workshop (chaired by ITS UK Communications Interest Group) was held in InnovITS, UK in October 2012. The workshop highlighted the differences between Pan-European eCall based on 112 and TPS-eCalls (e.g. Volvo OnCall, BMW Assist, PSA Apell d’Urgance, Toyota G-book etc.).

TPS-eCall is not based on 112 and it will not work on any network but only on the networks that the users are registered to. TPS eCall generally transmits data via SMS, however there are very few and TPS service centres who are capable of transmitting the additional data generated from a TPS eCall, this data is passed verbally. The data which is defined as personal data; it is not covered by data protection dispensations for TS12 calls. It should not be forgotten that the TPS eCall is generally provided by a commercial arrangement, and is generally linked to other services.

It was also noted that the evidence suggests that voluntary encouragement will not lead to rapid and widespread eCall deployment but to private services in a relatively small number of (high end) vehicles.
Key Points related to Costs and Benefits analysis in UK was that although PSAP additional costs are small and cellular costs are probably modest in UK and also in-vehicle unit costs are smaller than previously assumed (€150 OEM/€200 aftermarket and reducing with time), the evidence for time saving benefit was supposed to be scarce (crash notification: average of a few minutes at most and location finding assistance: 1-2 minutes at most?). Therefore, casualty saving less than previously assumed (best estimate is 1% fatality reduction, 0.5% serious reduction); however, congestion saving is significant (11% of benefit) and eCall on HGV and powered two-wheelers would also be beneficial. So the conclusion was eCall is beneficial but the cost-benefit case for UK is weaker than many (most) European countries.

Key Points of UK Implementation Issues are that privacy is not a barrier, no major liability issues are foreseen and will be addressed in service development, the technology issues (e.g. eCall flag, dormant SIMS, 2G legacy, silent eCalls etc.) will be handled. All mobile operators have implemented updates to “Teleservice 12“ such that emergency calls will be routed over any available of network if there is no coverage from the contracted mobile network operator. Standards are essentially fully developed; effectiveness of technology is being established through pilot trials. There is a strong demand for “bundling” of eCall with other services. There is a strong call for support of eCall legacy systems. So the conclusion is that UK is essentially “eCall-ready” and the private sector is (cautiously) ready to implement eCall.

Industry representatives highlighted that the Automotive Industry was one of the first signatories of the MoU on eCall and has since actively participated in developing potential solutions for pan-European eCall. The industry was positioning following issues for eCall.

About infrastructure industry has consistently outlined importance of parallel contributions from all stakeholders that the necessary infrastructure is in place before mandatory fitment is required in vehicles, because eCall can only realise its benefits when the corresponding infrastructure is in place. This includes availability of suitable mobile network services that match the in-vehicle system, for the vehicle lifetime (up to 15 years). A public eCall service has to be pan-European and available to all customers. Any staggered approach where Member States introduce the infrastructure at different dates with years in between is a non-feasible scenario for the automotive industry.

About technology Industry states that a range of eCall solutions should be allowed using a minimum set of performance/technical requirements based on the CEN standards. This should be enabled by technology neutral legislative requirements. The in-vehicle system can for example either be an embedded unit with an integrated network access device (e.g. a
GSM module) or a phone-based solution consisting of an interface between the in-vehicle system and a mobile phone. It should be permitted to run private eCall services in parallel to the public service, not only in addition to a public eCall but as an alternative, provided all performance standards are met and one or both, the pan-EU or private eCall service, is available in all Member States for the life of the vehicle. Any acceptable solution must be compliant with future technological developments and backward compatible. There appears to be concern that this will not be the case with the currently proposed solutions. Some OEMs have proactively invested in existing solutions, these should be recognised.

About legislation they stated that eCall concept is valid for passenger cars and light commercial vehicles and the fitment should apply only for “new vehicle types”. They require three-year lead-time for development and testing after all necessary specifications have been defined and published and the final type approval requirements are adopted. They say that it is essential that any mandatory requirements clearly define the test methods and boundary conditions of the in-vehicle system. For example it is not appropriate for the communication device, which depends on the Mobile Network to function, to be included in the vehicle type approval. Parallel legal commitments should apply for all affected stakeholders to ensure a robust roll-out across Europe.

Value added services. It is the firm opinion of the industry that so-called value-added commercial services cannot be used to justify the deployment of eCall but need to be dealt with separately.

As status industry says that the cost-benefit assessment conducted for the Commission/Parliament underplays the level of deployment of voluntary TPS eCalls expected in the coming years. As for infrastructure they see, that no clear indication when infrastructure will be available and for legislation a likely scenario is that proposal for type approval legislation will be high level, relying on so-called Implementing Measures to define details. This requires time to complete co-decision and delegated acts processes.

4.7.3 eCall in Japan

The first eCall Day in Japan was held on December 19th 2012 in Yokosuka City organized by Yokosuka Research Park (YRP). Representatives from the EU Commission, HeERO project, ERTICO ITS-Europe were present and GLONASS Union was present as a teleconference. There was an eCall demonstration with a vehicle collision at low speed, which simulated vehicles sending an eCall message to test the PSAP server in YRP. The goal for the event was to prepare car manufactures in Japan for equipping eCall system in new vehicles sold in
Europe from 2015 onwards. Russia has also announced that all manufactures exporting automobiles to EU and Russia must comply with EU and Russian laws and regulations related to eCall. In addition to the specific legal requirements, developing in-vehicle equipment will be a business for Japanese industries as well. Yokosuka Telecom Research Park, Inc. (YRP) has provided a test environment GSM network standardized in EU. YRP constructed the test bed to develop devices corresponding to eCall system. (YRP 2012)

After the eCall day the eCall testing centre was launched to be a permanent facility in Japan for eCall testing. Gemalto, Yokosuka Telecom Research Park, Fujitsu Ten and ERTICO launched the first eCall testing centre in Japan. On January 3rd Gemalto announced its collaboration with Yokosuka Telecom Research Park, Inc. (YRP), FUJITSU TEN, developer of advanced safety systems, and ERTICO to launch Japan’s first eCall testing facility in order to help global automakers meet the European Union’s new emergency response standards. Gemalto will provide facilities and techniques for all trial scenarios. It is the first eCall facility outside Europe allowing Japanese automakers to locally test solutions destined for the European Union. More information can be found in Gemalto’s netpage (www.gemalto.com).

4.8 ITS World Congress in Vienna 2012

HeERO participated in Vienna’s ITS World Congress with several technical papers, testing demonstrations and stakeholder meetings and other activities. The post-congress report mentioned especially the deployment of cross-border eCall as an important European ITS service. Commissioner Kroes identified three thoughts to keep in mind, of which one was that eCall is a great step forward in ITS and in Traffic safety development. HeERO project partners demonstrated how EU eCall works with the exhibition of a real eCall equipped car (see Italian eCall demo below). Emilio Dávila González, Project Officer of eCall in DG CNECT was rewarded for its vision and work in bringing the eCall initiative to life.

The European Commission has been instrumental in successfully promoting and creating a E-wide range of stakeholders working with one vision - that of making eCall available in all vehicles in Europe, with a service working seamlessly wherever the vehicle is, home or abroad.

**Example of Vienna Congress activity: Romanian eCall live demonstrator**

The Romanian HeERO Consortium organized a live eCall demonstrator during the ITS World Congress that took place in Vienna. The demonstrator was operated from inside the ITS
Romania national stand, ITS Romania being the national coordinator of the Romanian HeERO pilot site (Figure 4).

The Romanian eCall live demonstrator showcased how an eCall is being handled by the 112 PSAP. This was done by setting up a remote workstation in Vienna that was able to answer eCalls generated in Romania. During the Congress more than 60 live demonstrations were done. Besides the tests with the IVS from Romania, ad-hoc interoperability tests were done with IVS units available at the Congress.

The workflow for handling an eCall during the live demonstrator was the same as in real life, the only exception being that the operator’s workstation was located in Vienna. The workstation was connected through dedicated firewall to the Romanian 112 network, as an extension of the eCall PSAP.

![Figure 4: HeERO Romanian eCall pilot, live demo during the ITS Congress in Vienna](image)

After an eCall is generated using an IVS located in Romania, the eCall is forwarded by the MNO to the 112 Network and is routed to the Bucharest PSAP (the Romanian eCall PSAP). After the eCall reaches the PBX and CXE server (112 System’s VoIP server) it is placed in the 112 VoIP network (Figure 5).
At this point the eCall is being routed to the workstation in Vienna and appears in the 112 client interface. After the operator in Vienna picks up the call, the eCall modem receives the MSD and transmits it to the MSD Decoding Module from the servers located in Bucharest.

The MSD Decoding Module decodes the message, sends the decoded MSD to the Processing Module, extracts the VIN and transmits it to the VIN Processing Module. Finally, the MSD data is inserted in the 112 application and is available to the operator in Vienna.

After the MSD is received, the voice connection is opened and the operator in Vienna is able to talk to the caller. After the operator in Vienna processes the received data he forwards the case data to a simulated emergency agencies located in the county from which the eCall was generated.

When the emergency agency receives the call, it analyses the data and allocates resources to send to the incident scene. At the same time the emergency agency operator can send all the case file data to the on-board unit of the emergency vehicle. From this unit, also located in Vienna stand, the driver of the emergency agency is able to send data back to the operator and to confirm the different steps of handling an incident: receiving the data, on way to the incident, at the incident scene and case closed.

The eCall demonstrator also included an animation for showing the process of decoding the MSD and the process for querying the EUCARIS network.
**Figure 5: Romanian eCall demonstration architecture**

**Example of Vienna Congress activity: Italian eCall demo**

During the 2012 ITS World Congress the Italian HeERO Consortium team organized an eCall demonstration on the iCar Support stand to show a real case of using eCall.
The complete chain of the eCall process was covered, starting from a real IVS inside a real car (FIAT 500L), passing to the Mobile Network Operator via GSM up to the real operative PSAP in Varese (Italy).

The demo could be activated by a user inside the car by pushing the red button of the "manual eCall": just a few seconds later the occupants of the car could hear the voice of a real (Italian) operator in the 112 PSAP in Varese asking if help was needed. The setup gave participants a feeling of safety and closeness with the EU112.
In addition, people could see on a PC the screen that the operator into the Varese PSAP was looking at, with the data that the IVS had automatically transmitted (the MSD) with the precise localization of the car (in this case the Vienna ITS pavilion) and other data. The feedback people gave was very positive and everybody was asking when this service will be put in production.

Actually the live demo was provided with three IVS from different manufactures, all working with the Varese PSAP.

The eCall was terminated into the EU 112 first level PSAP in Varese, where the MSD Extracting Box was able to decode the Minimum Set of Data and to pass these data to the Operator console and to the operator software.

![Figure 8: Italian live demo: computer showing the Varese PSAP activity](image)

This console was duplicated, by a remote Internet connection, on a PC into the demo stand, so it was possible to act as a real operator in Varese; moreover, after the MSD decoding, the voice channel was opened and the operator in Varese could speak with people inside the car.

### 4.9 Other material - what has been in the media

**Broadcasting to the public**

A recent example portraying common understanding among end-users of vehicle safety systems comes from Canada. Results from a public opinion poll (published in June 2012) by
the Traffic Injury Research Foundation (TIRF) of Canada show that a majority of Canadian
drivers can benefit from more knowledge about the many vehicle safety features rapidly
becoming standard on new vehicles across the automotive industry. The poll, conducted
over the course of November 2011 to January 2012, explored a range of issues including
familiarity with different safety features, perceptions of their use, and the effects of these
features on driving. Less than one third were familiar with more sophisticated safety systems
than ABS brakes. (http://www.brainonboard.ca/, www.tirf.ca)

According to a public opinion survey held in the Netherlands during autumn 2012, 72 percent
of respondents are embracing eCall and 63 per cent think that this may contribute to their
own safety in traffic. The system is expected to expand with reports to emergency
breakdowns (bCall) and automobile service (Scall). In Scall the user includes reports when
the car is due for a service or a component needs replacing. 74 percent of car owners want
to decide which breakdown service (bCall) will take charge of the roadside service. And
when it comes to a sCall 86 percent of the respondents want to determine which car
company they alarm. (Jeremy Kesseler 2012)

“eCalls” of Mercedes Benz, Volvo, PSA etc.

Many articles and ads about different “eCalls” of vehicle industry have raised public interest
in 2012-2013. E.g. Mercedes Benz informed that “Automotive safety is advancing with
Mercedes-Benz eCall: an innovative emergency call system that can provide faster help at
the scene of a car crash. In the event of a serious incident, when the airbags or belt
tensioners are deployed, the Mercedes-Benz emergency call system automatically raises the
alarm within seconds. Using COMAND Online linked to a mobile phone, it sends a text
message to an emergency call centre giving the precise location of the vehicle and the
vehicle identification number (VIN). As an additional practical feature, the emergency call is
conducted in the driver’s own language rather than that of the particular country, making it
much easier to communicate in an emergency situation. ….First introduced in June 2012,
three years ahead of the date set by the European Commission, Mercedes-Benz eCall is
now available in nineteen European countries including: Germany, France, Italy, Spain, UK,
Austria, Belgium, Netherlands, Switzerland, Norway, Finland, Lithuania, Hungary, Romania,
Bulgaria, Greece, Portugal, Luxemburg and Malta.” (Mercedes Benz 2013, Tuulilasi 2012)

Volvo and BMW suggest the co-existence of both public and private services, while private
service can screen the calls and let only the real emergency calls enter PSAP. Since the
summer of 2012, Volvo has offered the eCall-type emergency telephone system (Volvo On
Call). In the future the service will expand also to mobile smart phone application for
Windows (Volvo On Call app has Android and iOS platforms already). The Volvo On Call system has a hands-free unit, as well as On Call and SOS buttons. If emergency help is necessary, the driver or passenger can press the SOS button and the message is sent to the service centre and audio session will open. If the car’s air bags inflate, a message is sent automatically. Volvo On Call is active in 17 European countries. The system consists of both emergency help and also Volvo’s roadside assistance. Volvo On Call eCall service is free of charge. In contrast, roadside assistance and other characteristics of the system after the first two years have a charge. Volvo On Call system costs 700 Euros plus car tax two years user charge is included in the price. (Tekniikan maailma 2012)

Over one million Peugeot and Citroën models featuring the emergency call system have been sold since 2003 and nearly 5,500 people have used it to access emergency services in the 10 European countries where PSA eCall has been deployed. In 2010, PSA Peugeot Citroën made the eCall emergency call system widely accessible with the launch of the autonomous telematics box (ATB). This vehicle-connected on-board unit separates the telematics systems from other functions, such as hands-free phone control, offering an independent communication solution free of contract obligations for the life of the vehicle. eCall is also equipped with a location-aware assistance system that puts vehicle occupants in contact with a roadside assistance network in the event of a breakdown. PSA Peugeot Citroën’s emergency call system received the Euro NCAP Advanced award in late 2010. PSA Emergency-call has been available for customers in France since 2003, in Germany 2004, in Italy, Spain, Belgium, Luxembourg and Netherlands since 2005. PSA offer a free service for the vehicle life, i.e. there is no charge to the user for installing the service of for using it. (PSA 2012)

One clear challenge for all In-Vehicle Systems of OEM is the language barrier, because for safety reasons voice-operation and voice-activation of services is vital. In articles related to Ford Sync it was said that the delay to launch the system for European market was due to all the different languages and dialects spoken in Europe. The Emergency Assistance in Ford Sync package costs about 1200 €.

