

E-MERGE

E-MERGE Final Report

Version 1.0

June 2004

Produced by:
ERTICO – ITS Europe

*E-MERGE is co-financed by the
European Commission DG Information Society*



Programme name:	Information Society Technologies (IST)
Project ID:	IST-2001-34061
Project acronym:	E-MERGE
Project name:	Pan-European Harmonisation of Vehicle Emergency Call Service Chain
Dissemination level¹:	Public

Deliverable number:	D 1.2
Contractual date of delivery:	31.05.2004
Actual date of delivery:	29.06.2004
Title of deliverable:	Final Report
Work package:	WP 1
Nature of the deliverable:	Report
Author(s):	Michael Nielsen (ERTICO) Rasmus Lindholm (ERTICO) Mariana Andrade (ERTICO)
Project co-ordinator:	Michael Nielsen (ERTICO) Tel: +32 2 400 07 49, fax: +32 2 400 07 01 E-mail: m.nielsen@mail.ertico.com

Abstract: The final report presents the E-MERGE project and summarise the findings, validation and exploitation intentions together with the main conclusions.

Keyword list: E-MERGE, eCall, 112, In-vehicle integration, achievements, specifications, trials, validations, results and recommendations.

Document Control Sheet

Electronic reference: D1.2 E-MERGE Final Report V1.0

Main author(s) or editor(s): Michael Nielsen
Rasmus Lindholm

Version history:

Version number	Date	Main author	Summary of changes
0.1	16.04.2004	Rasmus Lindholm Mariana Andrade	
0.2	14.05.2004	Michael Nielsen	Updated
0.3	28.05.2004	Rasmus Lindholm	Updated with partners comments
1.0	31.05.2004	Michael Nielsen	Authorised version

Approval:

	Name	Date
Prepared	<i>Rasmus Lindholm / Michael Nielsen</i>	<i>31 May 2004</i>
Reviewed	Jacob Bangsgaard	<i>June 2004</i>
Authorised	Michael Nielsen	<i>29 June 2004</i>

Circulation:

Recipient	Date of submission
Consortium	29 June 2004
EC	05 July 2004

Table of Contents

1. EXECUTIVE SUMMARY – (EDITED) FINAL REPORT	5
2. SETTING THE SCENE	8
2.1. INTRODUCTION TO THE E-MERGE PROJECT	8
2.2. E-MERGE OBJECTIVES	8
2.3. OVERVIEW OF THE E-MERGE APPLICATIONS	9
2.3.1. <i>The In -Vehicle System (IVS)</i>	10
2.3.2. <i>The PSAP and the Emergency Authorities</i>	11
2.3.3. <i>The Service Provider</i>	11
2.4. PARTICIPANTS AND ROLE	12
3. METHODOLOGY AND APPROACH	14
3.1. E-MERGE OBJECTIVES	14
3.2. METHODOLOGY	15
3.3. VALIDATION AND EVALUATION	17
3.3.1. <i>Validation objectives</i>	17
3.3.2. <i>Evaluation criteria</i>	18
3.3.3. <i>E-MERGE test-sites</i>	18
3.3.4. <i>Results achieved</i>	20
4. RESULTS AND ACHIEVEMENTS	20
4.1. RESULT 1: INTERFACE BETWEEN THE IN-VEHICLE eCALL AND PSAP SYSTEM	21
4.2. RESULT 2: INTERFACE BETWEEN PSAP AND SERVICE PROVIDER.....	22
4.3. RESULT 3: SPECIFIED MINIMUM SET OF DATA (MSD).....	23
4.4. RESULT 4: TRANSMISSION OF MSD AS DATA IN THE 112 VOICE CHANNEL.....	24
4.5. RESULT 5: RECOMMENDATIONS	26
4.5.1. <i>Technical recommendations based on test validation and test-site visits</i>	26
4.5.2. <i>Business Case recommendations based on the identification of Business Case Elements</i>	26
4.5.3. <i>Implementation and general recommendations for the E-MERGE system</i> ...	26
4.6. REALISATION OF PROTOTYPES	26
4.7. DEMONSTRATED APPLICATIONS	28
4.8. OVERALL TECHNICAL AND ECONOMICAL ASSESSMENT	29
4.8.1. <i>Technical evaluation of applications</i>	29
4.8.2. <i>Economical evaluation of applications</i>	31
4.8.3. <i>Fulfilment of project objectives</i>	37
4.9. LIAISON AND DISSEMINATION	39
4.9.1. <i>Articles produced, workshops prepared and conference attended:</i>	39
4.10. DELIVERABLES.....	46
4.11. PROJECT MANAGEMENT AND CO-ORDINATION ASPECTS	47
4.11.1. <i>Quality Manual</i>	48
4.11.2. <i>Main problem encountered</i>	48

5. OVERALL CONCLUSION.....	49
6. PROJECT DATA AND CONTACT DETAILS	52
APPENDIX A – COVER PAGES FROM ALL DELIVERABLES.....	54
APPENDIX B – INFORMATION DISSEMINATION MATERIAL	55
NEWSLETTERS	55
BROCHURES	57
POSTERS.....	61
PHOTOS.....	63

List of Figures

<i>Figure 1 E-MERGE Block Scheme</i>	9
<i>Figure 2 Validation approach taken by E-MERGE</i>	18
<i>Figure 3 The six test-sites</i>	19
<i>Figure 4 The interface overview between different in-vehicle systems and PSAP systems</i>	22
<i>Figure 5 The interface overview between the PSAP and the Service Provider</i>	23
<i>Figure 6 Message flowchart</i>	24
<i>Figure 7 CRF</i> <i>Figure 8 Volvo</i>	27
<i>Figure 9 SEAT</i> <i>Figure 10 Opel</i>	28
<i>Figure 11 Project Work page structure</i>	48

List of Tables

<i>Table 1 E-MERGE participants and their role</i>	14
<i>Table 2 Overview of E-MERGE work packages</i>	16
<i>Table 3 First and second level assessment objectives</i>	17
<i>Table 4 Validation methods used in E-MERGE</i>	18
<i>Table 5 Gamma testing for the six test-sites</i>	20
<i>Table 6 Scenarios and test scenarios</i>	30
<i>Table 7 Overview of the technical assessment</i>	30
<i>Table 8 Costs and Benefits per stakeholder</i>	37
<i>Table 9 E-MERGE objectives and fulfilments</i>	37
<i>Table 10 E-MERGE objectives, impacts and their fulfilment</i>	38
<i>Table 11 E-MERGE workshops, conferences and meetings</i>	44
<i>Table 12 E-MERGE Publications</i>	46
<i>Table 13 E-MERGE deliverables</i>	47

IST-2001-34061 E-MERGE

*Pan-European Harmonisation of Vehicle Emergency Call Service Chain***E-MERGE**

Executive Summary – Edited Final Report

1. Executive Summary – (Edited) Final Report

With over 40,000 lives lost each year, reducing the death toll on Europe's roads is not an option, it is a must! Improving the speed and accuracy of the delivered emergency response can help, potentially cutting fatalities by 5%, injuries by 10% and associated costs by €4 billion each year.

The E-MERGE project has targeted this goal by taking the first step towards ensuring the availability and functioning of vehicle-based emergency call systems that allow accidents to be dealt with in the same efficient manner across the European Union and regardless of the vehicle. By defining a common pan-European in-vehicle emergency call infrastructure and protocol — including the delivery of not only vehicle location data but also more extensive information about the vehicle, its occupants and crash intensity — the project has developed a platform that can help reduce fatalities and has the potential to be the next standard on the same level as seatbelts and airbags.

As part of the IST Programme, the E-MERGE project was supported by the European Commission (EC) Information Society Directorate General and managed by ERTICO – ITS Europe. The consortium — including partners from the car industry, public authorities, emergency call centres and service providers — began work in April 2002 and terminated at the end of March 2004. Its task was to develop, test and validate common specifications for the vehicle emergency call at all levels along the service chain as well as to produce parts of the necessary

technical, organisational and business structures for a Europe-wide take-up of the solution.

Based on the EC's recommendations concerning E112 across Europe, E-MERGE defined the in-vehicle system (the generating element of the emergency call), the data to be delivered and the transmission protocols. The project conducted tests in laboratories as well as with six EU countries. A survey was also organised with participating Public Safety Answering Points (PSAPs) to determine confidence in the system and look at the necessary steps for the E-MERGE solution to be deployed.

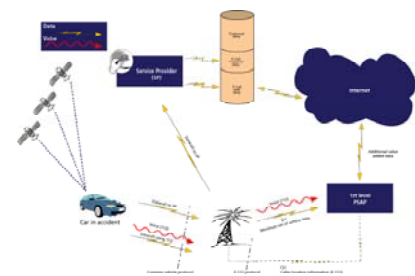
Testing and Validation

An E-MERGE emergency call is triggered by the activation of in-vehicle sensors (airbag deployment, rollover, etc.) or manually, if the user pushes the SOS button. This eCall is transferred to the PSAP, the public call centre responsible for providing a first point of contact to an emergency 112 call.

The PSAP receives the 112-voice call and the minimum

set of data as defined by E-MERGE (i.e. time and location, vehicle details, triggered sensors, direction of travel, service provider information).

If the caller subscribes to a private service provider (SP), the in-vehicle system also transmits more extensive data about the vehicle and its occupants to the SP. This option not only makes additional information available to the PSAP (via the



SP), but also allows for service delivery in the driver's native language in case of need for translation. This information will then allow the PSAPs to better instruct on how the call and response (e.g. dispatching of emergency vehicles) will be managed by the responding agency, such as the police, ambulance, health care rescue or fire brigade.

The project took a three-step approach to testing the E-MERGE solution:



- *Laboratory tests* at partner locations with their own equipment and simulators. Four scenarios were run with over 1500 alpha tests performed to ensure correct transmission/reception of data between the four elements within E-MERGE
- *Integration testing*: the relation between two components of the service chain tested at each test site. Five scenarios were run with more than 500 beta tests performed to simulate different integration of the transfer of data between the four elements within E-MERGE; and
- *Testing in real-life conditions* in six EU countries. This testing was designed to simulate pan-European coverage with E-MERGE equipped cars driving through the various countries accessing the local PSAP with a link to the SP of the country of origin of the car owner. Over 300 real-life gamma tests were performed to evaluate response times of the different chains and roaming. (Vehicles driving around Europe).



Results and achievements

The E-MERGE cross-border testing proved quite successful with 100% error-free testing along the entire service chain. It appeared from the testing that using SMS for the transfer of data was not recommended as gamma tests showed that the time for transferring data between the different elements within E-MERGE differed from 2 to 260 seconds, which is not acceptable. E-MERGE therefore developed a specification for sending the minimum set of data in the open voice channel. This also ensures that the dataset reaches the operator that handles the voice-call.

In addition to the test results themselves, a survey of the test sites provided some insight into user acceptance of such a system. Overall, it was felt that E-MERGE adds significant value to rescue operations, especially in more complex situations where the adequacy of the first initiated response to an incident is of prime importance.