*Business models, after market devices, value added services*  
“eCall is mandatory for all new cars in Russia from next year [2014] (for more details see par. 4.11) and Europe is likely to decide to make it mandatory from 2015. For life saving applications like eCall, quality is the key and systems will support additional services such as remote [vehicle] diagnostics, service calls and breakdowns." assured one chipset and hardware provider in one Telematics magazine.
The same article reports that early deployments typically involve top of the range vehicles from premium manufacturers, but if eCall become a regulatory requirement, the technology will rapidly feed down to mass market models.

Some think that the eCall trigger does not need to come from a device embedded within a vehicle. Smartphone technology has advanced so much that you can do all the things you might want to do in a vehicle on a handheld. So there are opportunities seen now for organisations to retrofit wireless systems to existing vehicles and fleets and use wireless technologies beyond the GSM family such as Wi-Fi and GPS. One application is in the insurance market and the location-based capability of GPS could be a critical enabler of highly granular applications. In European markets and the UK in particular, car insurance premiums for specific types of driver are so high that the cost of deploying a system that monitors vehicle usage and driving style and retrofitting it to a vehicle can easily be justified by a reduction in premium. (Wireless magazine 2012)

Some OEMs are concerned about the separation of technology development: eCall sticks to the in-band modem and data-over-voice while the OEM builds their own services and diagnostics on top of LTE so there will be two communicating technologies side-by-side, this is also a worry to the mobile operators, must they keep the old mobile networks alive just for eCall. There should be efforts to include smart phone as a solution supporting eCall functionality, it would solve the conflict quickly. (Strategy analytics 2012)

The new in-vehicle device based e.g. driver aiding systems can be related with vehicle insurance business. This is seen growing fast in the future. Accident prevention and aftercare possibilities related to all accidents will definitively grow while vehicle telematics use is expanding for the benefit of all, especially the preventing services.

**USA NG 9-1-1**

In the United States NENA (National Emergency Number Association) started to develop the next generation emergency handling in 2000, published the Future Path Plan in 2001, and it began development activities toward this end in 2003. In project Next Generation 9-1-1 (NG9-1-1) the focus of regulators is on enabling the most complete access to accident scene information, particularly via the mobile phones of the affected parties. The NG911 agenda is intended to ensure that PSAPs are prepared and equipped to receive all forms of data and voice communication. NG911 has no specific demands for the vehicle telematics (no specifications what kind of the vehicle equipment is needed for the service).
A system comprised of Emergency Services IP networks (ESInets), IP-based Software Services and Applications, Databases and Data Management processes that are interconnected to Public Safety Answering Point premise equipment. The system provides location-based routing to the appropriate emergency entity. The system uses additionally available data elements and business policies to augment PSAP routing. The system delivers geodetic and/or civic location information and the call back number.

The system supports the transfer of calls to other NG9-1-1 capable PSAPs or other authorized entities based on and including accumulated data. NG9-1-1 provides standardized interfaces for call and message services, processes all types of emergency calls including non-voice (multi-media) messages, acquires and integrates additional data useful to call routing and handling for appropriate emergency entities. NG9-1-1 supports all E9-1-1 features and functions and meets current and emerging needs for emergency communication from caller to Public Safety entities. (NENA 2013).

4.10 GSMA

The GSMA Automotive team has prepared a communication for all European operators to ensure a common awareness and understanding of the importance of timely deployment of eCall, as well as the opportunity it represents in facilitating connected car services. European operators have a responsibility to engage and be ready to implement the eCall ‘flag’ by December 31st 2014 as requested by the EC Recommendation. The GSMA not only firmly supports this initiative but wishes to actively encourage greater co-operation amongst all stakeholders for successful deployment. (GSMA 2012)

So at a strategic level the association for mobile network operators GSMA are committed to the principle of eCall. In Member States the view is more fragmented. The European Commission DG Connect initiated a request for a status update for all MS on the preparedness of each mobile network within each MS for eCall. To date some answers are missing. HeERO projects can provide assistance on what should be expected by a Member States in the provision of the relevant technology by a mobile network operator for the successful implementation of eCall in that MS.

4.11 Russian eCall project ERA GLONASS

Russian ERA GLONASS project is preparing eCall for the State of Russia. The project started in 2010 with system planning and the implementation is planned to take place in 2014 (for certain type of vehicles). The current consortium (from May 2012 onwards) preparing the
service is named GLONASS Union, appointed to be National Navigation Services Provider, and the sole contractor for ERA GLONASS infrastructure deployment. GLONASS Union is a partnership made up of JSC MTS, JSC Vimpelcom, JSC Megafon, JSC RTComm.ru (Rostelecom), LLC Yandex, JSC Navigation-Information Systems, GLONASS/GNSS-Forum Association, and LLC Summa-Telecom. GLONASS Union is mandated by the Russian government to develop and implement the ERA GLONASS system. It is envisioned that further extensions to ERA GLONASS will be developed by GLONASS Union in the future, but that GLONASS Union does not intend to provide services directly, but rather provide a platform for other service providers to utilise. (ERTICO 2012)

The main aim of the project is to deploy State owned System for Emergency Response Service (ERA GLONASS). It functions similarly to European eCall. All new vehicles in Russia will be equipped by ERA GLONASS OCUs, at the same time, ERA GLONASS land infrastructure will be completed and fully deployed by 2013. Besides eCall, the service in Russia is expected to boost the development of navigation, telematics and communications markets in Russia.

The Government decision to change the company that holds the role of National Navigation Services Provider was due to the necessity of attracting off-budget investments into that market sector and ensures equal access and usability rights for ERA GLONASS infrastructure for different market players.

On October 8th 2012 the Ministry of Transportation of the Russian Federation signed a Contract with GLONASS Union, which will serve as National Navigation Services Provider for the deployment and operations of ERA GLONASS Emergency Response System.

Given the schedule for outfitting vehicles with ERA GLONASS defined on April 9th 2012 the Government regulation which was distributed to project stakeholders in Russia:

- 01 Oct 2014 – new vehicles of categories M2, M3 intended for passenger transportation and new vehicle of category N1 (weight > 2.5 tons), new vehicle of categories N2 and N3 intended for dangerous cargo transportation (assessment of compliance in the form of vehicle type approval at first time)
- 01 Jan 2015 – new vehicles of categories M1, N1 (assessment of compliance in the form of vehicle type approval at first time); new vehicles of categories N2, N3 not intended for dangerous cargo transportation; new vehicles of categories M2, M3 not intended for passenger transportation (assessment of compliance in the form of vehicle type approval at first time)
- 01 Jan 2016 – vehicles of categories M2, M3 intended for passenger transportation and vehicles of category N1 (weight > 2.5 tons), vehicles of categories N2 and N3 intended for dangerous cargo transportation that will put in circulation at first time (as new vehicles as well as all vehicles not previously in use in the territory of the Russian Federation which will be imported to Russia)

- 01 Jan 2017 – all categories of vehicles that will be put in circulation at first time (as new vehicles as well as all vehicles not previously in use in the territory of the Russian Federation which will be imported to Russia)

Besides the principle aim of ERA GLONASS Project – to increase safety in automotive transportation environment, the capabilities of ERA GLONASS infrastructure reach much further. They can facilitate the development of interoperable telematics systems establishing the ground base for a multitude of different services, such as fleet management systems for transportation transit corridors, passenger transportation, heavy, hazardous cargo forward and deliveries, tolling systems, stolen vehicle recovery service, digital tachograph.

Additionally, the capabilities of ERA GLONASS infrastructure make it possible for Insurers to introduce new products based on Insurance Telematics Services. These include road traffic accident reconstruction Service for Compulsory Insurance and Pay-as-You-Drive/Pay-as-You-Use Insurance Programs for Voluntary Insurance (Domaratsky 2012).
4.12 HeERO Piloting Experience: overview

The main elements of eCall technical and operational functionality can be divided in three parts: the in-vehicle system functionalities, the mobile phone network functionalities (communications) and the PSAP functionalities and operations. The verifications of successful functioning of all these main elements are gathered in HeERO project in its many subtasks: in WP2 (specifications for the testing implementation), in WP3 (operational issues) and in WP4 (test results and the KPIs). WP6 summarises the experiences and will mould them into Guidelines (D6.4) for the future and new stakeholders.

The important non-technical elements of eCall deployment are legislative, administrative and business model levels with the stakeholders as well as the end-users involvement and privacy issues, which should be also taken into account while writing the Guidelines.

The HeERO partners are gathering important piloting experiences and materials in several WPs: in WP2 there is a comprehensive framework for writing down each piloting detail in deliverable D2.4 (System test cases and verification report) for issues like “Functional test of IVS”, “GSM module test”, “Integration test: PSAP modem – PSAP application” etc. The expected results and actual results and possible problems are written and gathered in the D2.6 (Final system test cases report). In WP3 the deliverable D3.2 (Operation Preliminary results) presents inputs from the first piloting round and D3.3 Final Operation results, which include issues related to e.g. MSD, VIN, exchanging needed information through the interface with traffic management centres and interconnections with 3rd party etc.

There is a need to highlight issues that are already visible, problems and solutions which we confronted during the first pilots, in order to provide important feeds for the next eCall projects like HeERO2 and for other future eCall related activities with Members States and stakeholders.

In the next chapters issues brought up by the HeERO partners in Member States pilots are described in order to sum up the project common Guidelines and Recommendations. The chapters present both Problems found in implementation and operation of the pilot scheme as well as solutions innovated for tackling the problems.
4.13 Piloting in Croatia

4.13.1 General

The Croatian eCall Pilot Architecture comprises the following components: IVS\(^3\) units (both the IVS simulator and commercial-grade units), Mobile network and PSAP\(^4\). These components were implemented both at test bed and in real environment.

The components of the Croatian eCall Pilot Architecture are presented on Figure 9.

![Diagram of Croatian eCall Pilot Architecture](image)

**Figure 9: Croatian eCall Pilot Architecture**

The eCall IVS units (both IVS simulator and commercial-grade units) were deployed both at the test bed and in real environment. The IVS units comprise features for setting up the eCall according to the most recent 3GPP and CEN eCall standards. The IVS is configured to dial either 112 call with eCall discriminator, or to dial directly the PSAP number.

The real test environment includes eCall enabled PSAP at NPRD, two mobile network operators with eCall flag implemented in their network, and various IVS units.

The eCall laboratory MNO component consists of fully functional mobile networks, including the Radio Access Network (RAN) and the Mobile Switching Centre (MSC). The MSC is connected. Key questions regarding the pilot are addressed below:

- *Was the whole chain (vehicle IVS - MNO network - PSAP) tested, if not why?*

The whole chain was tested.

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\(^3\) In-Vehicle System

\(^4\) PSAP- Public Station Answering Point
• **Was there already cross-border activities? Plans for the next phase?**

Cross border activities were conducted via remote tests with HeERO partners from Czech Republic, Sweden, Germany, Italy and Romania.

The second part of cross-border activities were performed at the 1\textsuperscript{st} International HeERO Conference where various IVS units were tested against Croatian PSAP and MNO with eCall flag.

Several scenarios in WP3 have included testing with foreign SIM card in roaming.

Plans for next phase include extensive testing with other HeERO partners and are to be agreed.

• **Where were the main focuses and efforts in the piloting (in percentages) and why?**
  
  o in IVS 25 %
  
  o in MNO / Communications 25 %
  
  o in PSAP environment 20 %
  
  o getting the test results (KPI) 25 %
  
  o or other 5 %?

• Gathering full support from all stakeholders due to the lack of legislation framework.

This distribution shows that every aspect required extensive effort to be undertaken to perform a full chain testing, and to consolidate data and provide test results. At the very beginning of the project major issues were related to IVS due to the lack of such devices on the market. MNO upgrade and PSAP upgrade were flawless due to excellent support from all involved parties.

**4.13.2 IVS**

• *technical performance – problems and solutions*

The first commercial grade IVS units had limited capabilities since they came with predefined MSD content but in new version manufacturers have enabled features which create MSD using real data from sensors.

As these devices were developed after the project had already started, several issues were addressed to manufacturers and all of them have been successfully solved.
4.13.3 MNO – Communications

Due to the fact that all operators have to interconnect with fixed-network operator interconnectivity regulations have to be defined.

Network coverage problems were detected in certain geographical areas, and therefore tests were performed at areas with satisfying GSM signal.

4.13.4 PSAPs

- No special issues related to PSAPs

4.13.5 Other issues

A time synchronisation issue between IVS and PSAP was resolved by adding additional equipment (GPS Time Sync) to the PSAP side.

Increased MSD & eCall initiation times for vehicles in motion due to poor network coverage – tests performed for stationary vehicle in the area of good coverage + additional scenario for vehicle in motion to be conducted in Phase II.

Consolidated data quality control – detailed manual of data consolidation will be prepared, and consolidated data quality check procedure will be put in effect in Phase II.

4.13.1 Conclusions and recommendations

According to current experiences from the pilot, eCall has proven to be a mature technology which might be deployed and use for commercial use. Several shortcomings which were identified were solved with additional effort from all stakeholders. Due to the number of stakeholders involved; mutual cooperation and proper technical support are critical prerequisites to success in this kind of project. This is one of the key messages that should be communicated.
4.14 Piloting in Czech Republic

4.14.1 General

We tested whole eCall chain (Figure 10). eCall solution was first tested in the beginning of 2012. Identified bugs on both IVS and PSAP level were then fixed and were ready for IVS implementation to the test car fleet in May. We have also discovered a false eCall issue so we had to reconfigure IVS and MNO for usage of short number 162 instead of 112+eCall flag. Since May 2012 we have implemented TMS interface allowing us to send accident data to the National Traffic Mgt Centre. TPS interface has been recently implemented and some tests have already been conducted. Intensive drive tests proceeded in September 2012 (2 weeks testing) and focused mainly on KPIs evaluation. We were testing the complete eCall chain – eCall generated by IVS goes through mobile and fixed network of Telefónica to the
testing PSAP. PSAP modem receives MSD and after the basic check it sends data to the application superstructure. In parallel, free operator is found and eCall voice + data are then distributed to his/her workplace. eCall handling is done either manually by operator (not real staff, people from 112 test bed) or by automated script allowing reception, processing and closure of eCall session.

- **Were there cross-border activities already? Will there be in the next phase?**

In September 2012 we performed first interoperability test between Czech Republic and Germany. Czech eCall testing car equipped with both types if IVS successfully communicated with German PSAP. MSD reception and Resend MSD passed without any problems. Another cross border test was performed in November against Croatia PSAP, again with positive test result, but only pure eCall, no Update MSD was tested.

- **Where were the main focuses and efforts in the piloting (in percentages) and why?**

  o **in IVS 40 %**

  We have tested two types of IVS and each of them has their own issues to be solved. Fixing bugs, upgrade Firmware and consequent retesting of basic IVS functions. Stability of IVS, audibility and voice clarity had to be solved. The major issue was to unify logging procedure for future KPI measurement.

  o **in MNO / Communications 5%**

  eCall flag evaluation was configured, tested and implemented to all Telefónica MSCs. Afterwards only configuration of new test number 162 had to be ensured in the network.

  o **in PSAP environment 25 %**

  The main focus was to the proper functionality of implemented In-band modem and related issues. We had to develop automatic handling of eCall in PSAP operator application to ensure unmanned PSAP operation during Field testing phase. We also implemented interface towards Traffic Mgt Control system.

  o **getting the test results (KPI) 30 %**

  First of all we had to identify concrete points in the entire chain to obtain proper values to be mapped to the time stamps for KPI calculation. All units in the testing chain had to be time synchronised. During the testing itself we had to ensure logged data integrity and their call per call consolidation.
Several issues had to be solved during functional and field testing:

- MSD update – solved by new Firmware of GSM module vendor
- Unit freezing – solved by IVS provider
- eCall status visualization – solved by IVS provider
- GPS freezing - solved by IVS provider
- Incorrect values in the field of N-1 and N-2 position – solved by IVS provider
- MSD ID increment, MSD update/resend and position update – still in discussion, because standards don’t offer unambiguous interpretation

- any issues related to standards

The main standard related issue is correlation between MSD update, MSD ID increment and position update – time stamp of generation and content of these MSD parameters. The problem is: when should be MSD updated to achieve the most actual MSD for PSAP (if needed)? Specification standards are lacking in this regard. Terms like "new MSD", "resend request", "the latest version", etc. are ambiguous and should be probably clarified and unified in the standard (HLAP - EN 16062).

Original discussion started by questions like:

- when PSAP pulls MSD, it can be received either "old" or "new" version
- should message ID be changed only when "feeding" with "new" MSD?

Our team decided that the most effective solution would probably be when PSAP pulls MSD, because without it we have to update MSD periodically with all its problems. It is up to the application layer of IVS to decide when to send "new" data to In-band modem (and it is possible only when restarting In-band modem). When application layer doesn’t not decide to "feed" In-band modem for any reason, then the In-band modem transmits "old" data with the same message ID as the last one.
In October 2011 an eCall flag routing in Telefónica mobile network was introduced. It allowed us to distinguish between eCall and ordinary 112 call. eCall was routed to the eCall testing PSAP. In the beginning of this year we registered, besides testing eCalls from IVS, some suspicious calls without MSD transfer in the testing PSAP. After deeper analysis we found that these are false eCalls generated by mobile phone. Normal 112 calls were identified as eCall since mobile phones - without any reason and contrary to the ETSI 3GPP TS 24.008 standard - beyond the control of the caller generated eCall flag.

First analysis showed that the majority of false eCalls came from LG mobile phones (LG - T310, T300, A200, A250…). Some of the LG mobile phones inserted into the Setup message Emergency Service Category field with non-zero values. We tested several samples of LG phone in Telefónica mobile network lab. This test confirmed that under certain conditions (emergency setup immediately after phone activation) mobile phone generates randomly Service Category with non-zero values and thus it can simulate even eCall.

We consider this as a serious problem if the eCall is routed to the testing environment where no call taker is present. Fortunately, in most cases these calls are mistakes or malicious calls; nevertheless the serious problem can occur if it is a real call of the people in distress.

This is definitely mobile device vendor problem. As a temporary solution we have taken immediate measure consisting in the change of eCall test number. Instead of 112 with flag we are using short number 162.

- Any issues related to standards?

See problem described above.

- any issues related to stakeholders and operational issues?

No problems relating to stakeholders and operational issues.

4.14.4 PSAPs

- technical performance – problems and solutions

Several issues had to be solved during functional and field testing:

- repeated MSD update not possible - solved in Telco part of PSAP
- MSD data mismatch in case of two parallel eCalls - still in progress
4.14.5 Other issues

- new material or links to relevant new information?

In the new document of European Commission on PSAP regulation Article 4, Conformity assessment states: "Member States shall designate the authorities that are competent for assessing the conformity of the operations of the eCall PSAPs with the requirements listed in Article 3 and shall notify them to the Commission. Conformity assessment shall be based on the part of the standard ‘Intelligent transport systems - eSafety - eCall end to end conformance testing’ (EN 16454) that relates to PSAPs conformance to pan-European eCall". Based on a quick evaluation of a.m. standard we recommend incorporating this specification into HeERO testing activities. The document focuses on all parts of the eCall service chain and each country will have to prove conformance with this standard prior eCall launch. (EU Commission 2012)

4.14.6 Conclusions and recommendations

The mean value of voice channel blocking during eCall session is about 7s while pure MSD data transmission is about 2s only. It means that the rest of the time (5s) is the overhead at the beginning and end phase of data transmission. A possible way to shorten it should be discussed.

We consider false eCalls generated by certain types of mobile phones a critical issue, see chapter 4.14.3.

An important question to the standardisation body is the MSD update related issue described in 4.14.2.

We also learned that a quite debatable issue is the information value of position as a trusted parameter in MSD. It is extremely important what position is sent in it and marked as trusted - e.g. in case of accident in the tunnel where the last known position is in the beginning of the tunnel.

4.15 Piloting in Finland

General

The system for HeERO first phase eCall piloting is built to simulate the straight-forward one-number emergency handling. The testing is done in a simulated PSAP environment until 2015 when the new PSAP central system will be implemented and where the eCall receiving capacity will be implanted in from the beginning. PSAP (Emergency Rescue Centre
Administration) is currently renewing its central system, the provider has been selected and
the development of the system is in progress. The new system will be functioning in the
same time as the organisational consolidation from 15 ERCs into 6 is underway.

The entire chain (vehicle IVS - MNO network - PSAP) was tested, but there were a few
problems with the IVS (figure 11). Cross-border tests started with tests with Russian IVS in
Finland.

Figure 11: Testing process

Main focuses and efforts in the piloting were quite even in all following areas:

- *in IVS 30 %* - few functioning problems with IVS
- *in MNO / Communications 15 %* - one SIM card used, one lab MNO environment
- *in PSAP environment 25 %* - simulated test bed environment
- *getting the test results (KPI) 30 %* - testing and KPI gathering was important area

There have been news and articles in Finnish motor-magazines which confuse commercial
bCalls and Third Party Services with 112-eCall. E.g. one Magazine “Tuulilasi” declared that
eCall starts to operate in Finland in January 2013, in reality what was starting was a
commercial premium service of one car model. (Tuulilasi 2013)
4.15.1 IVS

The main problem was the lack of good IVS. All used IVS were prototypes, which were not functioning perfectly. The first of them (Gecko) implemented only transmission of MSD but provided no voice connection. However, it has features for automatic activation of MSD transmission. The second prototype used in Finland (Indagon) provided both voice connection and transmission of MSD but no features for automatic activation of eCall. While the Gecko prototype has external GSM and GNSS antennas, the Indagon prototype has internal antennas mounted within its plastic enclosure. Both prototypes provide interfaces suitable for data logging at IVS side. However, the data logging interfaces as well as the formats of log files are different for the two prototypes. Therefore, both prototypes required their own tools for post processing of log files.

The main issue with IVS development is the uncertainty of Finnish IVS producers whether there will be a business case for them or not, so the commitment for the development was perhaps not the best. They either would want to see a real market ahead especially with retrofit/aftermarket IVS or subsidising from state. Russian IVS (Peiker) seems to be quite promising and it will be used also in 2nd phase piloting. Also one of the Finnish IVS providers has developed their prototype further and it will have better performance in the 2nd round. Discussions to use also Swedish and German IVS have been held.

PTI (Periodical Technical Inspection) makes the initial registration and approvals. There is a European WVTA database (type approved) for vehicles. Cars imported to Finland do not have a registration inspection. The procedure is that the vendor makes the prior notification of a new car into the registry. This means that by default, and the current view of the OEM eCall devices come to Finland as part of the type-approved cars "as it is" (unless the importer / manufacturer come up with some other solution). The so-called facelift changes are often made of type extensions. The first inspection of a vehicle should happen in the third year of use in Finland. (with eCall that means in 2017-18). As an exception to this rule, taxis are inspected also in the first year as professional service fleet. By default, the taxis (new type-approved vehicles) also have eCall so they are therefore the first in inspections. And, as we know, there is no information available yet of aftermarket devices.

4.15.2 MNO – Communications

One of the three main mobile operators of Finland (Elisa) was actively involved with HeERO testing. Elisa built an eCall testing environment to their lab and saw no special hinders in MNO performance for eCall process. The other MNOs will follow in 2013. Finnish
Communications Regulatory Authority (FICORA) is in charge of service demand for eCall from the Mobile Operators. FICORA made a decision in October to use the following control numbers for eCall:

- Manually initiated eCall 112 - will be routed to special number OX(Y) OC abc 115
- Automatically initiated eCall 112 - will be routed to OX(Y) OC abc 116,

so that the PSAP operators can handle them accordingly.

Some issues have been noted for testing: there have to be nationwide tests to get a picture of how the mobile network service functions e.g. in Lapland, the MNOs all operate nationwide but there are some “white spots” in the service. Field tests of eCall Flag needs special arrangements: there is a need to indicate the eCall Flag testers SIM-cards to separate them from others, because there may be real 112 calls, even eCalls with Flag around (there have already been real eCall cases and also some Asian smart phones have sent eCall with Flag in error!). Another possibility is to carry out the Flag-test in a very short time period with restricted amount of test calls. Some issues that the MNOs highlighted: e.g. mal-functioning of smart phones (see previous) - there are no standards for end-device coding, they can “simulate” eCall devices; 2G must be kept alive because of eCall. To find a solution for these issues there should be more discussions with stakeholders and also statistics of malfunctioning and false alarms should be kept for further analysis.

4.15.3 PSAPs

The receiving of eCalls was conducted according to standards in PSAP testbed. Output was stored to result database and error logs (Figure 12). About 100 test calls was made with a IVS prototype and analysed during January – February 2012 in lab tests. During June 2012, tests were conducted so that an IVS prototype (by Gecko Systems) was used and the test route was driven three times (three different days). All test routes were in Southern Finland, the length of test routes were 25 – 120 km in urban, suburban, interurban and rural roads containing also motorway. The IVS prototype was activated in total 307 times during the test. During September 2012 more tests were completed by using an other IVS prototype (by Indagon). The same test route was driven three times again. The IVS prototype was activated 323 times in total during the test.

Both of the tested prototypes had at least some inconsistencies or other problems in encoding of MSD. This underlines the need to verify the conformance of the testbed MSD decoder to the specification in EN15722 and to make the required changes to IVS prototypes.
to ensure the correct encoding of MSD. VTT made the finding of an inaccuracy in MSD-standard into a presentation in EN15722, which standardisation organisations have been informed of. Also the operation of eCall In-band modem in different situations need to be researched further.

For the second phase pilots, the system components will be developed further and an end-to-end system will be integrated. Before the pilots, the modules and the integration of the end-to-end system need to be tested.

In the second phase the new PSAP system provider’s facilities will be used and the tests will help the implementation of eCall to the new system which will be in use in the end of 2015.

![eCall Testbed](image)

**Figure 12: Example of the eCall test bed system output**

### 4.15.4 Conclusions and recommendations

During the first testing phase, the whole chain some issues were reported with IVS prototypes. This situation can direct the test efforts too much to the faults and incompleteness of IVS, and away from the other important aspect.
Taking into account these results, the second round of tests should employ more mature IVS equipment and be more effective in the performance evaluation of other part in the eCall chain.

In addition, more (separate) development work with retrofit IVS should be conducted (e.g. helping the market entry).