Based on the project's investigations, a full-scale deployment of the E-MERGE system is expected to lead to a decrease in fatalities and severe injuries in traffic accidents as follows:

- Fatality: 5% reduction
- Severe Injuries: 10% reduction to light injuries
- Light Injuries: No positive effect foreseen

That level of reduction would mean 2000 lives saved each year and a saving of nearly €4 billion each year in related social and health costs and lost "public" income calculated for the European Community. The savings will be related mainly to three stakeholder groups:

- Public authorities (medical, market productivity, congestion);
- Insurance companies (medical, legal costs, market productivity, administration costs);

- Individual drivers (medical, legal costs, market and HH productivity).

Potential Routes to Deployment

With the E-MERGE tests successfully completed, deployment now depends on the coordinated adoption of the architecture. However, Member States must ensure in the first stage the complete implementation of E112 in Europe. Secondly, PSAPs will then need to upgrade their E112 solution to handle also the E-MERGE minimum set of data.

The project consortium has identified three potential paths to deployment for the E-MERGE eCall solution:

- A preferred volunteer approach involving all stakeholder groups where deployment is ensured through a Memorandum of Understanding (MoU) with clear deployment targets. This approach is currently taken within the eSafety Forum Driving Group eCall;
- If the volunteer approach fails or is seen as delaying the process, an alternative approach could be that Member States and the EC create a directive on eCall; or
- Alternatively or in addition to this, the deployment process could be accelerated if an extra star in the European New Car Assessment Programme (EuroNCAP) for telematics safety services was introduced with eCall as the first telematics safety service.

The willingness and commitment of key players is critical for the implementation of the potentially life-saving solution offered by E-MERGE, thus making efforts such as the MoU important steps towards success. Cooperation must be encouraged between the vehicle manufacturers, telecom operators, the EC and Member States (in particular the emergency

agencies, the public PSAPs and the private PSAPs operating under the regulation of a public body). Other relevant parties such as the insurance industry, automobile clubs and other related industries must also be solicited to achieve a full and even cooperation for the project.

An EC communication and potential directive could help ensure Member State commitment and contribute to convince these countries of the benefits that such an investment has to offer. The momentum for such a directive already exists within the European Commission, with the White Paper “European Transport Policy for 2010: Time to Decide” targeting a 50% reduction in road victims by 2010 — a goal that can be achieved partly through the implementation of systems such as E-MERGE.

Finally, EuroNCAP provides motoring consumers with a realistic and independent assessment of the safety performance of some of the most popular cars sold in Europe. To date, the European Commission, five Member States, as well as various motoring and consumer organisations in every EU country, backed up this rating system. Should EuroNCAP choose, for example, to add a star for those



cars equipped with the E-MERGE capability, this could provide an

important push towards full deployment and implementation - as it would therefore introduce a higher safety rating system.

Contact point

ERTICO – ITS Europe
 Michael Nielsen, E-MERGE co-ordinator
 Av. Louise 326
 B 1050 Brussels
 Tel. +32 2 400 07 49
 Email: m.nielsen@mail.ertico.com

Public versions of main documents are accessible from: www.e-merge.org

2. Setting the scene

2.1. Introduction to the E-MERGE project

Launched on 1st April 2002, the E-MERGE project was a shared cost combined RTD & Demonstration project within the 5th Framework programme of the European Commission and the Directorate General Information Society.

2.2 Background

The integration of existing on-board technologies and communication networks in a new automated and integrated way can improve the notification of road accidents or other emergencies, speeding up emergency service response and saving lives. In 2001 40,000 people were killed and 1.3 million were severely injured in traffic accidents within EU-15².

To date, some vehicle manufacturers and telematics service providers, are already providing a proprietary vehicle emergency call service (eCall). However, there is no common technical solution, services do not (generally) offer roaming when abroad. Procedures and arrangements further down the service chain to the network operator, thence to an emergency call centre and finally to the emergency service itself vary greatly from country to country, which is why E-MERGE was initiated to create a pan-European in-vehicle emergency system.

2.2. E-MERGE objectives

The E-MERGE project objectives were to:

- Secure higher quality of life and health for European citizens by ensuring that the vehicle Emergency call service works throughout Europe, not only limiting itself to the country of a potential selected service provider.
- Support existing European policy objectives with technological development of a common in-vehicle and central system for handling eCall's when travelling across Europe and securing thus that Emergency call services is available for everybody, anywhere and at any time.
- Enhance the user-friendliness of the information society by extending availability of eCall services in the European countries;
- Create European added value for the vehicle manufacturers, SP's and PSAP's with the establishment of a common European vehicle Emergency call application that opens the way for offering not only Emergency call services but also additional services like route information, interactivity with the driver e.g. simultaneous monitoring and high speed warnings.

Besides this, the project aims were to:

Support existing European Policy on Casualty Reduction³ by enabling the Emergency services to get to the incident scene as soon as possible by using the most efficient itinary and utilising the "Golden Hour" principle to achieve a reduction in the severity of casualties.

² European Commission, 2004: Statistical Pocket Book 2003

³ European Road Safety Action Programme Brussels, 2.6.2003

Here, one has to note that a complete and working product/standard was not the scope of the E-MERGE project. The project is delivering the concept for the in-vehicle eCall standard and demonstrates the concept. With this in mind, this means that no validation has been done in relation to:

- Whether E112 and/or the E-MERGE solution is covering every inch of Europe;
- Whether the European citizens are willing to pay for the new technology;
- The reliability of the in-vehicle system (IVS) in terms of durability tests or every single option of triggering the IVS;
- Whether other or future protocols for communication are possible.

2.3. Overview of the E-MERGE applications

The E-MERGE project focus has been on the creation of the technical and operational prerequisites for one common pan-European vehicle Emergency call service as defined in the architecture shown in Figure 1 described below:

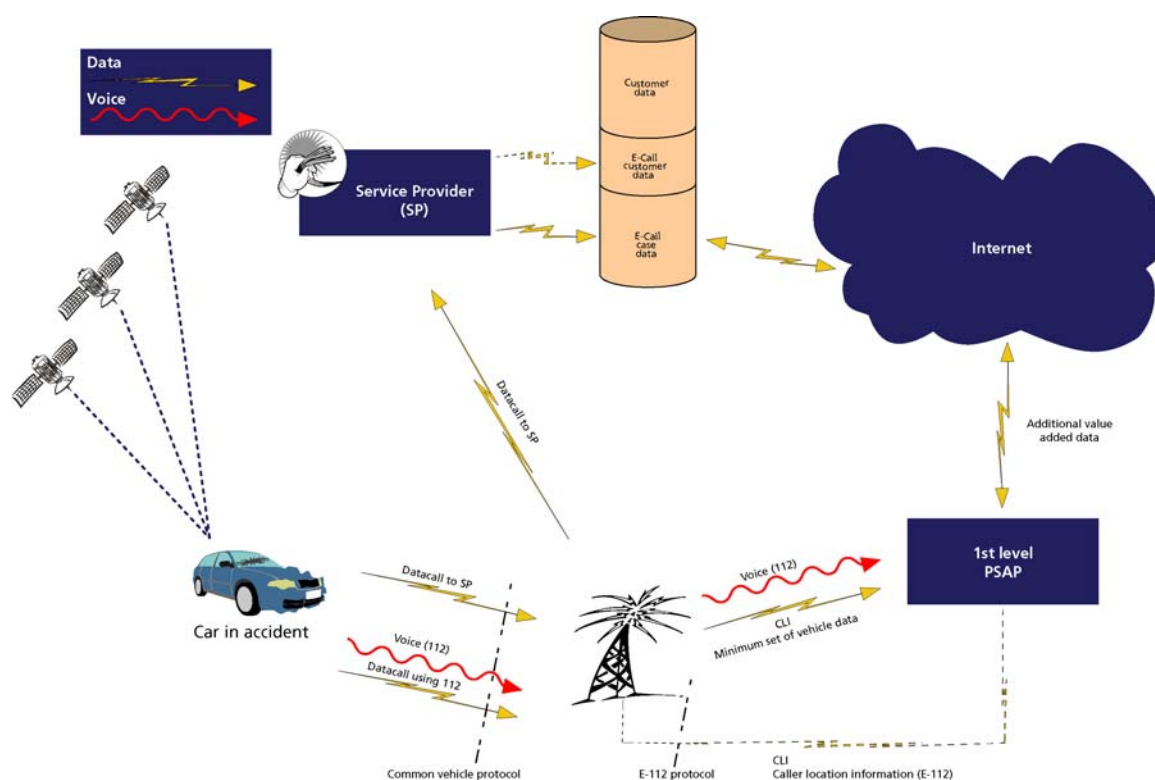


Figure 1 E-MERGE Block Scheme

1. The IVS (in-vehicle system), that is the generating agent of the eCall, sends the emergency call to a PSAP via the 112 voice channel, consisting of two elements: first, a pure voice connection based on 112; the second entails sending the minimum data set through the already established voice channel using GSM / GPRS / UMTS.
2. The eCall (data + voice) goes through the mobile network and is first handled by the telecom operator. The telecom operator recognises that the call is an emergency call and has the responsibility to enrich the call with the CLI (caller line identification). At the same time the telecom operator as a result of E112 will add the mobile location as a best effort principle into the location server database. After the emergency call

- handling, the telecom operator delivers the eCall to the appropriate PSAP via the fixed line network.
3. The PSAP receives two different types of communication via the fixed line network on a common channel: the first one is data communication delivered via a commonly agreed vehicle protocol whilst the second one is a normal voice communication. The minimum set of data plus the CLI are delivered as transparent data together with the 112 voice call. At the same time the Telecom Operator pushes the mobile caller location to the PSAP using a specific mobile location protocol (E112).
 4. The PSAP transmits acknowledgement of data received to the IVS and interprets and visualises the minimum data set.
 5. In case the user is a subscriber of a private service provider (SP), the IVS sends a full data set via a telecom provider to the SP, after receiving acknowledgement from the PSAP.
 6. The SP receives the data message and starts handling procedures, adding the additional eCall data in the SP database in order to make these data available for the PSAPs.
 7. The SP transmits acknowledgement of data received to the IVS.
 8. (Only valid if subscription to SP) If translation is needed, the PSAP uses a toll free number, provided in the MSD, to contact the SP who then starts a conference call with the driver.
 9. (Only valid if subscription to SP) The PSAP accesses the SP eCall specific database in order to obtain the additional data set directly from the SP.
 10. The PSAP operator elaborates the received data.
 11. The PSAP operator dispatches the emergency details to the most appropriate rescue centres.
 12. (Recommended) The PSAP communicates to the SP the involved rescue centres, to allow the SP to be able to provide additional post-accident services. This communication could happen via fixed line network as a simple phone call between the operators, or via Internet. In this last case the PSAP operator can access the SP specific eCall database and enter all available information about the involved rescue centres.

2.3.1. The In -Vehicle System (IVS)

The IVS is an embedded device designed specifically for the in-vehicle environment. Among other features, the IVS is able to acquire information from the Global Positioning System (GPS) and dedicated sensors and network of the vehicle. The IVS supervises the sensors, and in case of an accident initiates an Emergency call. The eCall could be triggered by the activation of dedicated sensors (airbag deployment, rollover, etc.) or manually, if the user pushes the eCall button.

The eCall is composed of:

- 112 voice call towards Public Safety Answering Point (PSAP);
- Data transmission of a minimum set of data (MSD) to the PSAP; and
- Data transmission of a full set of data (FSD) to the Service provider (SP) in case of a subscription.

The E-MERGE project has defined the MSD which each IVS should be able to send directly to the PSAP.

The MSD provides the following information:

- GPS Position;
- E-MERGE ID;
- Direction of travel;
- Number of triggers of the call;
- Colour, make, model of the vehicle;
- Indicates which sensors are triggered: airbag, roll-over, front crash, side crash or rear crash sensor (at least two should be activated);
- Time stamp of the event;
- SP ID;
- SP telephone number;
- Country ID; and
- Special vehicle /user code.

In the situations where the user (driver) has subscribed a contract with a private SP, the IVS will in case of an Emergency, generate a second data message. E-MERGE defined the FSD sent only to the SP specifically for this purpose.

It is recommended to send the minimum set of data in the 112-voice channel to the PSAP via a specific vehicle protocol - Global Telematic Protocol (GTP). During testing the consortium decided to use short message service (SMS) to transfer the eCall MSD to the PSAP and if subscribed thereto the full set of data (FSD) to the Service provider using the same vehicle protocol (GTP).

2.3.2. The PSAP and the Emergency Authorities

The PSAP is the public controlled call centre responsible for providing a first point of contact to a 112 call. The PSAP is thus receiving the Emergency 112-voice call and the E-MERGE MSD.

Based on the voice connection and the MSD content, the PSAP operator decide the hand over to the correct dispatcher, which will handle the remaining part of the specific Emergency response. The PSAP's source of information is the voice, the MSD and the location information provided by E112. For the cases where the driver has a subscription to a SP, the additional set of data can be pulled by the PSAP operator over a secure Internet IP connection from the SP specific E-MERGE database.

It may happen that the PSAP operator does not speak the language of the driver involved in the accident. In that case and under the sole condition that the driver has a service provider subscription, it is possible for the PSAP operator to set up a conference voice call between himself, the vehicle occupant and the operator at the responsible service provider .

2.3.3. The Service Provider

As mentioned previously, the MSD is only made available directly to the PSAP's to enable a first response. The potential SP link provides 'the FSD', which gives the possibility to give a more extensive set of data with further information about the vehicle and its occupants. This set of data is sent by the IVS to the SP where the driver has a subscription as mentioned above.

The FSD includes among other information:

- The Customer Line Identification (CLI);
- E-MERGE identification number;
- GPS position;
- Vehicle data;
- IVS data; and
- Vehicle ID.

Upon receipt of the full set of data, the SP searches its customer information databases, and starts transferring data to the E-MERGE specific database, where the PSAP's can retrieve information using the SP identifier in the MSD.

2.4. Participants and role

NO	Participant Name	Participant Role
1	EUROPEAN ROAD TRANSPORT TELEMATICS IMPLEMENTATION COORDINATION ORGANISATION S.C.R.L. ERTICO – ITS Europe	ERTICO was responsible for the overall management of the project. This involved managing the project work plan and ensuring work progress according to the plan, liaising with the EC and ensuring appropriate cooperation with related projects, developing and applying sound quality management procedures, managing contractual and financial matters and assuming editorial responsibility for WP 1 deliverables. ERTICO's activities in WP 1 consisted in organising management team meetings as well as drafting management reports. ERTICO's involvement in WP 2 consisted in being an interface for the eSafety initiative. ERTICO also lead WP 7 and took editorial responsibility for the deliverables and activities within the WP. In addition, ERTICO set-up the E-MERGE website and updated it regularly. Alongside the organisation of two workshops in the E-MERGE User Forum, ERTICO also edited two E-MERGE newsletters and a final brochure and disseminated the project at multiple events.
2	Adam Opel AG	Adam Opel AG, as a leader of WP2, was responsible for drafting the methodology and initiating the User Requirement Study to ensure that all relevant needs of all levels of users in the vehicle emergency chain were identified and properly documented. On the basis of their know-how on developing the GM OnStar system, Adam Opel AG also participated in the System specification of WP3. Finally, Adam Opel AG provided the vehicle to the German test site and participated in the validation of the German Trials.
3	Dienstleistungs GmbH KG	Dienstleistungs GmbH KG had the responsibility of adapting the current systems to comply with the E-MERGE specifications. Dienstleistungs GmbH KG acted as the German eCall Service centre in the various trials and contributed to the validation of the German trials.
4	Telmacon – consulting and Telecommunication Consulting and Solutions	Telmacon ensured that all relevant needs were considered for the implementation of vehicle eCall systems at the service of vehicle manufacturers and service providers. Based on their knowledge on developing the GM OnStar system Telmacon led the WP3 System Specification. Telmacon provided input for the creation of the necessary adaptation of technologies and systems in the fields of communication, data handling between the participants on common standard, data handling and connectivity for customer data, organization of the report system. Telmacon was the German validation site leader, which meant that they ensured the data communication coordination and implementation based on the E-MERGE protocol standard at the German Site. Finally, Telmacon was in charge of the local validation.
5	Volvo Technological Development	VTEC (Volvo) participated and defined the user needs and requirements on vehicle emergency call systems into WP2. VTEC

		contributed to the E-MERGE system specification based on their experience when designing the Volvo On Call system. VTEC developed a protocol and new message formats suitable for the agreed objectives for WP4. VTEC also carried out the testing on specified test sites. Furthermore, VTEC provided the vehicle prototype for the Swedish test site and participated in the development work at many other sites.
6	SOS Alarm Sverige AB	SOS Alarm Sverige AB provided the analysis of the overall E-MERGE questionnaire. SOS Alarm organised and carried out a local workshop to identify and compile the user needs, services and legal, institutional and organisational issues. In addition, SOS Alarm Sverige AB investigated the possibility of the establishment of a business model. SOS Alarm Sverige AB provided input on the functional specifications, operational requirements, data and information model, message protocols, creation of a minimum service levels, technical requirements to central systems and for interoperability issues. SOS Alarm Sverige AB was in charge of the test site in Sweden where they secured the operational development and implementation of the E-MERGE solution. SOS Alarm Sverige AB also collected test data, performed the analysis and documentation of test results, gave local conclusions and recommendations to the Validation work package Leader.
7	Comuni di Milano	As part of the global traffic management and control centre, Milan respectively ran the eCall service centre and PSAP centre for the duration of the trials. In addition to the validation process, Milan contributed to the definition of the user requirements, specifications, creation and testing of prototype solutions. Finally, Milan took part in the investigation of the impact of the E-MERGE results.
8	Peugeot Citroën Automobiles (PSA)	Peugeot Citroën Automobiles (PSA) participated in developing the user needs and requirements on vehicle emergency call systems into WP2. When WP2 was completed Peugeot Citroën Automobiles (PSA) took the role of an observer within E-MERGE.
9	ACASERVI S.A.	RACC contributed to the project by identifying the final users needs on telematic applications on services, roadside assistance, quality service level. RACC also participated in the definition process of the requirements for onboard equipment, user expectations in terms of usability, telematic equipment cost, cost service requirements and definition of technical specifications. RACC adapted the human and technique resources to accomplish the E-MERGE specifications for the telematic emergency call reception in Barcelona. As the Spanish test site manager, RACC carried out trials in Spain with SEAT and the E-MERGE Partners. RACC also participated in the validation of Spanish trials and was responsible for the interaction on the validation procedure.
10	SEAT S.A.	SEAT helped identifying services suitable for E-MERGE. SEAT supported the validation process from vehicle telematic module and the definition of quality levels of the E-MERGE telematic module. SEAT developed the telematic module according to the E-MERGE specifications for WP4 as well as the system via the telematic module implemented in the vehicle. Furthermore SEAT provided the vehicle prototype for the Spanish test site.

11	MIZAR Automazione S.p.A.	MIZAR contributed to the definition of the E-MERGE user needs in WP2. To achieve this, MIZAR worked closely with the Italian test site whose trial results contributed partially to the definition of the national architecture for ITS and validation of results. In WP3 MIZAR contributed to the definition and specification of the service chain necessary to collect and handle the eCalls. MIZAR also participated in the initial software prototypes and simulated environment needs to verify and explore the viability of partial E-MERGE solutions and message format during the development of the E-MERGE specifications. In addition, MIZAR managed WP5 and ensured a homogeneous approach for reporting on the test site activities. As part of this work package, MIZAR also created a structure able to highlight the commonalties and comparable results achieved by the different test sites.
12	C.R.F. Societa Consortile per Azioni	CRF gave support to the identification of services related to the vehicle manufacturers by means of the “TARGA” eCall services. CRF contributed in WP3 to the vehicle system specification and architecture definition as well as to the definition of communication protocol and messages format. CRF also ensured that the specifications were followed for the vehicle equipment. CRF was involved in the Italian test site activities such as test plan definition and validation with a particular focus on the vehicle equipment and prototype development to comply with the E-MERGE specifications.
13	Office of the Deputy Prime Minister	ODPM acted as an interface between the project and UK emergency services, telephone operating companies and PSAPs to ensure that national service requirements were met. ODPM used some of its expertise with existing 112 emergency call systems and development of telematics protocol for operations in the UK to help define the requirements of emergency services, PSAP and telephone operating services. Furthermore, ODPM worked with the emergency services and PSAP operators to identify the needs for necessary changes in order to operate systems and develop new training packages.
14	Association of Chief Police Officers United Kingdom	ACPO worked in WP2 on problems over technical faults, system misuse and false activation risks resulting from telematics systems as these can have a significant impact on the ability of the emergency services to be operational. ACPO also contributed to the minimum standards of service delivery and operator training required for service providers. ACPO led the UK test site with the preparation and validation of the UK trials for the E-MERGE project.
15	Cap Gemini Ernst & Young	Cap Gemini Ernst & Young led work package WP6 in charge of validation. Cap Gemini Ernst & Young was also in charge of D6.1, D6.2, and D6.3, entailing validation by simulation, Use of reference equipment as well as overall validation.

Table 1 E-MERGE participants and their role

3. Methodology and approach

3.1. E-MERGE objectives

The overall objective was to ensure the availability and functioning of vehicle based emergency call systems from any vehicle anywhere in Europe. The key objective of E-MERGE was therefore to develop, test and validate common specifications for the vehicle

emergency call at all levels in the vehicle emergency call chain and to investigate the technical, organizational and business structure for European wide take-up of the solution. The other main objectives were to remove current cross-border and language problems so as to have an interoperable solution covering the whole of Europe and including all European vehicle manufacturers. The overall objective of the project was that the manufacturers, eCall service centres, PSAPs and emergency agencies would adopt the E-MERGE solution after the project has ended.