Functioning of the In-Band modem needs more research and nationwide testing of MNO network quality is important. Also issues such as new smart phones causing false eCall alarms may perhaps need further study and reported incidents.

4.16 Piloting in Germany

4.16.1 General

Germany is a federal state that has decentralised structures. Therefore an implementation like eCall, which affects several players, is a substantial organisational issue. Without pressure from the EU the process will take a long time.

In Germany the national ITS Action Plan includes the eCall situation and addresses the problems which need to be solved – focus is to set to the process in the different states and the responsibilities of the governments. In addition to this a national eCall platform is established to inform all stakeholders about the current status and the on-going process. It is chaired is by the Ministry of Transport, Building and Urban Development (BMVBS) in Berlin.

The key problems in implementation process are the different competences of the involved players. Clarification of different point of views will take some more time. Moreover the awareness is not on the same level everywhere. Some players are still waiting for legal binding decisions by the EU or the German government. Only with these binding decisions it will be legal to define a budget in the German government for implementation of the system and the needed infrastructure.

For VIN and EUCARIS utilisation Germany has discussed and implemented the technical interface between the national PSAP reference system and the EUCARIS network. For this action an extra meeting with the representatives from EUCARIS took place in Braunschweig and the solution was shown in Berlin during the eCall Days 2012. This implementation shall be used for the introduction in Germany as well.
In EU the plans for technical supervision of eCall IVS exist already; within the EeIP there is a task force which is dealing with all requirements of PTI (periodical technical inspection). NavCert is leading this task force.

Regarding the related authorities (road authorities etc.), they are informed and cooperative, but they are waiting for legal binding guidelines to start an official working progress. Germany is discussing the current status through the national Platform, the CeBIT fair and the eCall Days in Berlin as a continuous process.

The German test site consists of 10 Volkswagen cars as test vehicles. Five cars are equipped with the IVS by Continental and the five other cars with S1NN's IVS. The team member Oecon provided special server which emulated as a PSAP an eCall test server that handles the incoming test data and builds up the base for the evaluation. Because of the missing implementation of the eCall flag in Germany the test systems use a long number instead of 112. No mobile network operator is directly involved in those tests or is part of the team.

For the first test phase the PSAP in Braunschweig is the only involved PSAP. The PSAP Oldenburg as the second intended PSAP will be part of the tests during the next test phase 2013. Cross-border tests with the German test fleet are planned for the next year in close cooperation with the Czech team.

The German test period took place in summer 2012 and generated 10.697 automatic and 248 manual test eCalls. The evaluation of test data for Germany is completed.

**Current cross-border activities**

In September and October 2012 cross border tests with the Czech Republic were done, in which 75 Czech eCalls reached the German PSAP.

**The main focuses and efforts in the piloting (in percentages)**

- *in IVS* 30%
- *in MNO / Communications* 0%
- *in PSAP environment* 30%
- *getting the test results (KPI)* 40%
- *or other* 0%
4.16.2 IVS

- low success rates in the automatic tests (caused by synchronisation timer issue)
- missing time stamps
- problems during dialling a busy number in PSAP
- different formats were used by the different IVS, solution: adapting of formats for the next test phase

4.16.3 MNO – Communications

No mobile network operator is directly involved in those tests or is part of the team. So as of now, the eCall flag is supported by no network operator. An escalation took place on governmental and state level. However the MNOs are not open to implement the eCall flag prior to 2014. The project team is not involved in this decision. Therefore all tests had to be done with long numbers instead of dialling 112.

An interesting contact to T-Mobile was established in November 2012 during the HeERO conference in Zagreb. This contact may lead the German team to do some testing with the eCall flag in the T-Mobile test centre.

Technical performance – problems and solutions

The ten IVS were configured with SIM cards from all German MNOs: T-Mobile (3), Vodafone (3), e-plus (2) and O2 (2). None of them had the eCall flag implemented.

4.16.4 PSAPs

Germany has no consistent organisation of PSAPs. Most of the PSAPs operate in a local area and work for one area municipality. But there are also regional PSAPs that are integrated into several areas. It can be expect that a merger process of smaller PSAPs will take place in the near future.

The eCall handling in Germany with regard to the existing different structures is still under discussion. Germany is working on a special technical solution for the implementation of all PSAPs.

Known or predicted problems in implementing eCall to PSAP system lie in:

- The PSAPs have very different technical infrastructure, so that some PSAPs have to buy new systems and some others need only software updates.
• The PSAPs do not have personnel resources to manage eCalls in other languages.

The PSAPs infrastructure must be able to receive the MSD. This is not realised yet. If the technical infrastructure will not be available, the normal emergency call is the fall back solution all over Germany. As for eCall implementation into PSAP system the scheduling of the needed infrastructure and the training will be done during the project and has to be discussed with the BMVBS and the responsible partners of the national government. After this discussion the real budget for the upgrade will be addressed to the related PSAPs and the national governments.

NavCert sees that the main challenge in supranational eCall sending (from country-to-country) from PSAP’s viewpoint is the support of different languages and identifying of the proper language.

ADAC was concerned of the possibility of false alarms from eCall equipped vehicles. This issue was reported to ADAC from the involved German HeERO PSAPs. Already today, PSAPs regularly suffer from automatically triggered false alarms, e.g. from fire detection systems. In ADAC’s opinion, the issue of false alarms needs to be examined in HeERO and it must be clarified who pays for costs arising from false alarms.

First HeERO tests

For the first test phase the PSAP in Braunschweig was the only involved PSAP. The PSAP Oldenburg as the second intended PSAP will be part of the tests during the next test phase 2013.

A certified PSAP-system by OECON was used for the tests and therefore no issues occurred.

4.16.5 Other issues

In 2012, there were some interesting meetings with the involved partners in Germany:

• In March 2012 a first discussion with the responsible regional Ministries of Interior was started. The HeERO team was able to modify a proposal how to handle eCalls in Germany. The original proposal would have neglected manual eCalls in the PSAP process.

• In August 2012, a meeting between the Ministries of Transport, Interior and Economy was held to discuss the German timeline for the introduction of eCall. However, this meeting was not very successful, because the responsibilities and decisions “what to
do when” interdependent. The resulting decision was to ask the European Commission to approve a mandatory date for introduction of IVS to the automotive industry.

- In October 2012 the Emergency call experts group (German “Expertengruppe Notruf”, EGN) held a meeting with several PSAP PBX suppliers and informed them about the necessity to upgrade their systems. Bids for new installation will only be accepted if eCall can be integrated. The companies also promised to identify if, when and how old systems could be upgraded.

### 4.16.6 Conclusions and recommendations

#### Political factors of implementation

The communication among the German federal Ministries and between them and the political subdivisions in the federal states is still suboptimal. The eCall affects the federal ministries of Transport (which signed the MoU), Interior (responsible for the whole emergency system) and Economics that have to solve the question of responsibility. Moreover these Ministries have to define how the implementation could work in the federal states, because federal states and their municipalities have local responsibility for the emergency system. However, there are the open issues of:

- Responsibility
- Financing
- Legal framework

These issues must be solved very quickly. Unfortunately the German HeERO consortium is not directly involved in this process. It could only offer the experience from the project and show potential approaches to the interested stakeholders.

To hurry up the political process in Germany a legal directive from the European Commission would be very helpful. Such a directive could also make sure that the implementation of the eCall flag will be done earlier than 2014 by the MNOs.

#### Retrofitting

The German team is confident that an early offer of eCall retrofitting modules would accelerate the implementation of eCall. Those modules will increase the public acceptance of the system and will force the car manufacturers to hurry up. Furthermore the retrofitting
market will need a legal framework that could be lead to faster decisions in the political sphere. Moreover this would affect the standardisation and certification issue, which is a deployment enabler per se.

**Test results**

In Germany the MSD Presentation Time (KPI 5) and Voice Channel Blocking Time (KPI 7a) were evaluated in detail, because these are the most relevant ones for acceptance of eCall. The Voice Channel Blocking Time is higher than expected and higher than the Czech IVS which called the German PSAP. Therefore there is some room for improvement for the second test phase.

### 4.17 Piloting in Greece

#### 4.17.1 General

Greece has had a public procurement for acquisition of hardware and software equipment for the PSAPs and vehicles, the process of starting the project is on-going. Greek MNOs have expressed support for eCall discriminator performance during the piloting. Technical discussions between the Hellenic Telecommunications Organisation (OTE) and the MNOs for the implementation of eCall discriminator through the fixed and mobile networks have been held.

Plans for operation workflow are ready and the emergency services will review the final workflow.

Possible interoperability partners are Romania, the Netherlands, Czech Republic and Croatia to perform common interoperability tests.

Public procurement for the acquisition of hardware and software equipment for the PSAP next steps are the evaluation of the technical features of the offers of participating companies and the evaluation of the financial offers. After that the signing of the contract for the acquisition of hardware and software for the PSAP, proceeding to tender for the tests and the evaluation of results and proceeding to tender for dissemination activities. And then starting the actual piloting which will consist in the whole chain (vehicle IVS - MNO network - PSAP).
4.18 Piloting in Italy

4.18.1 General

The Italian pilot architecture is based primarily on a full chain realized into a live environment that represents very closely the real situation that we will face after 2015. The consequences that this choice has posed will be reported later below. The full chain is based on three main components:

1. the Varese 1° level PSAP operated by AREU;
2. the TIM mobile network and the 112 fixed network, both operated by Telecom Italia;
3. the IVSs
   a. 3 types from different suppliers, integrated by C.R.F. in a FIAT car;
   b. 1 type from Magneti Marelli integrated and customized by Magneti Marelli itself; for the 2nd phase of tests this IVS has been modified to host both eCall and bCall on the same board.

The 1st phase of tests has been limited to the eCall, basing the calls strictly on its standards, and has involved a car by C.R.F. equipped with 3 IVSs and a car by Magneti Marelli equipped with its IVS.

The 2nd phase of tests has included, beside the eCall, the bCall (that is based on different standards like GPRS, XML, HTTP) and has analysed the possible coexistence of these two services on the same IVS (the MM one). The bCall tests have been possible thanks to ACI that has involved one of its Service Centre (that is already delivering at present the mechanical assistance to their associates). These tests have involved 10 cars of 10 ACI members, normal drivers that have accepted to host in their private cars the MM IVS box modified for eCall & bCall, and the C.R.F. car with 3 IVSs.

The Pilot has also covered the interoperability tests; some of them were done during the Vienna ITS World Congress (some IVSs not included in the Italian Pilot have successfully made eCall, using a long number, towards the Varese PSAP that has received the MSD and opened the voice channel) and some more during the 1st International HeERO Conference (the MM IVS has successfully made eCall, using a mobile network with eCall flag, toward the Croatian PSAP). More interoperability tests are previewed in the 2nd phase of tests.
4.18.2 IVS

Since the IVSs were not commercial products but prototypes, several issues were addressed during the 1st phase test setup with the direct help of the manufacturer (MSD with predefined and not modifiable data, no VIN number, no eCall flag, presence only of the manual call, and so on). The objective was to have the IVSs completely adjusted to our requirements and fully compliant with the eCall standards.

This has been a no easy step, due to the fact that the Pilot partners have had to appeal to other resources outside the Pilot to have the proper technical support and, sometime, the plans were not overlapping exactly.

Before the operative tests, for these reasons, it has been necessary to perform a lot of bench tests. These tests were performed on a short chain composed by the IVS itself and a direct link to a MSD Extractor Box (MEB) that was developed on purpose by AREU:

- C.R.F. tested IVS from Actia, NXP and Denso;
- MM tested its IVS, the Tbox.

For the 2nd phase test, the Pilot has planned to use an eCall IVS modified to host also the bCall on the same board, thanks to the technical support of MM. The purpose of this integration is to analyse the commercial sustainability of the IVS box and the liking of a complete emergency service (for incident and for mechanical failure) by normal users.

The experience gained, especially implementing the eCall standards, will be useful both for the Pilot partners and for the IVS manufacturers that will be able to move toward the production of commercial products.

4.18.3 MNO – Communications

Choosing to operate in a live environment has forced the Pilot to implement the eCall on the EU 112 service already in use into the Varese 1st level PSAP.

The TIM mobile network in Varese was, for these reasons, upgraded by Telecom Italia with a software special release provided with the eCall flag. This was necessary to permit to distinguish between the 112 calls and the eCall calls and to route the latter to the proper queue into the PSAP. Due to the fact that this mobile network was the live Varese TIM network has resulted in a prolonged test campaign before enabling this network for the Pilot tests. On the other side, now the TIM network, in Varese, is compliant with the eCall requirements and will not need further modifications.
On the fixed network the Pilot had to solve another problem: how to route the eCall to the proper queue linked to the PSAP. At national level the mobile networks deliver an emergency call to the 112 fixed network using a standard routing format. For the purpose of the Pilot a new routing format has been created taking into account the eCall case, but, since the tests were done in a live environment around Varese, before starting the 1st phase of operational tests, this new format has had to be agreed with all the MNO in Italy. This routing format provides both automatic and manual calls that in the Pilot are linked on two different PSAP queues.

At present the Pilot PSAP is reachable by eCall calls using the UE 112 (Varese area) and a fixed long number (national and roaming, only for test purpose).

4.18.4 PSAPs

For the PSAP the Pilot has had to resolve several issues:

- a way to decode the MSD and realize the in-band modem; the solution was to develop an hw appliance (the MEB) linked to the PABX;

- the most proper way to manage the eCall, both data and voice, and how to synchronize them with the operator intervention; the solution adopted was to pass the incoming eCall to the MEB, for the MSD decoding, and to the operator console queue at the same time: if the decoding ends before the operator picks up the call from the queue, the vehicle occupants will hear a voice tone; on the contrary, the operator will hear a music tone;

- a way to decode the VIN extracted from the MSD; the solution adopted was to interconnect the PSAP with the Italian Licence Registry and to send to it the query with the VIN; in case the VIN is an international one, the Italian Licence Registry will forward the query to the EUCARIS network; this solution simplify the overall architecture and centralize the EUCARIS contact point.

The solutions identified have permitted to integrate the eCall quite smoothly in the PSAP general architecture and in its procedures and routines; in this way, after the MSD decoding and the opening of the channel voice with the vehicle occupants, the call is managed as any other 112 call: the MSD data are displayed inside the event form to the operator together with the geographical localization of the accident and, after the assessment, transmitted to the 2nd level PSAP for the intervention.

Due to the fact that the PSAP is a real one, we noted some important facts:
• a positive feedback from the operators,

• the time to answer to an eCall and to have the MSD decoded is comparable with the time necessary to answer to the other normal 112 calls (5 second to 18 seconds);

• in the case the operator couldn’t take the eCall, due to another actual incoming call, the MSD was transmitted again by the IVS; the solution for this problem is currently under investigation.

4.18.5 Other issues

The choice to install the Pilot test site into a live environment has implied that several variables were not under control by the Pilot team: planned software revision in the mobile network has interfered with the planned test phase; enabling the eCall flag into an operative mobile network has meant to perform repeated telecommunication test campaigns; PSAP upgrades and extensions have implied the revision of the Pilot planning, and so on.

4.18.6 Conclusions and Recommendations

The example of the Italian Pilot confirms the fact that choosing to install the pilot test site inside a live environment is a good choice, even if involves some risks. A strong coordination between all actors of the chain (IVS manufacturer, car integrators, mobile network operators, 112 network operators, PSAP operators and their hw and sw suppliers) is essential to mitigate these risks and to successfully integrate the eCall service.

The main outcome of this strategy is that, after the pilot conclusion, the eCall service will remain active in the Varese PSAP and will act as a seed to disseminate the service in the rest of the country. This installation will become the reference one and the experience gained will drive the political and organizational agreements among all the national involved public actors.

Moreover, the coexistence of the Pan European eCall, a free service, with a private service, like the bCall, on the same IVS device will give to the private actors and to the stakeholders the opportunity to investigate several business models and different scenarios for the deployment of the eCall service.
4.19 Piloting in the Netherlands

4.19.1 General

In Netherlands one vehicle with four IVS’s (D-FACTS) and 7 separate IVS’s were used for the field tests. Drive tests took five days and 5378 calls were made. PSAP Test System (CIS) was used for 112 calls and regional PSAP2 with 4 desks were used for PSAP testing. Three MNO’s were involved with no eCall flag capability.

Other important elements were the connection to RDW EUCARIS database, to road authority communication system (OWBCS) and to Traffic Centre interface (Xpose).

Developing eCall for Heavy Goods Vehicles is part of the Dutch HeERO pre-deployment pilot, and therefore also HGV Transport Company and Fleet management system (Carcube) will be involved in 2nd phase of the HeERO testing.

The whole chain was tested. The Dutch pilot has two kinds of testing:

- **Drive tests** aimed at the technical aspects of the eCall system (performance).
- **Scenario tests** aimed at the operations in the PSAP and the Emergency Control Rooms

In the 1st phase of testing the Dutch pilot was focused on the drive tests. In the 2nd test phase (2013) efforts will be on drive tests and scenario tests.

Figures 13 and 14 present the eCall-architecture in The Netherlands and the drive testing area.
The driver of the test vehicle drove a predetermined route through the Rotterdam-Rijnmond region. This route was designed so that specific situations would be encountered that might have an effect on the GPS accuracy (urban canyon) or on the mobile reception:

- Low mobile coverage
- Rotterdam Port
- Rotterdam-The Hague Airport
- Rotterdam city centre
- High voltage cables and pylons
- Tunnel
4.19.2 IVS

- 3 types; Civitronic, Skymeter, S1nn

- Different IVS implementations, IVS are still prototypes. Although the IVS modems are up to the present standards, they behave differently. This implies that the standards need to be adapted. The HeERO Taskforce on standardisation has been informed.

4.19.3 MNO – Communications

- The involved MNOs were KPN, Vodafone, T-Mobile, and Int'l SIMs Telenor

- As the eCall flag is not implemented in The Netherlands yet, tests were performed using a long number (not 112). The Dutch pilot hopes to be able to test with the eCall flag in 2013. This is both EU’s and national ministry’s regulation issue.

4.19.4 PSAPs

- 2 levels were used: national PSAP (112), regional PSAP

- PSAP system (CIS) is still a standalone system. After the HeERO pre-deployment pilot the functionalities of the eCall test system will have to be incorporated in the operational 112 and emergency control room systems

4.19.5 Other issues

- EUCARIS has only been tested with a EUCARIS test database. Testing with the operational database still has to be done in order to assess the EUCARIS performance.

- Informing and educating the public is a vital issue in making eCall successful (use of eCall, misuse, silent calls etc.). A brief survey performed in The Netherlands showed that there is support for the introduction of eCall, but there are different beliefs on the use of eCall (especially the manual eCall).

4.19.6 Conclusions

The main conclusion from the first round of drive tests is that eCall seems technically feasible but the results aren’t satisfactory yet. For an emergency system the results are below par:

- The variance in performance between the different IVSs is substantially although the used IVSs are supposed to be according to standards. This implies that the standards might not be specific enough
IVSs that behave differently will be a menace for PSAP operators when they have to assess the incoming emergency-calls.

The variance in performance between the different MNOs is less significant.

### 4.19.7 Recommendations

- Testing is only useful when all manufacturers have implemented the standards correctly; our research shows that this may not be the case.
- Insight in every part of the eCall chain is necessary in order to be able to realise and interpret test results.
- Every test method has its own presumptions on the functioning of the systems that are being tested. One should make all these assumptions explicit.
- The analysis of the test results implies that some standards need to be adjusted (change of additional data definitions, timestamp definitions, a newly asked MSD should contain new information).
- Good understanding of the problems occurred while testing needs more analytical tools than presently available.
- Test results have led to changes in modems and application. A 2nd round of drive-tests and scenario tests is needed, with a larger number of calls.
- Interoperability testing will show whether the disappointing performance is merely a Dutch issue or that there will be implications for other pilot countries as well.
- The implication of the results in the HeERO pilot sites should be aggregated and discussed on European level.
- A distinction should be made between problems specifically related to eCall and more general problems (like i.e. bad coverage) not related to eCall. These are not the scope of the eCall project.
- The definition of additional data in the standard MSD needs to be changed to make it usable. This will also take away the risk that future implementations of the “spare” room in the standard MSD could have negative impact on the deciphering of the standard MSD.
- The technical implementation of the first additional data within the present standard now used by HGV eCall asks for more active involvement of other HeERO members.
- Standardization issue of MSD: use of optional data field for HGV experience should be proposed to standardisation WG15.
4.20 Piloting in Romania

4.20.1 General

For the eCall solution, Romania implemented the pilot in a centralized manner, all eCalls (data and voice) are forwarded to a central PSAP located in Bucharest, whose operators will process the call and will contact directly the necessary emergency services (also referred as “agencies”) from the county where the incident has occurred.

The eCall solution is fully integrated in the existing platforms, and was implemented as an additional function, not by modifying the current system, but by adding new functionalities.

For implementing eCall in Romania, two PSAPs received hardware upgrades and other 40 PSAPs and emergency agencies received software upgrades. Both Bucharest and Brașov PSAPs received the same hardware upgrades (marked with yellow in the figure above). Bucharest is designed to be the main PSAP for receiving eCalls, but the system will automatically reroute the calls to the Brașov PSAP if anything happens with the one in Bucharest. The Brașov PSAP has the same functionalities as the one in Bucharest.

Besides the hardware upgrades the software in all other PSAPs and emergency agency was upgraded in order to be able to receive the data stored in the MSD.

Figure 15: Romanian system architecture

For implementing eCall in Romania, two PSAPs received hardware upgrades and other 40 PSAPs and emergency agencies received software upgrades. Both Bucharest and Brașov PSAPs received the same hardware upgrades (marked with yellow in the figure above). Bucharest is designed to be the main PSAP for receiving eCalls, but the system will automatically reroute the calls to the Brașov PSAP if anything happens with the one in Bucharest. The Brașov PSAP has the same functionalities as the one in Bucharest.

Besides the hardware upgrades the software in all other PSAPs and emergency agency was upgraded in order to be able to receive the data stored in the MSD.
Figure 16: SW and HW upgrades in the national 112 System

- Was the whole chain (vehicle IVS - MNO network - PSAP) tested, if not why?

For the first phase the whole chain was tested from the vehicle IVS to the MNO to the 112 PSAP.

The entire chain IVS-MNO-STS network-PSAP-Emergency agency was tested with simulated agency operators without disturbing the emergency agencies’ activities.
In the second phase, the Braşov backup site will be involved in tests and tests will be done also with the emergency agencies, until resources reach the incident site.

**Figure 17: Operational flow for tests**

Therefore, the eCall operational steps used in the first phase of the project are:

1. Depending on which IVS equipment is used the eCall (Automatic, Manual or Test) is triggered as described below:
   - **T-IVS**: controlled by connecting a laptop on a serial interface. A software application allows MSD content configuration, B-Number used, GPS position etc. The GPS position is entered manually because the equipment doesn’t have a built-in GPS module.
   - **C-IVS** – The equipment has 3 buttons for triggering eCall used for setting the Activation type field to Automatic, Manual or Test. The MSD structure is built automatically when one of the buttons is pressed. The equipment has a built-in GPS module for acquiring the position of the vehicle. The default B-number dialled is 112.
2. The call is picked up by the nearest site GSM PLMN in which the SIM card is registered. If the IVS is equipped with RDS SIM card, based on eCall flag the calls are routed through Romtelecom PSTN to a long number assigned to the Bucharest PSAP modem ISDN input line. If the SIM card used is from another operator than RDS the call will be generated from the IVS to the long number assigned to the Bucharest PSAP modem ISDN input line;

3. From the RTC network, the call is routed to PSAP modem equipment situated in Bucharest site;

4. The eCall modem changes the B-number: CountyCode<112> or the long number into <21199> and the call is routed to the Bucharest PSAP (A-number=caller number; B-number=199 is associated to eCall PSAP operator inbox);

5. The eCall enters the STS central network (MSS) and based on the <21> (prefix for Bucharest) will be routed to the Bucharest PSAP;

6. The call is received and distributed by MD110-PBX to the CXE server (CoordCom VoIP server);

7. The eCall is routed to the 112 VoIP network;

8. The call is displayed on the eCall operator's console and is answered by assigned operator:
   A. The eCall modem receives and transmits the MSD message to the MSD decoding module; During MSD transmission the eCall operator hears a voice message that informs data transmission;
   B. The MSD decoding module decodes the message, extracts the VIN and transmits it to the VIN processing;
   C. The MSD decoding module decodes the MSD message and transmits the decoded data to the MSD processing module;
   D. The MSD data is processed and inserted into the 112 applications;

9. The 112 operator processes the received information and ask for VIN information:
   I. The operator requests VIN data from the MSD processing module;
   II. The MSD processing module requests VIN data from the MSD decoding module.

- Was there already cross-border activities? Or in the next phase?

For all the tests in the first phase, IVSs from two different providers were used.

First interoperability tests were started in Q4 2012. These tests were documented, but the results will only be included in the reports for the second phase. The interoperability tests were performed with 3 other IVSs from the HeERO consortium: one from Croatia, one from
Italy and one from Sweden. Additional tests were done with a Taiwanese manufactures that is not part of the HeERO consortium.

4.20.2 IVS

- technical performance – problems and solutions

The IVSs used for field tests were not capable of receiving a call back from the PSAP after a call was ended. This will be fixed until the second testing phase will start.

- any issues related to standards

The eCall in-band modem works well when radio signal is good. Where radio signal is low the IVS is making a lot of retries before having a succeeded eCall. We encountered situation when the voice call was possible from a regular phone, but the IVS didn’t succeed to generate the call. We consider that an update of the standards is needed to force IVS to switch to another mobile network after a number of repeated unsuccessful tries.

During the laboratory tests only Topex IVSs (T-IVS) were used. Radio interface used: 2G, 3G GSM module made by Cinterion – AH3-W with QualComm in-band eCall modem.

T-IVS:
- Manufacturer: Topex
- Version of standard for eCall Modem: 10.0.0
- Version of standard for MSD: June 2011

During the drive tests only Civitronic IVSs were used. Name of this IVS used in this document: C-IVS. Radio interface used: 3G GSM module made by Cinterion with QualComm in-band eCall modem. Used only with 112 number to call.

C-IVS:
- Manufacturer: Civitronic
- Version of standard for eCall Modem: 10.0.0
- Version of standard for MSD: June 2011

4.20.3 MNO – Communications

- technical performance – problems and solutions

Call back isn’t supported when an IVS calls from a network other than the native one of the SIM. The normal call goes through and is being handled correctly by the PSAP, but call back
isn’t possible because the telephone number isn’t available in the PSAP. This will be resolved by implementing national roaming.

- *any issues related to stakeholders and operational issues*

Not all PLMNs in Romania yet support the 112 eCall flag handling. If an eCall isn’t routed based on eCall flag and reaches an unprepared PSAP, in most of the cases ended as “silent calls”. This situation must be further analysed to determine very clearly if it is a scenario that can happen in real life operation, after the eCall solution is finalized or not (eCall flag implemented in all MNOs).

- *other*

In Romania there are currently 4 MNOs: RDS-RCS, Orange, Vodafone and Cosmote.

RDS-RCS is the only MNO that has implemented eCall flag in the live network. The eCall flag was activated on request in the counties were the field tests were done.

With Orange and Vodafone tests were performed in test cell were eCall was implemented.

### 4.20.4 PSAPs

- *technical performance – problems and solutions*

The following mean values were achieved during the tests:

  - 3.5 seconds from the moment we generate the call until is presented to the operator;
  - 15 seconds from the moment an operator answer the call until MSD information is displayed in 112 applications;

- *any issues related to stakeholders and operational issues*

The real emergency agencies were not involved in the first phase (to avoid any unnecessary disturbances), but they will participate in the tests that will take place in 2013.

In the first operational phase tests were made only with the primary eCall PSAP, without involving the backup site from Brașov.