The project goals are listed below.

1. Identify requirements of users, manufacturers, operators and emergency services for eCall application, information exchanges and services;
2. Define specifications for technical elements, including message content and formats, exchange protocols, databases, location referencing etc.;
3. Achieve a Europe-wide consensus on a single harmonised vehicle Emergency call system based on adaptation of existing technology and systems;
4. Define operational procedures and arrangements for all stages of ECall handling;
5. Test the system in at least five vehicles from five different European vehicle manufacturers in different scenarios and locations across five test-sites in Europe;
6. Validate the system via some “black box” tests and real life testing. Realise at least 50 consecutive successful full information exchanges throughout the vehicle emergency call chain in each test site by each vehicle type to meet the success criteria;
7. Ensure the take-up of the E-MERGE solution in non-participating countries via a project Forum. The consortia has the objective that all public and commercial organisations providing vehicle emergency call services will adapt to the E-MERGE specifications;
8. Analyse social/institutional issues such as data privacy;
9. Examine organisational options and business cases for a pan-European eCall network;
10. Propose scenarios for European eCall service chain deployment via the standardisation work suggested; and
11. Promote the adoption of the agreed business solution across Europe via the defined dissemination tasks within the project.

3.2. Methodology

The work was organised in six Work Packages (WP) in addition to the project management (WP1) as shortly presented in *Table 2*, where the involved partners are listed with their respective goals achieved.

WP #	Title and short description	Goal	Involved partners
WP 2	User Needs Constitutes the first step in the definition of the system requirements and the creation of an E-MERGE business plan. This WP was set up to define and investigate the functionalities based on a user point of view and all actors involved (Vehicle manufacturer, retrofit system manufacturer, eCall Service Centre, PSAP, emergency agencies, local authorities, Insurance companies, GSM providers etc.). The output gave the E-MERGE project a unique set of user preferences and requirements ensuring a wanted and functional system.	1	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 & 14

WP 3	Specification of System Used the results of WP 2 to define the system requirements. A generic system architecture was defined and site-specific options were chosen for the system definition and thereby gave the recommendations to reach a common optimal vehicle system specification. From this, a common architecture was defined for interface and interoperability amongst eCall service centres and between eCall service centres and PSAPs.	2	2, 4, 5, 6, 8, 9, 10, 11, 12, 13 & 14
WP 4	System development Consisted in developing prototypes and defining potential necessary adaptations of technology and systems at the vehicle manufacturers, eCall Service centres and PSAPs/emergency agencies. This WP also compiled and developed eCall data and communication network for eCall service centres.	4	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 & 14
WP 5	Trials This WP ensured that each test site carried out site-specific management tasks such as implementing the E-MERGE system and validated the interoperability. Trials were carried out in six different sites across Europe.	5 & 6	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 & 14
WP 6	Validation This WP carried out the evaluation of the trial results. At first the evaluation methodology and the indicators were defined. Each site then gathered the evaluation data. These data were processed to derive the compiled evaluation conclusions. Elements for final E-MERGE business plans were also provided.	8 & 9	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 & 15
WP 7	Dissemination & exploitation Dissemination and exploitation actions were present throughout the project to present the results achieved at the various stages of the life of the project. Indeed one of the key objective was to raise the awareness of Vehicle Manufacturers, eCall service centres, PSAPs, Public Authorities and Emergency agencies about the existence of the E-MERGE concept. Moreover, the very fact that the concept was worthwhile in terms of implementation made it possible to obtain a large added value. The dissemination plan included a reference brochure, a website, a regular newsletter, two major information workshops, publications, contacts with relevant official standardisation bodies, etc. In addition, a exploitation plan was developed to ensure the exploitation of the vehicle eCall solution developed within the E-MERGE project. Furthermore, a technology implementation plan was developed.	3, 7, 10 & 11	1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13 & 14

Table 2 Overview of E-MERGE work packages

3.3. Validation and evaluation

The aims of the validation activities within E-MERGE were to show that the technical specifications of the pan-European vehicle eCall system developed within E-MERGE works through validation of this solution on six trial sites.

The first development step of the E-MERGE specification was to define the system architecture for the pan-European vehicle eCall. The technical validation focuses on the interfaces between the different aspects of the E-MERGE system but also on the different business aspects and the impact for society in saving lives.

3.3.1. Validation objectives

The objective for the validation was to check whether the user needs and requirements and the goals set forth could be achieved with the system developed within the project. *Table 3* shows the high-level assessment objectives considered within the project.

Object for validation	Decision makers	First level assessment objective	Second level assessment objectives
E-MERGE system	<ul style="list-style-type: none"> ▪ Car manufacturers; ▪ Mobile telecom operators; ▪ Member states; ▪ PSAPs; ▪ Emergency dispatchers; ▪ Emergency operators; ▪ Private Service Providers incl. automobile clubs; ▪ Insurance companies; ▪ Equipment manufacturers; and ▪ Drivers. 	<ul style="list-style-type: none"> ▪ Technical assessment, to determine the performance and reliability of an application; ▪ Impact assessment, to measure the effects on safety, efficiency, environment; and ▪ Socio-economic evaluation, including cost-benefit and multi-criteria analysis. 	<ul style="list-style-type: none"> ▪ To determine the extent to which the application improves safety; ▪ To assess the system's technical reliability; and ▪ To assess market opportunities.

Table 3 First and second level assessment objectives

The technical assessment investigated whether the system tested fulfilled its requirements from a technical point of view. Another important issue of the validation phase was to assess the impact of the requirements and preferences of the users, decision makers and other stakeholders concerned in the project. Finally, elements of a business model for the E-MERGE system were developed.

The following impacts were selected for the E-MERGE validation:

- Reduction of medical costs;
- Reduction of rescue costs;
- Business opportunities for service organisations;
- More effective management of road network-less traffic jams;
- Pan European coverage, better safety;
- Quality of response; and

- Timelines of response.

The first activity was the development of the test-plan, which describes the overall test scenarios and procedures. With this, a uniform way of reporting was realized. The test-sites developed the test-site procedures and described the way they tested their part of the overall test scenarios. The test-sites implemented their part of the E-MERGE functionality and performed the tests, in conformity with the ‘E-MERGE test-site plans’.

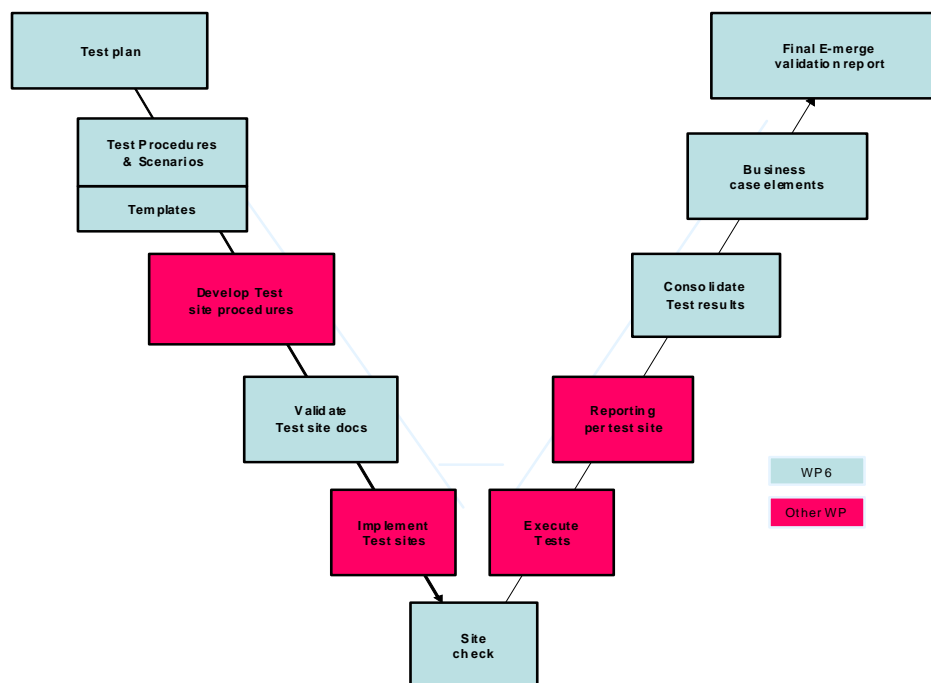


Figure 2 Validation approach taken by E-MERGE

3.3.2. Evaluation criteria

Table 4 shows that the relevant validation methods were identified as appropriate for the validation of the E-MERGE project:

Method name	Object of validation	Outcome
Test scenario with log files	Test sites	Shows whether equipment works
		Shows results of technical validation object
		Shows that implemented functionality is working and components/systems are present at test site
Site visit	Test site	Proof that implemented functionality is working and components/systems are present at test site
Questionnaire	Opinions / plans	Information about impact validation object
		Information about socio-economic prospects
		Indication whether the new system improves the current overall situation

Table 4 Validation methods used in E-MERGE

3.3.3. E-MERGE test-sites

The validation activities was based on the procedures and scenarios described in the

‘E-MERGE validation plan’. The tests was divided in:

- Alpha tests (α) – stand-alone tests within the compounds of one decision maker (e.g. the vehicle manufacturer of site ‘X’ first test the basic functionalities of the IVS until it works according to the specifications);
- Beta tests (β) – connectivity testing, relation between 2 decision makers (e.g. the vehicle manufacturer of site ‘X’ and the PSAP of site ‘X’ have a combined test); and
- Gamma tests (γ) – real life testing, complete scenarios from IVS until PSAP.

Demonstrations were carried out in six test-sites (UK, Sweden, Italy, Spain, Germany and Netherlands) and all performed real-life alpha, beta and gamma tests. The gamma tests were focused on cross-border functionality in which at least one foreign vehicle was driving in a specific country communicating with the PSAP of that country and the SP of the home country of the vehicle.