### 4.20.5 Other issues

An interface with the Traffic Management Centre was developed during the project.
The interface is implemented using the standard Web Services architecture, the connection with the web service is made over an encrypted SSL channel.

Information received automatically from the eCall IVS and information completed by 112 human operators during phone conversation with the caller is being sent to the TMC through this interface.

The following data fields will be published by the 112 PSAP and retrieved by the Traffic Management Centre: date/time, geographical coordinates, county, city, address and 2 indexes used for incident classification.

4.20.6 Conclusions and recommendations

- The eCall in-band modem works well when radio signal is good. Where radio signal is low the IVS is making a lot of retries before having a successful eCall. We encountered a situation when the voice call was possible from a regular phone, but the IVS didn’t succeed to generate the call. We consider that an update of the standards is needed to force IVS to switch to another mobile network after a number of repeated unsuccessful tries.
- The in-band modem seems to have a slightly lower robustness than the voice call itself.
- In all eCall tests, during an eCall session the MSD has the same data (If a resend MSD command is sent by the operator, a new MSD is presented to the operator but it contains the same information as the initial one). We consider that when a resend MSD requests made by the eCall operator, the IVS equipment should send actualized data.
- If an eCall session is terminated (with clear down command), there is no possibility to call-back the IVS.
- Further activities such as test of foreign IVSs roaming to and within Romania should be done (also foreign SIM cards).
- Analyses upon the time in which an IVS is generating eCalls (registered / unregistered in a MNO) must be done.
- More drive tests in various rural or highway areas with low radio signal coverage should be done to clearly identify potential problems. In areas with varying results, tests should be repeated to find out that the results vary substantially.
Not all PLMNs in Romania yet support the 112 eCall flag handling. If an eCall isn’t routed based on eCall flag and reaches an unprepared PSAP, in most of the cases ended as “silent calls”. This situation must be further analysed to determine very clearly if it is a scenario that can happen in real life operation, after the eCall solution is finalized or not (eCall flag implemented in all MNOs).

4.21 Piloting in Sweden

4.21.1 Current E112 handling – the foundation for eCall in Sweden

The piloting in Sweden has been done by implementing additions to the systems that are in use for E112 services today. The pilot has used test software in non-production systems (with exception of the mobile networks where the production systems have been used). A brief overview of the current E112 organisation and services is first described below, in order to better understand the Swedish HeERO pilot and its results.

Sweden has had a nationwide emergency number since 1956, and the EU-common emergency number 112 was implemented in 1996. 112 is the one emergency number where you can reach police, fire rescue services, ambulance, sea and air rescue, as well as social services. The company SOS Alarm AB is the first receiver of all 112 calls. In addition, SOS Alarm handles certain interviews and dispatches ambulance and fire units on commission from most of the county councils and communities.

SOS Alarm is mutually owned by the Swedish state (50%) and the Swedish communities and county councils (50%) together. SOS Alarms commitment is regulated by the Swedish state in an agreement.

The organisation of SOS Alarm and the 112 service is currently under investigation and a report has been delivered April 30, 2013.
Figure 18: Overview of Emergency Response operations

Currently there are 16 alarm centres, so called SOS-centrals, spread across Sweden. They are organised in a redundant and resource efficient way, which means that each of the centres could handle calls from anywhere in the country. This structure allows both for load sharing and redundancy on all levels. The alarm centres handle all incoming 112 calls, that is, SOS Alarm is today the only first level PSAP organisation in Sweden.

In addition, SOS Alarm handles most 112-calls concerning Fire & Rescue Service and Ambulance Service within its organisation. For these two functions, Fire & Rescue Service and Ambulance Service, SOS Alarm is also the second level PSAP. Agreements with the concerned municipalities and county councils regulate how this service is provided. Different county councils, who are responsible for the healthcare service including ambulance, may have different agreements. For example several, but not all, county councils require that all calls concerning healthcare and possible need of ambulance are to be handled by a nurse.

The responsibility for healthcare and ambulance service part of the 112-service is regularly procured by the county councils. Up to 2010 SOS Alarm had all agreements, but then the company Medhelp secured an agreement with 4 county councils (Uppsala, Västmanland, Södermanland and Gotland).

This means that another actor is responsible for the evaluation of the 112-callers need for ambulance and dispatching ambulances as of November 1\textsuperscript{st}, 2011. This in turn means that SOS Alarm will transfer 112-calls concerning healthcare in the 4 concerned counties directly to Medhelp for further handling.
The handling of calls will be more complex concerning accidents or events where more than one of the helpers on 112 is needed, for example a traffic accident that involves ambulance, police, and fire brigade. During 2012 there have been discussions between SOS Alarm and OEM manufactures and OEM branch organisations regarding handling of TPS-eCall. The current approach has been that if a TPS call centre receives an eCall they should at least be allowed to call the SOS centres and verbally transfer the eCall and MSD information to the SOS Operator.

Figure 19: The way from 112-caller, via SOS Alarm, to the responsible helper/type of help needed

SOS Alarm delivers event information to, amongst others, The Swedish Transport Authority and the national Swedish radio, Sveriges Radio (SR) who is a public service company owned by the Swedish state. This event information is automatically generated in SOS Alarms operational technical system, CoordCom G5, when certain types of fire and rescue events occur. This allows the Transport Authorities Traffic Management centrals (TMC) to monitor the accident and even send resources, Road Assistance, in Stockholm and Gothenburg areas. Sweden. SR may in their broadcasts immediately alert the public that a traffic accident has occurred which give the drivers a possibility to choose an alternative road.

This event information is accessible also to the media by individual agreements with SOS Alarm.
TMC and SOS Alarm communicate and cooperate in several ways, for example in exchanging information in case of a road accident. This exchange is taking place both verbally (by phone) and automatically (event information).

Much of this information exchange takes place in the Joint Cooperation Web (Samverkanswebben). This is a web site available only (by agreement) to fire & rescue services, SOS-centrals, County Administration Boards, the police, and others who has a part in the 112- and/or crisis management in Sweden.

![Image of the Joint Cooperation Web](image)

**Figure 20: The Joint Cooperation Web (Samverkanswebben)**

When eCall is deployed it is expected that any car crash information is more accurate and received in a timely manner, especially in rural or less populated areas. The flow of information is not expected to be dramatically affected.

### 4.21.2 HeERO pilot set-up

Based on the current structure of emergency handling the Swedish HeERO pilot has seen eCall as "just another type of E112 calls". As the partners in the Swedish pilot covers the systems where eCall is specified, it has been possible to get a very "near-real" test environment, from use of a real car to use of two production mobile networks, to use of a modified version of the system used by SOS Alarm for first and second line PSAP.
PSAP (Public Service Answering Point):

Handling of Pan-European eCall with the In-Band Modem technology was added to the CoordCom system, which is the PSAP system used by the SOS Centres. During the pilot however three physical instances of the PSAP were used, two CoordCom PSAPs and one lap-top PC PSAP. The majority of the tests were conducted using the PSAP installed at the CoordCom vendor Ericsson´s premises (CC-PSAP). A test-PSAP installed at SOS Alarm´s premises in Stockholm was also used (SOS-Alarm´s_test-PSAP). Finally, the eCall PSAP functionality was also implemented and installed in a lap-top PC (AC-PC).

PLMNs (Public Land Mobile Networks):

The eCall flag handling was implemented for test purposes throughout Sweden in the existing mobile networks of TeliaSonera and Telenor. The routing tables in the switches in the mobile networks, the MSCs, were modified to fit the test scenarios, whereas the eCalls in most test scenarios are routed to the CC-PSAP. For most of the tests the eCall flag was used. However, the long numbers was also used, especially for the interoperability and cross-border tests.

IVS (In-vehicle system) and cars:

One Volvo V60 with the proprietary Volvo “On Call”-system with an In Vehicle System, IVS, from Actia has been used. The Pan-European eCall In-Band Modem was implemented in the software of this unit. Laptop/mobile-phone-based IVS and PSAP with good logging and debugging tools have been used in functional verification, drive tests and interoperability testing with other HeERO pilots.

The car has been driven in Sweden, while Test Sessions which incorporated a computer-generated Test Sequence was run continuously. This test session encompassed; setting up an eCall, transmitting two MSDs, hanging up, initiating a call-back with Pull-request from the PSAP, transmitting a third MSD and hanging up; then repeating all over.

All planned KPIs are captured, all planned functionality and interoperability tests were done, also the PSAP operator evaluation and laboratory tests. The drive tests are done with the following results. The drive covered a total of 2700 km – rural, urban, highway, 1050 eCall attempts, 3000 MSD attempts. Overall success rate ranges in these Test Sessions from 100% down to 75%, depending on mobile coverage. Time from eCall-triggering to MSD presentation at the PSAP were 8- 24 sec (with registered IVS)
The tests were divided into different types of tests, listed below:

a. **Drive tests**: The drive test were divided into two different type of tests; Computer-Initiated Tests, and Voice testing:
   - **Computer-Initiated tests** – These tests can be initiated from and to a driving vehicle by computer units in IVS and PSAP. The Test Procedure is designed to capture the KPIs in a reliable and resource efficient way.
   - **Voice testing** - voice channel disturbance tests – These voice tested eCalls are manually triggered and evaluated by a professional PSAP call taker and expert listeners in the testing car.

b. **Laboratory tests** – These tests are used for test of the eCall performance in weak or interfering (mobile network) radio signal conditions, cross border tests and the other tests. The PLMN-laboratory environment is used to emulate and simulate various critical situations in a controlled manner, to be able to evaluate specific KPIs for an in-depth analysis.

c. **Interoperability tests** – These tests are aimed to assess the performance of the eCall service in situations when at least residents or organisations of two different EU
countries are involved in the eCall service provision. The interoperability tests have been conducted in both laboratory and live-network conditions.

d. **Functional tests** – we have also performed other types of tests, for example, verification that transmission chain works according to expectations. The issues found during these tests have been brought forward to HeERO standardisation task force. (Those tests are not further described in this document).

![Functional test setup to SOS-PSAP (SE)](image)

Figure 22: Functional test setup to SOS-PSAP (SE)

Successful functional tests with the Swedish PSAP SOS-Alarm have been performed. SOS-Alarm is equipped with the CoordCom system from Ericsson, the same equipment as used in the HeERO’s drive tests and lab tests.

4.21.3 Main issues

- Start of next eCall deployment step need involvement from SOS Alarm and MSB (Swedish Civil Contingencies Agency)

- Some identified issues for eCall deployment were:
  
  o PSAP/SOS Alarm: Operational questions to be handled: silent calls, noise, time delay between call in-in-queue and voice call up and running, answering eCalls where the MSD transmission delays or fails.

  o MNO consequences – only eCall flag?

- Conformance test specification – issues raised by industry partners

- TPS: consequences for OEM services?
The performance and reliability of eCall is lower in rural areas than in urban areas. The In-Band Modem seems to perform less robust than the 112 voice call itself.

The pilot also recognises that the time expected for the eCall set-up time while the dormant mode is used as another important issue. How will the resulting longer set-up time affect the number of “silent” eCalls to SOS Alarm, the Swedish PSAP operator? A long call set-up time may give many “silent” calls, as passengers that are able to, often try to leave a crashed car quickly after an airbag deployment.

There have been some voices raised regarding possible privacy violations and the risk for tracking and supervision of individual vehicles.

4.21.4 Conclusions

The intent of the Swedish HeERO pilot has been to evaluate if the requested performance of the eCall service can be met with a deployment of the approved eCall standards in the existing public mobile networks and within the existing 112 system. This means that the testing has had a strong focus on the eCall standards and capturing the key performance indicators, the KPIs. Other issues, such as the response time of the rescue services and ambulances, use of EUCARIS and use of VIN in the operational rescue chain, as well as non-operational issues, like legal liability, periodic time inspections, change of a car ownership, etc. have not been considered by the Swedish pilot.

The outcomes of the tests performed by Swedish HeERO Pilot Site and reported in this document confirm that the pan-European eCall is working according to expectations when used in communication environments with good quality (high strength) of public mobile network radio signals. The results show that the performance and reliability of eCall is lower in rural areas than in urban areas, as expected as the coverage generally is better in urban areas. The In-Band Modem seems to perform less robust than the 112 voice call itself.

Lessons learned and remarks

This section is a collection of things we have learned during our testing, mistakes we have done that we would like to help other pilots to avoid. There is not any importance semantics in the order of these lessons learned.

1. Lesson: The effort for preparation and testing was far higher than estimated beforehand and the allocated budget was not adequate.

2. Lesson: Several uncertainties in the standards caused more effort than anticipated.
3. Lesson: Calibrate the equipment in lab environment before or after drive testing, if an exact comparison is wanted; be aware that individual equipment varies in radio performance, which has an influence on eCall KPIs.

4. Lesson: In areas with varying results repeat tests more often; to find out whether or not the results vary substantially the same route must be used at least twice.

5. Lesson: In order to evaluate the timing-KPIs precisely to 1-second-granularity, the clocks in the PSAP and IVS need to be synchronised beforehand to a granularity of at least 0.5 second, better to 0.1 seconds, to get precise time stamps.

6. The definition of KPIs in D4.2 is maybe not fully sufficient. It is e.g. of interest to differentiate Voice-call-success and MSD-success also in call-backs. Also the simple average of the timing KPIs is maybe misleading and Min-, Average- and Max-values are at least required. Swedish HeERO Pilot Site extended therefore the KPI definition.

7. Lesson: Not all PLMNs in Sweden (and other countries) support the 112-eCall Flag handling (so far). Just calling 112 “blindly” in any PLMN may cause a roaming IVS in “cross-border-testing” to end up in a real, life PSAP, diverting the attention of the PSAP operator from real emergencies. A roaming IVS shall therefore either use a white list” of allowed PLMNs (TeliaSonera and Telenor, so far) or use “long-number” calling to the CC-PSAP directly (number will be given on request).

8. Lesson: No significant difference in KPIs was observed between 112-eCalls with eCall Flag and normal “long-number” voice calls. This holds for the tested networks under the given (non-congested) network conditions.