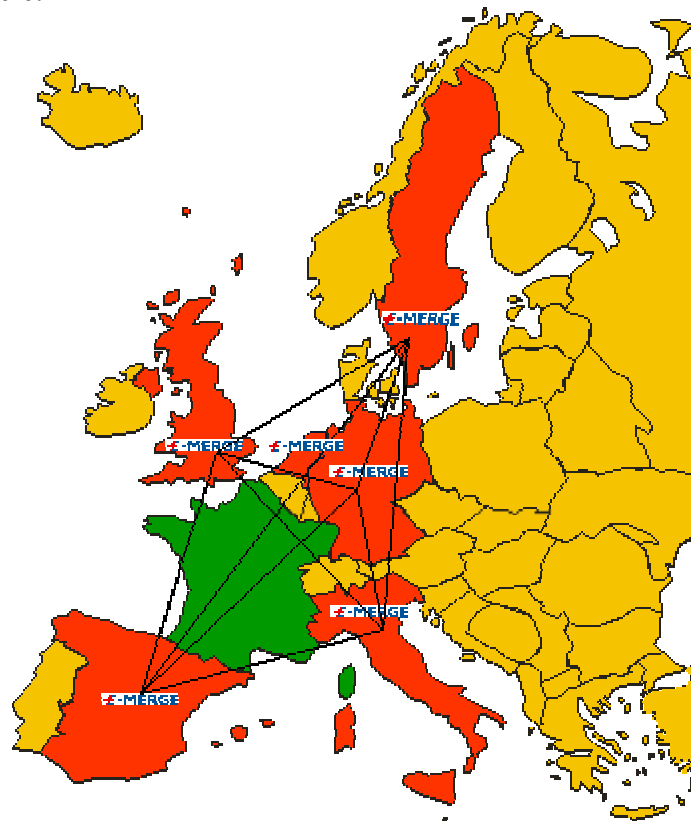


Figure 3 The six test-sites

The tests focused on analysing the various interfaces:

- IVS-PSAP (MSD): The IVS in the vehicle send MSD to the PSAP in the specific country. The PSAP received the MSD;
- IVS-SP (FSD): The vehicle sends a FSD to the SP in the owner’s country. The SP received the FSD; and
- SP-PSAP (FSD): The PSAP in a specific country requested the FSD from the SP and pulled the FSD from the SP database.
- PSAP1-PSAP2-EV: The MSD received by PSAP1, was sent to PSAP2 and forwarded to the emergency vehicle.

In *Table 5* the performed gamma testing for the different test-sites are shown. The left column shows the interfaces. The marked cells show the covered interface. The top rows of the table show the specific country and the vehicles, which have been there.

	Sweden: Stockholm		Italy: Turin	Germany: Selingenstadt	Spain: Barcelona		UK: Haywards Heath	Netherlands: Nijmegen	
		Foreign				Foreign		Foreign	Foreign
	S (Volvo) in S	Volvo/FIAT/S EAT in S	I (FIAT) in I	D (Opel) in D	ES (SEAT) in ES	I (FIAT) in ES	UK(patrol) in UK	S (Volvo) in UK	NL in S
IVS-PSAP (MSD)									
IVS-SP (FSD)									
SP-PSAP (FSD)									
PSAP1-PSAP2-EV									

Table 5 Gamma testing for the six test-sites

3.3.4. Results achieved

As described earlier the project took a three-step approach to testing the E-MERGE solution. The results achieved in the various test phases is here described in more details:

- **Alfa (α)** — Four scenarios run with more than 1500 tests performed to ensure correct transmission/reception of data between the four elements within E-MERGE;
- **Beta (β)** —Five scenarios run with more than 500 beta tests performed to simulate different integration of the transfer of data between the four elements within E-MERGE; and
- **Gamma (γ)** — testing in real-life conditions in six EU countries. Designed to simulate pan-European coverage with E-MERGE equipped cars driving through the various countries accessing the local PSAP with a link to the SP of the car owner's country. More than 300 real-life tests performed to evaluate response times of the different chains and the roaming (vehicles driving around Europe).

4. Results and achievements

The work performed in E-MERGE and described in the previous chapter has led successfully to the following five main results:

1. Tested and validated specifications for the interface between in-vehicle eCall system and PSAP at pan-European level;
2. Tested and validated specifications for the interface between PSAP and Service Provider at pan-European level;
3. Specifications for the Minimum Set of Data (MSD);
4. Specifications on how to transmit MSD as data in the 112 voice channel; and
5. Recommendations on related issues such as in-vehicle system design, PSAP system design, SP design and Full set of Data.

In addition the following results were achieved during the E-MERGE project:

- Final compilation of user requirements and state of the art;
- E-MERGE compliant in-vehicle prototype available;
- E-MERGE compliant prototype for ACUNIA car cube available;
- Implementation of GTP protocol application and transport layer;
- Coding of MSD;
- Encoder and Decoder for the MSD;
- E-MERGE compliant PSAP visualisation system and connectivity to 112 response system available;
- E-MERGE compliant PSAP decoding and visualisation system available;
- Emergency dispatcher system that include MSD available;
- E-MERGE compliant PSAP operator manual for vehicle eCall;
- Specified Full Set of Data (FSD);
- Coding of FSD;
- E-MERGE compliant SP system available;
- Demonstration of interoperability between vehicles and PSAPs and between PSAPs and SPs;
- Opened up for offering new features when selling vehicles;
- Achieved a starting point to introduce advanced telematic service;
- Face stakeholders to advanced telematic service;
- Started national cooperation for vehicle eCall in Sweden (Memorandum of Understanding MoU);
- Started European cooperation for vehicle eCall (Memorandum of intention MoI); and
- Acquisition of know-how regarding the whole eCall chain at a pan-European level.

These results are in general represented by the following final project deliverables:

- D2.1 & D2.2: General consumer and State of the Art;
- D3.0: Specification on the European in-vehicles emergency call;
- D4.0: The E-MERGE developed system;
- D5.1: Test site details and plans for field trials;
- D5.2: Performed trials and results; and
- D6.3: E-MERGE Compiled evaluation results.

The above-mentioned results are similar to the results described by the partners in D7.3 "Technology Implementation Plan". The five main results are presented in the next sections.

4.1. Result 1: Interface between the in-vehicle eCall and PSAP system

The main objective of the E-MERGE project was to specify the eCall interface between the in-vehicle system and the PSAPs. This first result consisted in defining, specifying and agreeing on this interface. The interface specifications ensured the ability to initiate the in-vehicle eCall via specific in-vehicle sensors and to transmit the voice and defined data message to the same PSAP operator using the GTP protocol. The specification ensured interoperability between different in-vehicle systems and PSAP systems. Here, the interoperability was ensured by using 112 as the calling number and by sending the minimum set of data as "data in the voice channel".

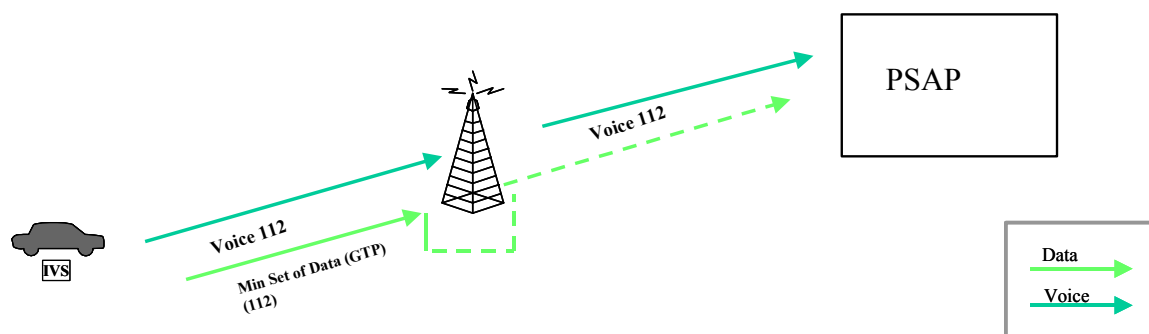


Figure 4 The interface overview between different in-vehicle systems and PSAP systems

The E-MERGE infrastructure consists firstly of, an In-Vehicle System (IVS), which is built into the vehicle with the aim to manually or automatically call 112 and provide the agreed minimum required data to the PSAPs as fast as possible so as to grant an optimum incident response.

The IVS consist of three main elements:

- A communicator (GSM)
- A locator (GPS)
- A processor with interface to various crash detection sensors.

In case that at least two crash sensors is activated on the basis of defined and agreed thresholds the IVS will automatically initiate a eCall towards the PSAPs.

The eCall consist of a voice call (112) and a data call. The data will be transmitted via a common vehicle protocol to be agreed on by the stakeholders. Within E-MERGE, the developments and testing was done using the Global Telematic Protocol (GTP), which is a Telematics Forum development and consists of a merger between GATS and ACP.

After specifying, developing, testing and validating GTP encoders and decoders are available to code and decode the minimum set of data in the vehicle and at the PSAPs. Furthermore, various in-vehicle prototypes complying with the specification are available and have been integrated in SEAT, Volvo, Fiat and Opel vehicles. For the PSAP side, visualising and mapping software are available to display the Minimum set of data and related location information. These systems have been implemented in Sweden, Italy, UK, Spain and Germany.

The specification of this interface is a new innovative feature that can generate a massive spin-off in the deployment of in-vehicle eCall across Europe. It is expected to lead to the implementation of eCall compliant in-vehicle systems as standard in new vehicles, thus ensuring the availability of a processor, communicator and locator in all vehicles. This would strongly encourage the launch of other telematics services.

4.2. Result 2: Interface between PSAP and Service Provider

The interface between the vehicle and the Service Provider has been defined using the GTP protocol. In-vehicle prototypes complying with the specifications are available from Fiat, Volvo, SEAT and Opel. Furthermore, encoders for the full set of data (FSD) are available to code the FSD message. At the SP level, decoders are available to decode the GTP coded FSD

messages at service providers in Sweden, Germany, Italy, Spain, UK and the Netherlands. Also visualisation software for the FSD is available at the PSAPs involved in the project.

Recommendations have been given for the content and development of SP specific databases and data content. Additionally, the interface between the SP and the PSAP has been specified, implemented and tested to ensure that PSAPs can retrieve information in a common way from various SPs across Europe. It has been decided to use the HTML “get” command to create a standard interface for the PSAP request for FSD.

Finally, specification on how the PSAP operator, on the basis of the contact information received in the MSD, can contact the SP operator to initiate a conference call and thus retrieve language support if needed, were created.

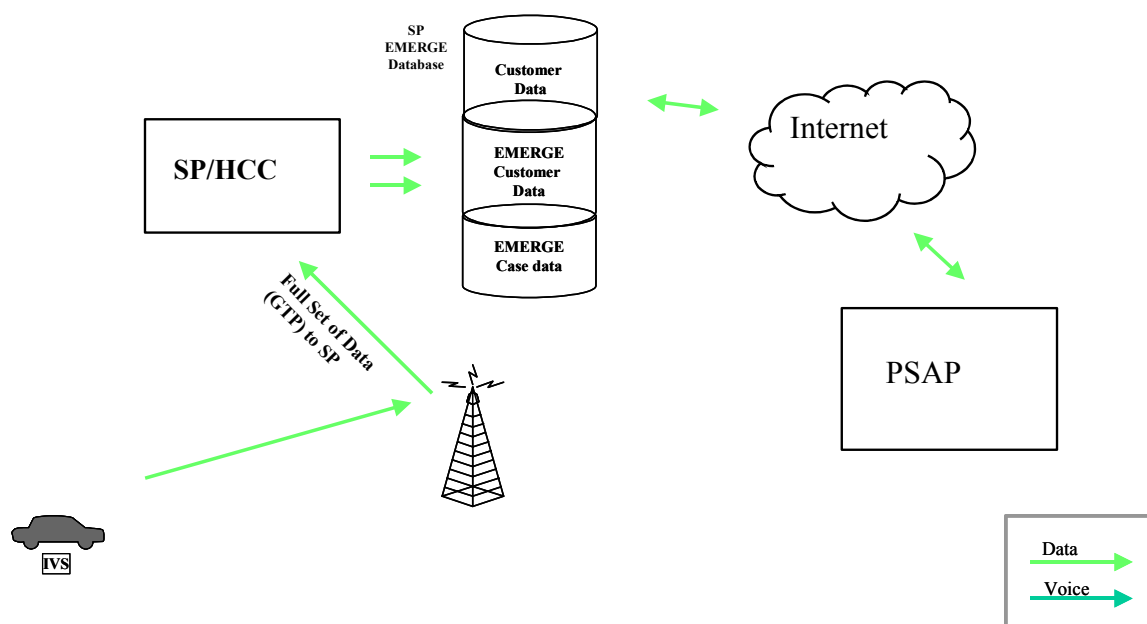


Figure 5 The interface overview between the PSAP and the Service Provider

The focus of the E-MERGE project in relation to the SPs has been on delivering the FSD to the PSAPs and to provide a possibility for the PSAPs to pull information from the SPs.

4.3. Result 3: Specified Minimum Set of Data (MSD)

The specification of the minimum set of data was created by the emergency agencies that participated in the project. These specifications were set on the basis of the information the emergency agencies would need to make a correct response and to speed up the response time. The definition of the MSD was made in close co-operation with the vehicle makers. The minimum set of data has been coded using the GTP protocol. The minimum set of data consists of the following information that will be forwarded, together with the voice call, to the PSAP operator when receiving an in-vehicle eCall:

- "When" via time stamp;
- "Where" via precise locations (e.g. satellite positions including the direction of driving);
- "Who" via vehicle description (caller line identification [CLI], colour, make and model including, if possible the vehicle identification number, VIN);
- "Where to obtain more information" via service provider identifier (IP address, including for example telephone number and country code); and
- "How severe" via eCall qualifier (source of the trigger – manual or automatic including what type of sensors or, if available, the number of sensors).

The minimum set of data makes it possible for the PSAP operator to respond to the eCall even without the voice connection. It was requested by the PSAP operators that at least two sensors should be activated and send information to the PSAP before they deal with the call as a silent call. The minimum set of data is critical for supplying the correct service to the crash-site and to speed up the response. It is generally expected by the PSAPs that the response time can be improved by 5-10% when this information is available at the PSAP immediately after the crash.

4.4. Result 4: Transmission of MSD as data in the 112 voice channel

The message communication between the IVS unit and PSAP was done using SMS for the field tests in E-MERGE.

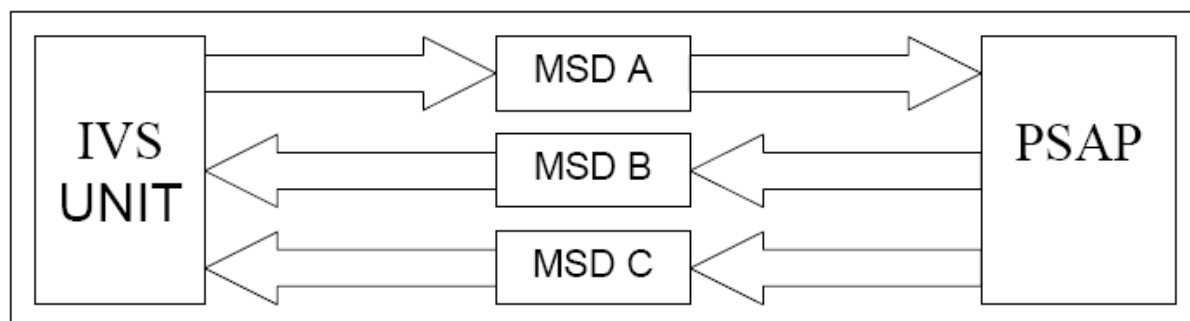


Figure 6 Message flowchart

- IVS->PSAP (MSD A): **Emergency Call Request message** (also referred to as “minimum set of data”);
- PSAP->IVS (MSD B): **Emergency Call Reply message** (acknowledgement that data has been received at the PSAP side, also referred to as ACK); and
- PSAP->IVS (MSD C): **Emergency Call Terminate message** (tells the IVS that service is ended at PSAP side, hang up by operator, also referred to as “End Of Service”. shortening “EOS”).

MSD A, MSD B (also ACK), MSD C (also EOS) refer to the order of communication in which they occur. The same goes for FSD, but here we send two FSD packets / sub-messages (because the message to SP does not fit into one SMS) and one ACK for each FSD packet /

sub-message. ACK and EOS, which is used to comply with GTP use cases for emergency call, are sent after the reception of the second FSD packet / sub-message.

However, the validation showed that SMS was a non reliable and to slow way to transmit the MSD. It was therefore decided to specify another solution.

The specification of the transmission of the MSD in the voice channel has thus been carried out to ensure in a fast and reliable way that the data will reach the same PSAP operator who receives and handles the voice call. Both, hardware and software based solutions have been specified and the related source code is available for download at www.e-merge.org.

The two proposed solutions to transmit MSD over voice channel represent low cost solutions. However, whilst the hardware-based solution introduces a fix additional cost for the implementation, the software based solution allows more scalability. MSD sending over the already opened voice channel means that no voice and data matching over the network is needed because it represents a P2P (point-to-point) connection. All the data exchanged together with the voice communication are thus totally transparent for the carrier and the telecom operator.

FSK encoder and decoder modules must be implemented on both the communication sides (IVS and PSAP) for data message exchange (e.g. MSD, ACK and EOS). The baud-rate of 300 baud/sec for data transmission over the voice on GSM network is very low, which means that MSD transmission could be completed in about 4 seconds. Here, the selection of this data transfer solution ensures that the eCall will obtain in addition the same priority and user features as using 112 for voice only.

The communication flow from the mobile network provider to the PSAP concerns more specifically a part of the whole emergency-call management chain. The communication flow could be summarised as follows:

1. The TELECOM operator enriches the incoming E-MERGE 112 call with the CLI (Caller Line Identification) and adds the mobile location (E112) into the Location Server Database. After the emergency call handling, the TELECOM Operator delivers the E-MERGE call to the appropriate PSAP via the fixed line network;
2. The PSAP receives two different type of communication via the fixed line network on a common channel: the first one is data communication delivered in GTP whilst the second one is a normal voice communication. The minimum set of data + CLI are delivered as transparent data together with the voice. At the same time the TELECOM Operator pushes the Mobile Location (E112) to the PSAP;
3. The PSAP transmits acknowledge of data received to the IVS and interprets GTP minimum set of data using a GTP interpreter.

According to the communication architecture adopted by the E-MERGE project, some important aspects involved in this part of the communication chain and be summarised and a technology independent analysis conducted. In the first stage, the entire mobile network provider has to route the call to the appropriate PSAP via fixed line networks and provide the CLI to the PSAP.

This solution, identified as the best one, could be implemented into the 2G GSM Network. The architecture is ensuring that data together with voice are delivered at the same PSAP and

that the voice connection link is always established, so that the TELECOM Operator can add Mobile Location to the communication with complete benefits from EC Regulation.

4.5. Result 5: Recommendations

The recommendations made are based on the findings of E-MERGE and are divided into three categories.

4.5.1. Technical recommendations based on test validation and test-site visits

The technical recommendations are related to the implementation of the E-MERGE architecture and needed infrastructure.

- Use ‘data in voice’ as a mechanism to transmit data from the IVS to the PSAP (MSD);
- Make use of the E-112 introduction and implementation as the additional effort to upgrade the PSAP facilities to the E-MERGE specifications is marginal in case E-112 is implemented;

4.5.2. Business Case recommendations based on the identification of Business Case Elements

The recommendations from the Business Case Elements are aimed at finding ways to achieve the potential benefits. The major benefits have been identified within 3 stakeholders: Public Authorities, Insurance Companies and Vehicle manufacturers where the major costs are with the PSAP’s and the individual drivers. To have a more even balance between costs and benefits the following recommendations have been suggested:

- Update the PSAP’s first, this will be the driver for the roll out of E-MERGE;
- Insurance companies and public authorities receive a great percentage of the benefits of E-MERGE, Inclusion of an E-MERGE solution as part of the required insurance will speed up the total roll-out; and

4.5.3. Implementation and general recommendations for the E-MERGE system

- The system has to prove its success at a large-scale deployment. It is recommended to start the implementation in 1 or 2 advanced Member States, e.g. Sweden and UK to learn from their experiences there in order to apply the solutions in different countries. The idea is that the technology has to be stable and proven before it can resolve political and organisational issues which given the complexity of the system and the large number of different stakeholders will occur;
- Start with the MSD only as a starting point to get a pan-European system up and running;
- Start a small implementation in one of the new Member States. This has high referential value for the eSafety programme and can be a highly visible example of the progress EU will bring to these countries. Given the experiences of the last two years these countries have many of the preconditions for a successful implementation:
 - A state-of -the -art mobile phone network;
 - High rates on traffic accidents;
 - Fast growing number of vehicles;
 - More rural areas; and
 - Limited existing PSAP organisation.

4.6. Realisation of prototypes

This chapter entails the description of the main features of the IVSs, developed inside the E-MERGE project. The features of the IVS have been defined in the work package 3.

The different systems developed followed the E-MERGE specifications but presented different features and followed different philosophies during the design and realisation phase. The development of the IVS goes from the hardware integration and software development to the Alfa test in laboratory and finally the integration of the system in the vehicle prototype.

The IVS development is mainly composed by:

- Hardware integration and software implementation;
- eCall flow sequence definition; and
- Message content implementation.

Hardware integration is where each party could act independently and the solution could be proprietary and designed accordingly to the car manufacturers specific style and philosophy. The aim was that the system would be dedicated to the emergency call only and not associated to future telematics application. The specifications are therefore more restrictive also from HW point of view. The engineering phase deals with:

- Automotive environment restriction;
- Crash proofness;
- Embedded SIM card;
- Redundancy on antenna and back up battery;
- Self-check capability;
- Hands free kit and microphone installation;
- Interface towards OEM network and special sensors in order to acquire needed information to compose the minimum and full set of data; and
- HMI and user friendliness.

The main challenge of the software development is the implementation of GTP, limitedly to eCall use case, besides the guarantee of the basis requirements for eCall functioning.

CRF, Volvo, Seat and Opel, have all developed and integrated an IVS prototype.



Figure 7 CRF



Figure 8 Volvo



Figure 9 SEAT



Figure 10 Opel

4.7. Demonstrated applications

In E-MERGE four different applications were tested through a large number of different tests in five different test sites across Europe

Application 1: In-Vehicle eCall

The eCall made from the IVS is composed by a voice call and a data over voice transmission. In the testing phase the data transmission was realised using SMS. The eCall was initiated automatically by the activation of dedicated sensors (airbag deployment, rollover,...) or manually by the user.