9. Lesson: The SIM-card, national or foreign, has no influence on the KPIs, if it has roaming agreement with the PLMN under test and if it is registered. There is not any need to perform this kind of “cross-border” testing.

4.21.5 Beyond Swedish HeERO Pilot Site test result

The Swedish HeERO Pilot Site tests focused on the reliability and coverage of the basic eCall service as specified so far. No in-depth considerations have been given on future aspects, like adding features or more accident-related information, e.g. providing better severity estimation from vehicle to PSAP for better judgement, resource allocation and treatment preparation.
Also other aspects, which may play important roles in other regions, such as data encryption, or text chat for hearing or speaking disabled people, are so far not considered in Swedish HeERO Pilot Site. It is, however, to some extent obvious that the specified In-Band Modem has only very limited capability for such additional aspects. It is not likely that the In-Band Modem standard will be able to be extended to have such capabilities.

Further: have the privacy issues had an impact in the standards? The functionality verification for privacy protection would need to be specified, which has not been done so far.

There have also been concerns raised by the Swedish HeERO Pilot Site partners regarding the possibility for Third Party Services, such as Volvo-On-Call, to co—exist with eCall. Is there a risk that the mandatory eCall service will negatively affect commercial services?

4.21.6 Recommendations for further activities

Most of these activities are recommended to be done before implementation of the eCall service. The activities are not planned for or budgeted to be included in the HeERO project.

- Test of foreign IVSs (other implementations) roaming to and within Sweden. These IVSs must ensure that they use only PLMNs where eCall Flag handling is provided.
- Test of eCall behaviour for Dormant IVSs.
- Interoperability testing in Finland and over the border into Russia. This to confirm interoperability with ERA GLONASS (support from this Russian project is required). (outside the scope of HeERO)
- Evaluate the impact of the speed of the IVS. So far Swedish HeERO Pilot Site performed tests with cars moving. This is relevant for manually triggered eCalls, but is untypical for automatically triggered eCalls. To understand the impact of speed tests with standing or slow moving IVS should be performed, too.
- Evaluate the impact of combined coverage of all PLMNs in a certain location, when using 112-eCall with eCall Flag handling. Theoretically the combined coverage should be higher. To perform this evaluation the IVS must be standing still to have sufficient time for selecting the best available PLMN. Of course all PLMNs must have eCall Flag handling active.
- Evaluate effect on MSD success rate with back-up solutions, for example back-up SMS.
5 Framework for systematic identification of enablers, opportunities and challenges

The framework detailed in this Chapter is equivalent to that proposed in D6.1 since this Deliverable is supposed to be a complement and an update of the previous D6.1.

- General framework

There are at least four layers to consider and deal with in successful implementation of any ITS service, which includes eCall:

- **Policy layer** (eCall policies and implementation, national policies and implementation, general regulation e.g. privacy and safety).

- **Business layer** (all administrative, financial and organisation issues, regulation, issues related to user - needs and feedback, functional and service architecture etc.).

- **Application layer** (technical architecture of the service, interfaces between systems, technical service quality, user interfaces and devices etc.).

- **Network layer** (all communication between systems and stakeholders, interoperability, shared communication protocols and physical components of the system, the mobile communication infrastructure).

The policy layer is the basis for eCall implementation and the Pan-European eCall introduction. The policy layer is responsible for the fulfilment of general policy objectives of safety, sustainability and competitiveness and bringing well-being to the citizens of Europe. eCall is expected to support Pan European casualty reduction targets and thus saving lives.

The majority of Member States are willing to invest on eCall implementation and operation when they are convinced that the introduction is generating added value in terms of casualty reduction, and associated cost reductions from social security payments and the fiscal burden that is placed on society following road death. Therefore, eCall has to be integrated into strategic policies at European and at Member State level.

At a national level the commitment also has to be reflected in both national and regional governmental decisions and safety budgets and programmes guaranteeing the necessary resources for institutional, regulatory and technology investments, which will be required to ensure that eCall is deployed in line with the defined European timetable.
Business layer challenges related to eCall are:

- Differences in the organisation of PSAPs
  - One or two or more levels of PSAPs
  - One PSAP receiving all requests or several sector-specific ones?
  - Aforementioned issues leading to different technical and communication solutions

- Differences in regulation and responsibilities; e.g. regulated duties for MNOs, outsourcing parts to commercial services or a totally state operated system etc.

- General challenges related to markets and business models
  - Different market situation in different Member States (some countries already have private emergency assistance services available on the market while others do not)
  - “Chicken and egg” scenario; no one stakeholders (automobile industry or Member State) has been ready or able to move first
  - Uncertainty and limited knowledge on socio-economic costs and benefits of deployment

- Some answers for the aforementioned challenges will be revealed in the piloting phase and some must be dealt with separately in the Member State implementation phase, but it should be recognised that as this is a Pan European solution, all responses to the challenges must be within the European framework to ensure that Pan European eCall remains as an interoperable solution.

Issues related to the application layer for eCall are:

- Requirement for interoperable solutions at European level
  - All eCall in-vehicle systems have to be compatible with all eCall-ready PSAPs in Europe, therefore a centralised approach to standardisation is seen as necessary
  - Changes needed in safety-critical systems at PSAPs
  - Large number of PSAPs may need to be equipped in some Member States, or other technical solutions identified.
Common understanding on the quality of service to be provided

- What level of reliability should be expected (incident detection / communication / reception / visualisation of MSD etc.)?
- Who/How will conformity assessment be carried across all MS?

Management of dependencies between systems

Challenges related to network layer for eCall are:

- As the MNO systems were not originally made to include eCall and the available technologies do not match the requirements for data transmission between vehicle and PSAP, there must be planning and resources for the updates of the system.

- Implementation of the ‘eCall flag’ requires changes to mobile and fixed-line networks; the costs and resourcing of the implementation can be an issue, however GSMA as a body representing mobile network industry are signatories to the eCall MoU, and the majority have indicated support to the necessary upgrades within the defined timetable set for the deployment of eCall.

- There can be problems synchronising MSD and voice calls, although technical solutions to this are being defined with the HeERO standardisation task force.

- Slow implementation of E112 emergency calls (the network-based positioning of calls to 112 emergency number) in some countries, although the implementation of eCall will result in this additional functionality in some instances.

These issues will be dealt mainly with standardisation, certification and technical excellence.

Framework for HeERO

The framework for HeERO can be divided into five layers:

1. Policy layer
2. Business layer – Administrative layer
3. Operative layer – PSAPs, service providers etc.
4. Technical/Technological layer – including hardware software, applications, and communication
6 Identified enablers, opportunities and challenges

In this chapter the main points illustrated in Chapter 4 (eCall and current development activity and HeERO piloting experiences) are summarized considering the framework detailed in Chapter 5 to present an overview on enablers, opportunities and challenges.

This Deliverable collects the feedback after the 1st Phase of the Operational Activity and the feedback provided by partners focused in particular on the Technical/Technological Layer.

6.1 Policy Layer

As detailed in paragraph 4.1 and 4.2 eCall legislation proceeds. The European Parliament impressively supported the development of eCall by publishing the resolution on July 3rd 2012, which highlighted the possibilities of eCall in traffic safety and deplored the slowness of voluntary progress of deployment of eCall.

The European Commission published on the Official Journal of the European Union (03/04/2013) the Commission Delegated Regulation (EU) (No 305/2013) of the 26th November 2012. This Delegated Act, supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision for an interoperable EU-wide eCall, constitutes the part related to the Public Safety Answering Points (PSAPs) infrastructure of the Commission strategy on eCall, based on a 3-prong regulatory approach addressing the in-vehicle system, the telecommunications networks and the PSAPs. The Commission wants to ensure that PSAPs are ready to receive manual and automated emergency messages from vehicles registered in any EU country in 2015, when eCall fitted cars are in traffic. Despite this, legislation is criticized for being slow, e.g. the Type Approval Directive should have already been available for automotive industry to keep up the 2015 deadline. A proposal for a decision concerning type-approval requirements for the deployment of the eCall in-vehicle system and amending Directive 2007/46/EC and on the deployment of the interoperable EU-wide eCall COM(2013) 315 has been published the 13 June 2013.

22 Member States and over 100 companies have signed the eCall Memorandum of Understanding. So it is natural that other stakeholder groups and separate Member states have been active in preparing eCall deployment.
The Work of EeIP is now concentrating on specific issues such as: location accuracy, false alarms and silent call prevention, the last EeIP guidelines were updated in spring 2012. EeIP started the retrofit IVS task force. EeIP OPEN task force studied the eCall business models and potential ecosystem connected to eCall with other value added services.

Considering the activities reported in Chapter 4, the following points have to be mentioned.

Concerning the enablers and barriers related to policy for the Member States, some considerations have been reported for instance by Germany.

Germany is a federal state that has decentralised structures where an implementation like eCall, which affects several players, is a substantial organisational issue. To enable the eCall deployment and to overcome identified barriers different initiatives have been promoted in Germany:

- the national ITS Action Plan which include the eCall situation and whose focus is to set to the process in the different states and the responsibilities of the governments. 
- a national eCall platform established to inform all stakeholders about the current status and the on-going process and chaired is by the Ministry of Transport, Building and Urban Development (BMVBS) in Berlin.

These initiatives aim to face the key problems in implementation process as detailed in paragraph 4.16.

Analysing the policy related aspects, Czech Republic underlines the interest in the Commission Delegated Regulation on PSAP regulation of Article 4, Conformity assessment: "Member States shall designate the authorities that are competent for assessing the conformity of the operations of the eCall PSAPs with the requirements listed in Article 3 and shall notify them to the Commission. Conformity assessment shall be based on the part of the standard ‘Intelligent transport systems - eSafety - eCall end to end conformance testing’ (EN 16454) that relates to PSAPs conformance to pan-European eCall".

6.2 Business Layer

Concerning the Business Layer, some activities have been reported by different Member States and in the context of European eCall Implementation Platform (EeIP).

The Task Force OPEN was activated to define a positive business model through the common use of the eCall platform. The work of the task force has received a great deal of
attention from several parties. This is due not only to the rich possibilities that the eCall ecosystem provides to both areas of application, in-car provision of other services and potential enhancements of public services – but also due the fact that there is great potential for using the eCall in-vehicle system for other services. This concerns not only the car manufacturers and their business partners but the automotive aftermarket as a whole and naturally the users as well.

As reported in Paragraph 4.4.9, of the final report shows that there is no business case for stand-alone eCall, except for the national economies of the supporting states. Value-added services, either free of charge or commercial, can potentially be added to in-vehicle systems initially designed for pan-European eCall. Some services will be new, but some existing services will come into the vehicles by new access means. The report states further for the moment proprietary in-vehicle systems dominate the market and it explains why open in-vehicle platforms provide a higher service variety, more innovation and more choice for customers.

The report recommends that the development and dissemination of open in-vehicle telematics platforms should be fostered by all stakeholders and the findings of the task force will be used in HeERO and other related European projects. The report has been approved by the EeIP members in 2011 and is publically available.5

Following the OPEN final report there are several discussions going on concerning additional services besides eCall and regarding the fact that fair competition in the automotive aftermarket needs to be safeguarded by EU legislators.

Italy reports that the coexistence of the Pan European eCall, a free service, with a private service, like the bCall, on the same IVS device will give to the private actors and to the stakeholders the opportunity to investigate several business models and different scenarios for the deployment of the eCall service.

The cost-benefit calculations presented during UK’s eCall workshop in 2012 showed that most important benefits come from the congestion saving (indirect impacts) and benefits for 2-wheelers and HGV, not so much from time savings for rescue alerting.

6.3 Operational Layer

eCall end-to-end process is based on a network of different organizations of which many are public and many also private.

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Considering the activities reported in Chapter 4, for supporting the deployment of eCall, Member States report a wide range of activities. Some examples are here reported.

In Sweden, SOS Alarm is mutually owned by the Swedish state (50%) and the Swedish communities and county councils (50%) together. SOS Alarms commitment is regulated by the Swedish state in an agreement. The organisation of SOS Alarm and the 112 service is currently under investigation and a report has been delivered April 30, 2013.

Croatia emphasizes the importance of mutual cooperation and proper technical support as critical prerequisites to success in HeERO Pilot Project: a strong effort has been done on point since it is reported as a possible barrier for the large number of stakeholders involved.

From improving the operational efficiency, Romania implemented the pilot in a centralized manner, all eCalls (data and voice) are forwarded to a central PSAP located in Bucharest, whose operators will process the call and will contact directly the necessary emergency services (also referred as “agencies”) from the county where the incident has occurred.

6.4 User Layer

Considering the information provided by the HeERO partners, participants highlighted the importance of the users’ awareness: users need to be aware of the advantages and potential benefits of eCall system, but also of the technical limits (when it does work and when it will not).

These aspects have been focused as part of the HeERO dissemination activities across the MS Pilot Sites and supported during several public events, as detailed in Chapter 4.

The Netherlands highlighted that informing and educating the public is a vital issue in making eCall successful (use of eCall, misuse, silent calls etc.). A brief survey performed in The Netherlands showed that there is support for the introduction of eCall, but there are different beliefs on the use of eCall (especially the manual eCall).

During the ITS World Congress 2012 in Vienna, many interoperability demonstrations and presentations were held. The event caused a great deal of public interest. Many MS have had Public Events informing of eCall and HeERO project, this work is of utmost importance: as an example, a recent Canadian study showed that less than 1/3 of Canadian drivers knew anything of more sophisticated in-vehicle safety systems than ABS-brakes.
National and common eCall related actions, workshops and “plug-tests” are very important to get eCall related stakeholders involved in eCall development and to spread the information and knowledge also to a wider public.

A specific EeIP Task Force (CAMP) is on-going to promote the design of awareness and education campaign. Several eCall demos have been proposed done for decision makers in several European Member States.

The dissemination activity for HeERO has a very important role especially considering that current development of bCall and other Third Party Services advertised as eCall mainly by vehicle industry can cause confusion in Member States.