Once activated the IVS collects all the needed information to compose the e-call message and consequently:

1. Start a voice call with the PSAP: IVS system opens a voice call between the driver and the PSAP;
2. Send the eCall minimum set of data as data over voice to the PSAP;
3. Optionally send the eCall full set of data to the SP.

Application 2: Added eCall service provision

Only the minimum set of data is pushed to the PSAP through application 1. The IVS send the same information together e.g. with enriched vehicle data to the SP with whom the driver has a subscription. The SP adds static data and makes this available to be pulled by the PSAP.

Application 3: Language support

In the case that the PSAP operator does not speak the language of the driver involved in the accident it is possible for the PSAP operator, if the driver has subscribed to a SP, to set up a conference voice call between the vehicle occupant, an operator at the responsible SP, and itself. The SP toll free telephone number is included in the minimum set of data.

Application 4: Incident input visualised in Emergency vehicle

Inclusion of eCall data in route guidance systems in emergency vehicles improves the emergency response to the incident. The PSAP pass the MSD including location of the incident vehicle to the emergency vehicle that will use a route navigation system to route the

emergency vehicle to the scene of the incident and will update the emergency control room automatically upon arrival.

4.8. Overall technical and economical assessment

4.8.1. Technical evaluation of applications

In the validation plan, sets of top-level validation objectives were derived. During the validation, the fulfilment of these derived validation objectives was evaluated. The validation activities were thus based on procedures and test scenarios as identified in *Table 6*:

	$\alpha\beta\gamma$	Scenario
1.	α	IVS The in-vehicle system sending and receiving data, voice calls. Includes minimum and full set of E-MERGE data.
2.	α	Telecom The Telecom operator is responsible for forwarding: <ul style="list-style-type: none"> ▪ Voice call (112); ▪ Minimum set of E-MERGE data directly to PSAP using same voice channel; ▪ Full set of E-MERGE data to the SP.
3.	α	PSAP Displaying the minimum set of E-MERGE data and activates the rescue dispatcher. Pulling the full set of E-MERGE data from the SP specific E-MERGE databases.
4.	α	Dispatcher Receiving the minimum set of E-MERGE data and initiating the rescue response.
5.	α	SP Receiving the full set of E-MERGE data and responsible for the E-MERGE database.
6.	β	IVS – Telecom – SP Data connection to send and receive data and routing this to the SP who add information.
7.	β	IVS – Telecom – PSAP 112 voice connection. Routing available minimum set of E-MERGE data to PSAP. Visualizing the data.
8.	β	PSAP – SP SP makes available the full set of E-MERGE data in the SP specific E-MERGE database. The PSAP pulls the full set of E-MERGE data by using the SP identifier (IP address) given in the minimum set of E-MERGE data.
9.	β	Performing the whole chain Complete procedure from IVS to PSAP to SP including language support with one IVS and one SP from the same country.
10.	γ	E-MERGE complete chain. Different IVS are tested with one PSAP. Language support. PSAP calls the free number of the SP in order to check the language

		support availability.
11.	γ	E-MERGE call complete chain (local + foreign vehicle). Different IVS in real life conditions.

Table 6 Scenarios and test scenarios

The test phase was successfully completed with over 1400 α tests, 450 β tests and 300 γ tests performed as can be seen in the below table.

Application	Assessment Objective	Indicators	Number of Measurements (Sampling) or Number of Simulations	Overall Definition of Success	Measurement Plan	Result
E-MERGE system	Overall functionality	Successful integration	Lab tests: 1400 Field trials: 450 Real-life trials: 300	99% of field trials and lab tests work out	May 2003 - Feb 2004	→ far more than 1400 complete transactions have been carried out in the lab with simulators. During field trials, more than 750 complete transactions were run. ALL transactions were error free.
IVS-PSAP	Functionality	Number of successful transfers	Lab tests: 1400 Field trials: 450 Real-life trials: 300	>99%	May 2003 - Feb 2004	Same as above.
PSAP-SP	Functionality	Number of successful transfers	Lab tests: 1400 Field trials: 450 Real-life trials: 300	>99%	May 2003 - Feb 2004	Same as above

Table 7 Overview of the technical assessment

In the evaluation of the ‘E-MERGE test site reports’ the following findings were acknowledged and related to stakeholders:

Overall findings

- All the interfaces have been successfully implemented and are in compliance with the architecture;
- The human machine interface recommendations have been respected;
- The tests have been successfully conducted. The data sent matched the data received. The chain worked correctly, including the conference calls and the receipt of the MSD/FSD at the SP;
- E-MERGE has based itself on a neutral architecture for the existing present and future PSAP architecture

Findings for the PSAPs

- A positive feedback has been received from the PSAP operators regarding the handling of an emergency due to better information and faster availability of the

information. A faster PSAP handling is possible with E-MERGE in comparison to the use of 112 alone;

- That the use of the location reference from the E-MERGE vehicle to the emergency response vehicle provided a significant saving in response time whilst providing a precise location to the unit responding;
- Improve the timing aspects by benefiting of the E-112 infrastructure when E-MERGE is implemented;
- Due to the use of E-MERGE a lower risk of human error is obtained in transfer of data to the Emergency operators.

Findings for the Telecom Operator

Merging of voice and data on the 112 Emergency call lines

- The biggest challenge was to merge voice and data on the 112 Emergency call lines. The MSD can be sent to the PSAP and be decoded without large technical development of today but there is a problem when it comes to pinpoint the operator and the operator's desk that is handling the eCall from the vehicle. 112 calls are routed from 1st stage PSAP to 2nd stage PSAP if there is a capacity problem. This makes "data in the voice channel" a strong alternative to overcome this problem.

Timing using SMS a problem - ECall 'IVS to PSAP': within 1 network provider 2 sec to 4 min and 5 sec to 1 hour between providers.

- Timing issues are very dependent on the current traffic in the GSM network. Delayed messages are very common. Within the same network, provider message times vary from approx 2 sec to 4 minutes on the eCall chain from IVS to PSAP. Between network providers message times vary from 5 sec to 1 hour regarding the same scenario IVS to PSAP. IVS to PSAP is the most time critical piece on the eCall chain and therefore a limiting factor for E-MERGE message times.

Problems occurred during the use of some SIM cards

- Problems were experienced when using SIM cards. This issue resolved around the provision of the SIM and by the telecom operator, but was outside of the control of the project;
- The prepaid SIM did not work in a foreign country, as roaming was not a functionality included in the specific prepaid card. Therefore, roaming problems were encountered when using SMS.

4.8.2. Economical evaluation of applications

The business case elements is investigated through a cost/benefit analysis taking the starting point from the basic assumptions made in various studies in e.g. Germany, Netherlands and the UK. The results of the studies range from 2-7% reduction in the fatality numbers and 10-15% on the severe injuries. Introducing E-MERGE in all vehicles at a pan-European scale this will bring a saving of 3-5 B€ on a yearly basis.

The cost and benefits for the various stakeholders has been summarised below:

<i>Stakeholder</i>	<i>C/B</i>	<i>Text</i>	<i>Explanation</i>
Vehicle maker	B	Adding additional value to the car and providing competitive edge for OEM-related insurance company	Car makers have declared that the IVS based on a cost price of 80 to 100 Euro will add 4-600 Euro to the price of the car, based on a 100% coverage and 15 Mln cars sold every year. E-MERGE will add: 6-9 BLN EURO to the market
		Better image on safety	Although a long term process safety is a value people are willing to pay a premium for, quantification is limited and effects are only measurable after several years
		Standardized Platform for additional services	Many suppliers are working on standardizing the platforms and aiming for the cost benefits as seen in the mobile handset and pc market. The major challenge is to define the interface with the in-vehicle safety system
		Experience with after crash care and services	Using an after crash care and service database is a valuable way to keep track of your customers. As most customers are not customer of the OEM but of a local dealer centralized insight in customer behaviour is of the most importance to the car manufacturers. Difficult to implement because of the impact on the complete chain of manufacturers, distributors, dealers etc
	C	Installing IVS (dedicated box or software-stack)	Adding additional electronics to the car is a process that has been going on for the last couple of years within the vehicle OEMs. Despite the advantages for production costs and flexibility of functionality the deployment of electronics has proven to be a difficult one, directly affecting the quality perception of the customers.
		Training the maintenance and sales organization	Adding new electronics means that the complete service chain needs to be trained. Documentation has to be added and the separate organization has to be in place.
		Back-office organization to take benefit from E-Merge database	Taking full benefit from the E-MERGE data means that you have to have a system in place, which is capable of dealing with this information. In the trucking industry these kind of fleet management system already exist but for passenger cars not all OEMs have already implemented a solution.

Member States	B	Less payment on state medical costs	One of the largest possible benefits, and of the aspects heavily influenced by the better response times E-MERGE delivers. Whereas there is an ethical dilemma, it is a fact that a fatality cost less in medical costs than a severely wounded. This applies to 14% of total costs of traffic accidents, which means around 20-30 BLN Euro and E-MERGE benefits around 1 BLN Euro
		Less costs on social benefits for survivors	This benefit is by far the largest single benefit and consists of productivity loss, and also loss of taxes and payments from social security institutions. In the UK case this adds up to 60% of total costs of traffic accidents. Which should mean for Europe more than 100 BLN Euro.
		Less congestion caused by traffic accidents, because rescue operations are more effective	An aspect that will grow in importance over time as mobility and congestion become more and more national issues, see implementation of congesting tax in UK and especially affects the people who are not directly involved in the accidents. According to Mr. P.Wesseman (SWOV-D-200-17) this accounts in 1997 for 120 MEuro damage in The Netherlands alone. Extrapolating for the entire EU this means approx. 3.4 BLN Euro (Data from CARE: Netherlands has 3.5% of all traffic accidents in Europe)
		Build experience in eSafety as a base for “pay as you use” taxation in the member states.	We have identified limited costs for the public authorities. It almost seems like they are a free user of the system, given the effects for the general public a more pro-active role might be more appropriate.
	C	Communication to the general public	New legislation and broadly implemented systems need centralized communication to the end-user. Public authorities need to communicate to their population what the goal and objective of such a system can be (same role as communication around wearing seat belts or alcohol and driving)

PSAPs	B	Better use of available workforce	With the information available call centre agents can perform their work better in the way that they can not only could provide a better emergency response but also that they will faster be capable of handling the good Samaritan calls, however the real implementation of the improvements will take time, headcount reduction is not something that can be achieved over night.
		Lower communication costs	By formalizing the data streams less time will be consumed on telephone calls to collect the complete picture
		Higher service levels	Given the time gained the same PSAP will be able to cover a larger area with the same reaction speed or serve the same area in a better way.
	C	Equipping their dispatching centre with equipment that can deal with E-Merge Messages	Based on the E-112 guidelines most PSAP centres will undergo some changes the upcoming period, E-MERGE will not need much more investments. Taking E-MERGE into account during the implementation of E-112 will save money and effort
		Training staff	Training staff is difficult to quantify, again integration with E-112 will save money and effort, on average a day of training will cost between 300 and 1000 Euro per seat, excluding the missed working hours.
RESCUE Operators	B	Better use of available workforce	
		Lower communication costs, less coordination by phone because of better information	
		Better quality of services	
	C	Equipment, adjusting their call centre for receiving and handling E-Merge information	
		Training staff	
Mobile telecom Operators	B	Increased penetration of mobile phone subscriptions	Similar to the situation after 9-11 in the US as mobile phones are linked to personal safety penetration rates will go up, analyst foresee a (theoretical) 100% penetration occur around 2007-8, E-MERGE can play a stimulating role in this process.
		Increased SMS-traffic for SP link	Given the new system a lot of voice-traffic will be replaced by SMS, as the costs for both kinds of traffic need to be covered by the operator, the low cost SMS option is more attractive than using the limited bandwidth of the voice-network.