6.5 Technical/Technological Layer

The following elements can be highlighted from the experiences of the 1st HeERO piloting round concerning enablers, opportunities and challenges (related to the identified issues and barriers) for the technical/technological layer.

By combining the tests conducted by the HeERO pilots the entire eCall chain has been successfully tested, from manually or automatically triggering by IVSs in vehicles, to reception at first level PSAP, to incorporation of information from first level PSAP to 2nd level PSAP as well as Traffic Management Centres.

Successful interoperability tests have been performed between some HeERO Member States. The piloting efforts have been "distributed" quite evenly on the IVS, MNO and PSAP parts of the value-chain.

With IVS, the use of prototypes in piloting has been an issue. Tests with fully functioning and certified devices would have revealed the possible problems in other parts of the chain more easily, now testers have to eliminate all factors one by one starting with functioning device. Limited capabilities and some problems have been identified with current IVS prototypes e.g. with MSD sending, with voice and echo handling, with starting and stopping of functions, with call-backs, units or location devices “freezing”, incorrect values in MSD fields, in ID and time stamping, timestamp missing completely etc. However, this project has shown the necessity of trying out the standards in a “Production-look-alike” environment before a commercial deployment is taking place. This type of projects then reveals weaknesses both in the standards as well as in individual implementations. It is first in this type of environment that certain issues will be identified, such as incorrect timers, risk for incompatible solutions due to ambiguous specifications, hardware specific issues such as the echo-cancelling
equipment in some mobile networks, etc. It has of course been very beneficial for IVS producers and providers to get real-life feedback for development of the IVS and for standardization institutions. But as a conclusion too many resources had to be allocated to deal with the IVS functionalities, which is away from other important issues. WP3 stated that IVSs should be tested more widely than in just one or two MS.

The resolution of the above reported issues is a challenge for the second round of test. These problems have being reported to IVS providers for the required implementation modification; some MSs have decided to try different IVS; some issues have been reported to the Standardization taskforce, as detailed at the end of this paragraph.

The need for retrofitting devices was brought up by many—they would accelerate the implementation of eCall. As one Member State writes: “Those [retrofit] modules will increase the public acceptance of the system and will force the car manufacturers to hurry up. Furthermore the retrofitting market will need a legal framework that could be lead to faster decisions in the political sphere. Moreover this would affect the standardisation and certification issue, which is a deployment enabler per se.”

To face the challenges related to the retrofitting market, the creation of this Task Force (RETRO) was approved in November 2012 (Paragraph 4.4.13).

Experiences with MNO stakeholders and communications between IVS and PSAPs contain both total successes and also minimum functionalities. In some countries where there have been tests in various parts of the country, the tests show problems with network coverage performance in some MS but also that the whole country is well covered. Both mobile and fixed networks have been used for transporting the MSD and eCall—call to PSAP, which is the normal case of mobile 112-call also without eCall and depends of the structure of the local 112-system. Usually some specific (short) number or other guiding behind 112 is needed for eCall. In some Member States, MNOs have already installed Flag capability to their network (Italy), in others the Flag capability has been enabled for test purposes, and in some Member States the eCall Flag has not been enabled at all. Using the long number instead of 112 has had effects on test results (usually long numbers don’t get priorities). MNOs have also brought up worries of a need to keep 2G alive because of the eCall.

One interesting detail which was found with MNO tests was that some Mobile Phones can simulate eCall in certain conditions and cause false eCalls (Czech Republic).

Members States will focus on the previous reported issues as challenges for the 2nd HeERO pilot. Some of the identified problems have been reported to the involved partners/providers.
Many Member States say that some legal pressure or regulation is needed to make the MNOs cooperate.

Connecting to PSAP have brought up various minor and large issues e.g. that the time stamp can be different in IVS and PSAP which is an annoying but quite small problem, but also that the time connecting to PSAP can be long due to network coverage problems which is an important problem to deal with. PSAP tests have been performed both in test beds and in real PSAP environment. A more substantial political issue, involving also technological choices, is the current situation of organizing PSAPs for receiving eCall (as already detailed in Chapter 6.1); the more complex and many-layered the PSAP structure is, the more there is problems with eCall. E.g. because the PSAPs have different infrastructures and systems in different maturity level within the same MS. eCall service in different languages can be a resourcing problem in many Member States. One issue which is brought up by all PSAPs is the fear of false alarms – they struggle with it already even without eCall. All possible means to prevent false alarms must be available.

Creating testing methodologies and log filing the KPIs, the part revealing the quality of eCalls, has used a great amount of resources in HeERO pilots, a minimum of 25 %. E.g. data logging from different IVS can need different tools for processing the log files. In WP4 the reported KPI 005, “duration until MSD is presented in PSAP” in pilots was between 5 to 20 seconds. The value 10 seconds seems to be reasonably good. KPI 007 “voice channel blocking time” has been between 3 to 18 seconds. These first round piloting results among other form a very good base for the work of the second round and they also give important input for the guidelines and recommendation work.

However, there are some important functions of the standards that have not been tested yet in any Member States. One of these is Dormant IVS, which is the functionality that is expected to ensure privacy. Some Member States have raised concerns regarding the consequence of using the Dormant IVS functionality, and how it will affect the voice blocking time, and the time from the eCall is triggered to the time the voice connection is established between the PSAP and the vehicle. Other functionality that has not been tested is Test eCall, and the option of setting up a test eCall or sending a Test MSD from the vehicle.

During the second round of piloting additional tests will be planned for increasing the number of tested functions.
As related services many Member States have built a link between PSAP and Traffic Management Centres, so the road accidents can be reported rapidly to the traffic management.

**Standardization** taskforce have gathered problems related to standards EN15722, EN16062, TS16405, EN6454, some of the proposed changes have been sent to relevant standardization bodies. One example of detected standard problem which Member States reported concerned MSD: “When should be MSD updated to achieve the most actual MSD for PSAP, if needed? Specification standards are lacking in this regard. Terms like ‘new MSD’, ‘resend request’, ‘the latest version’, etc. are ambiguous and should be probably clarified and unified in the standard HLAP - EN 16062. So when PSAP pulls MSD, it can be received as either the ‘old’ or ‘new’ version and should message ID be changed only when ‘feeding’ with ‘new’ MSD?” The team which stated this issue decided that probably the most effective solution would be when PSAP pulls MSD, because without it MSD must be updated periodically with all its problems.

Some Member States have been very active concerning **VIN and EUCARIS** utilisation and also planning the technical supervision of eCall IVS and the periodical technical inspections of them.

In order to achieve a successful implementation process, there have to be one or several active stakeholders in the Member State who take care of needed actions, negotiations and prepare legal and procuring projects related to eCall. Some Member States have been proactive also in preparing eCall related PTI (periodical technical inspection) because in many Member States the inspection must be available from the very start of the eCall deployment (2015) either for inspections related to vehicle registration processes or for professional use inspections (e.g. taxis).

A quite debatable issue is the information value of position as a trusted parameter in MSD. It is extremely important which position is sent in it and marked as trusted - e.g. in case of accident in the tunnel where the last known position is in the beginning of the tunnel.

### 6.6 Overview of enablers, opportunities and challenges

As a conclusion the following statements can be referred to: Although “The effort for preparation and testing was far higher than estimated beforehand...” “According to current experiences from the pilot, eCall has proven to be a mature technology, which might be deployed. Several shortcomings which were identified were solved with additional effort from
all stakeholders. Due to the number of stakeholders involved; mutual cooperation and proper technical support are critical prerequisites to success in this kind of project. This is one of the key messages that should be communicated."

The following Table provide an overview of the enablers, opportunities and challenges previously reported.

<table>
<thead>
<tr>
<th>Layer</th>
<th>Identified Challenges</th>
<th>Identified Enablers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy Issue</strong></td>
<td>Incomplete EU legislation</td>
<td>European Parliament resolution for the development of eCall (03/07013)</td>
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<td></td>
<td>Commission Delegated Regulation (EU) (No 305/2013) (PSAP)</td>
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<td></td>
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<td>Proposal for a decision concerning type-approval requirements for the deployment of the eCall in-vehicle system and amending Directive 2007/46/EC</td>
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<td></td>
<td></td>
<td>Proposal for a decision on the deployment of the interoperable EU-wide eCall COM(2013) 315 Final</td>
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<tr>
<td></td>
<td>Open issues with location accuracy and technical, false alarms and silent call prevention</td>
<td>EeIP task forces for facing open issues</td>
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<tr>
<td></td>
<td></td>
<td>eCall Memorandum of Understanding signed by 22 Member States and over 100 companies</td>
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<tr>
<td></td>
<td></td>
<td>National initiative for coordinating the activity for eCall Deployment: for instance in Germany: national ITS Action Plan and national eCall platform (par )</td>
</tr>
</tbody>
</table>
| **Operational Layer** | On-going activities for coordinating the network of different organizations:  
(Sweden) Organization of SOS Alarm and the 112 service  
(Croatia) Extra-effort in mutual cooperation  
(Romania) Centralized approach for implementing eCall deployment |
| **User Layer** | Lack of user awareness  
HeERO dissemination activities across the MS Pilot Sites  
Many interoperability demonstrations and presentations were held and planned in the context of HeERO Pilot Project.  
National and common eCall related actions, workshops and “plug-tests” are very important to get eCall related stakeholders involved in eCall development  
A specific EeIP Task Force (CAMP) is on-going to promote the design of awareness and education campaign. |
| **Business Layer** | Opportunity to investigate several business models and different scenarios for the deployment of the eCall service (due to the coexistence of the Pan European eCall, free service, with private services)  
Following the OPEN final report there are several discussions going on concerning additional services besides eCall and regarding the fact that fair competition in the automotive aftermarket needs to be safeguarded by EU legislators. |
### Technological layer

By combining the tests conducted by the HeERO pilots the **entire eCall chain has been successfully tested**, from manually or automatically triggering by IVSs in vehicles, to reception at first level PSAP, to incorporation of information from first level PSAP to 2\(^{nd}\) level PSAP as well as Traffic Management Centres.

<table>
<thead>
<tr>
<th>Weaknesses in IVS implementations</th>
<th>Real-life feedback from HeERO1 Pilot Site to IVS producers and providers for improving these aspects in the 2(^{nd}) round of tests.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambiguity in the interpretation of the standards</td>
<td>Feedbacks to standardization taskforce have been reported</td>
</tr>
<tr>
<td>Interoperability</td>
<td>Successful interoperability tests have been performed between some HeERO Member States and they are planned also for the second round of test.</td>
</tr>
<tr>
<td>Need for retrofitting devices</td>
<td>Task Force (RETRO) was approved in November 2012 to deal with this kind of issues</td>
</tr>
<tr>
<td>Not all the functions of the standards</td>
<td>Additional tests have been required in the second phase of Piloting test</td>
</tr>
<tr>
<td>Coordination between the different authorities in each Member State</td>
<td>Many Member States have built a link between PSAP and Traffic Management Centres, so the road accidents can be reported rapidly to the traffic management.</td>
</tr>
</tbody>
</table>

**Table 1: Overview of enablers, opportunities and challenges**
7 Conclusion

This deliverable presents an overview of identified enablers, opportunities and challenges for eCall deployment.

In Chapter 4, eCall and current development activity HeERO piloting experiences are reported. In Chapter 6 a general overview is illustrated to present the final considerations on enablers, opportunities and challenges taking into account the contributions from partners and Member States.

The main points illustrated in Chapter 4 are related to the current eCall activities in political arenas, in voluntary eCall related networks and in media. The initiatives of the European Parliament and of the European Commission are highlighted: the European Parliament impressively supported the development of eCall by publishing the resolution on July 3rd 2012, which highlighted the possibilities of eCall in traffic safety and deplored the slowness of voluntary progress of deployment of eCall. The European Commission published on the Official Journal of the European Union (03/04/2013) the Commission Delegated Regulation (EU) (No 305/2013) of the 26th November 2012. The Commission wants to ensure that PSAPs are ready to receive manual and automated emergency messages from vehicles registered in any EU country in 2015, when eCall fitted cars are in traffic.

In addition, the EeIP activities are illustrated and the main public events related to eCall are described. The successful eCall workshops are reported with an overview on the interesting presence of eCall on media.

Chapter 5 and Chapter 6 detail the enablers, opportunities and challenges identified from the partners’ contribution in Chapter 4. Different Layers have been considered:

- **Policy Layer**: The European Parliament impressively supported the development of eCall and the European Commission is working according to a 3-prong regulatory approach addressing the in-vehicle system, the telecommunications networks and the PSAPs (the published regulation is detailed in Paragraph 4.2)

- **Business Layer**: the final conclusions of the EeIP Task Force OPEN have reported. There are several discussions going on concerning additional services besides eCall and regarding the fact that fair competition in the automotive aftermarket needs to be safeguarded by EU legislators
- **Application Layer**: eCall end-to-end process is based on a network of different organizations. Member States reported a wide range of activities for improving the operational efficiency by clarifying the rule of the different organizations.

- **User Layer**: Considering the information provided by the HeERO Project, participants highlighted the importance of the users’ awareness: HeERO dissemination activities have been promoted across the MS Pilot Sites and supported during several public events (ITS World Congress, for instance) to show the potential of the eCall.

- **Technological Layer**: detailed reports from the experiences of the 1st HeERO piloting round highlighted issues regarding eCall implementation. To overcome the reported issues a wide range of actions have been promoted both for solving the implementation problems than to improve the available standards, by a precise reporting to the Standardization Task Force.

Considering the different contributions, as a conclusion, the following statements can be referred to: “Although the effort for preparation and testing was far higher than estimated beforehand according to current experiences from the pilot, eCall has proven to be a mature technology, which might be deployed. Several shortcomings which were identified were solved with additional effort from all stakeholders. Due to the number of stakeholders involved; mutual cooperation and proper technical support are critical prerequisites to success in this kind of project. This is one of the key messages that should be communicated.”
8 Reference

http://aftersalesmagazine.nl/nl/blog/item/Onderzoekwaar_mag_sCall_uitkomen/2954