		SIM-Card management on behalf of Car manufacturers	Mobile telephone operators are moving towards more added value services. This is a slow and difficult process and implementing E-MERGE will create the possibility for the operators to work more closely together with the Vehicle manufacturers.
	C	Adjusting the network to be able to transport the E-MERGE messages if this is not already the case	Depending on additional work compared to E-112
Private service providers & Automobile clubs	B	Increased service for their members	Following your members through Europe and provide local language support everywhere can add value to the existing service portfolio of this stakeholder. For a complete telematics package people are willing to pay up to € 5-10 per month, unclear still what the WTP for only E-MERGE will be.
		More effective use of existing infrastructure and manpower	Additional telematics services could be initiated that would make more use of the infrastructure and manpower.
		Better partnerships with European partners, synchronizing of member data;	The existing partnerships in this market, e.g. RACC will benefit from the centralized E-MERGE database. Synchronizing existing databases however has proven to be difficult because of differences in usages and definition of the data.
	C	Investments in adjusting their call-centres	Similar to the PSAP's and the emergency Agency also this stakeholder has to adjust his call centre to be able to work with the E-MERGE messages in an effective way, costs are similar but legacy situation tends to be better than in the PSAP and Emergency Agencies area.
		Investment in back-office systems Training of staff	
Insurance	B	Less payments for: - physical damage to drivers and passengers; - inability to work and related insurances/Human costs;	Insurance companies have a considerable interest in lowering the payments for traffic accidents victims
		Better risk profiling based on the data from the E-MERGE database;	Pay as you go functionality has been tested for several insurance companies, although with a positive business case, implementation still has too much impact on the business model
		Less administrative costs;	5-10% reduction on administrative costs
		Possibility to differentiate by providing E-MERGE infrastructure to clients;	
		Additional services	Anti-theft systems more and more a requirement in the premium segment

	C	Implementing a back-office capable of dealing with E-MERGE input	Most companies have similar systems, adjusting to fit E-MERGE requires additional research
Equipment manufactures	B	New market for all vehicles in the European market	Based on a 100% penetration this is a 170 Mln Vehicle market, split in Factory fitted (15 Mln a year) and retro-fit which accounts for the rest of the market. Given a cost price of 80 to 100 Euro this means a 17 BLN Market.
		Relatively high margin when delivered through governmental or insurance companies channels;	When delivering directly to the end-customer through public authorities or insurance companies the equipment manufacturers will be able to sell for higher prices making use of lower volumes and local differences. Next to that the margins for state of the art technology is better than on common goods
		Possibility to speed up replacement of older equipment, similar to other technologies in the mobile and automotive market;	When E-MERGE will be an additional feature of other build-in solutions this new technology will speed up the replacement of older equipment. In the PC market Intel is using this model successfully to stimulate sales of their new chipsets
Drivers	B	Lower costs for non insurance covered costs caused by a traffic accident and related costs	Even the best insurance leaves costs uncovered which have to be carried by the individual driver having an accident. With lowering the severity of the injuries E-MERGE will also lower the not covered costs and of course the costs for loss of quality of life. According to NHTSA figures this accounts for 24% of all traffic accidents related costs. Also a great part of the immaterial costs has to be carried by the individual driver. 25% of total costs € 40-45BLN min. 5% reduction
		Lower insurance costs.	The better risk profiling and the lower amount paid on claims will eventually lower the insurance rates for the individual drivers. It also creates possibilities for more competition as additional functionality can be enabled by E-MERGE technology. Max. 5-10% saving is approx. € 50-100 per year per vehicle
		Possible Vehicle tracking when combined with anti-theft system	Advanced anti-theft systems have proven their benefit already. E-MERGE has the potential to implement such a service based on the location data of the vehicle
		Better after accident management by SP and insurance companies	

	C	Buying and installing the IVS;	With a cost price of 80 to 100 Euro and a perceived value by the vehicle manufacturer of 4-600 Euro these costs have to be covered by the individual driver/owner of the vehicle.
		Subscription fee for Telecom operator	A subscription is needed to be able to communicate with the vehicle and the PSAP. A minimum charge currently for additional Sim-cards is between 20 and 30 Euro one time costs.

Table 8 Costs and Benefits per stakeholder

4.8.3. Fulfilment of project objectives

The E-MERGE objectives and their fulfilments are shown in *Table 9*:

Project objectives	Fulfilment
<u>Securing higher quality of life and health</u> for European citizens by securing that the vehicle Emergency call service works across Europe and not only in the country of your selected service provider.	The E-MERGE service is pan-European demonstrated and can be rolled out within Europe. By having timely and high quality information the Emergency services (PSAP) are better informed and response time lowered. Based on the ‘golden hour’ principle the casualties are reduced, so the quality of life and health increases.
<u>Supporting existing European policy objectives with technological development</u> since the projects core is the technical development of a common in-vehicle and central system for handling eCall's when travelling across Europe and thus securing that Emergency call services is available for everybody, anywhere and at any time.	The development of a common interface ensures an interoperable service. Via the validation tests the technological development of the IVS's and the central systems SP and PSAP are demonstrated.
<u>Enhancing the user-friendliness of the information society</u> by extending availability of eCall services in the European countries;	By having a standard interface and common minimum requirements all citizens and countries will be ensured a common service.
<u>Creating European added value</u> for the vehicle manufacturers, SP's and PSAP's by the establishment of a common European vehicle Emergency call application that opens the way for offering not only Emergency call services but also additional services like route information, interactivity with the driver e.g. simultaneous monitoring, high speed warnings.	Added value to the SP's, PSAP's and vehicle manufacturers is realised because E-MERGE is the driver for offering telematic services by vehicle manufacturers. SP's are able to extend their service offerings. PSAP's are able to interact better and faster with the driver in emergency situations.
<u>Besides this the project aims to:</u> Support existing European Policy on Casualty Reduction by enabling the Emergency services to reach the scene of the incident by the most efficient route and to utilize the “Golden Hour” principle in achieving a reduction in the severity of casualties.	By being pushed high quality information fast and in an reliable way the Emergency services (PSAP) are better informed and have a shorter response time to the accident scene. So a reduction of casualties can be realised. 5% decrease of fatalities and 10% decrease of severely injured has been validated to be feasible.

Table 9 E-MERGE objectives and fulfilments

In *Table 10* the objectives and the impacts to be dealt with in the E-MERGE project and their fulfilment are shown.

Assessment objective		Impact	Fulfilment
Technical	Correct transmission /reception of data	Reduction of medical costs Reduction of rescue costs	As shown by the validation tests the correct transmission and reception of data by IVS, PSAP and SP is demonstrated. So the E-MERGE interfaces have been working correctly.
	Correct interfacing among SP/PSAP and among Telco and PSAP	Reduction of rescue costs	The response times of the interfaces are too long, because of the transmission mechanism, which is used for the tests. It is advised to use 'data over voice' as the transfer mechanism for the MSD and FSD.
	Correct access and management of SP DB	Reduction of rescue costs	
	Response times of the different chains	Reduction of medical costs Reduction of rescue costs	Thanks to the 'golden hour' principle the number of casualties can be reduced, so the medical and the rescue costs are reduced .
	Roaming (cars driving around Europe)	Pan European coverage, better safety	By implementing E-MERGE a better safety is going to be realised.
	Correct management of false call	Reduction of rescue costs	The extra data of E-MERGE will not reduce this problem, having all location data available makes it easier to take action afterwards
Impact	Time savings of rescue (saving lives via a more qualified response)	Reduction of medical costs Reduction of rescue costs	By implementing E-MERGE the number of casualties can be reduced, so the medical and the rescue costs are reduced. Reduction of 5% of 25% of total cost of traffic accidents is 5% of 45 BLN euro = approx. 2.25 BLN Euro.
	More effective management of road network-less traffic jams	Reduction of rescue response times More effective management of road network-less traffic jams	E-MERGE will definitely help because of the more effective coordination of the rescue operation. Also in cases with only material damage the fact that the E-MERGE system is activated improves the response times.
	Business opportunities	Business opportunities for service providers and indirectly vehicle manufacturers	Added value to the SP's, PSAP's and vehicle manufacturers is realised because E-MERGE is the driver for offering telematic services by vehicle manufacturers. SP's are able to extend their service offerings. PSAP's are able to interact better and faster with the driver in emergency situations.
Social economic	Cost savings due to earlier rescue	Reduction of medical costs Reduction of rescue costs	Thanks to the 'golden hour' principle by implementing E-MERGE the number of casualties can be reduced, so the medical and the rescue costs are reduced. Medical costs reduction is around 2.25 BLN Euro, Rescue costs reduction is 10% of 1.8 BLN Euro = 180 Mln Euro.

Table 10 E-MERGE objectives, impacts and their fulfilment

4.9. Liaison and dissemination

During the whole project period all consortium members have been actively disseminating the findings and interacted with other projects or organisations. E-MERGE, as a result of this, has been presented in a number of events and conferences. Papers and articles have been published in a number of magazines and proceedings and each E-MERGE partner has presented the E-MERGE project at various local events and carried out liaisons with related national and European projects.

During the project liaison was established with ETSI through several meetings, where the in-vehicle eCall was discussed and the possible solutions for using the ETSI E112 specifications in E-MERGE. Discussion on the ETSI progress with E112 and how E-MERGE could make use of the specifications from ETSI were also discussed which led to finding alternative solutions for E-MERGE testing. Furthermore, co-operation between E-MERGE and GAUSS (Galileo And UMTS Synergetic System), MESA (Mobile Broadband for Emergency and Safety Applications) The telematic forum, OCG-EMTEL (Operational Co-ordination Group on Emergency Telecommunications) were established with the aim to share technical knowledge. E-MERGE has furthermore participated in information and networking meetings with multiple organisations and companies during the project. Another important liaison method during the project has been the E-MERGE Forum where the project partners has co-operated with key companies within the sectors related to E-MERGE. The members of the E-MERGE Forum were at the end of the project 185, which shows a great interest in the project from the involved sectors.

4.9.1. Articles produced, workshops prepared and conference attended:

The main articles produced, workshops prepared and conference attended are listed in below:

<i>Date</i>	<i>Event/ presentation title</i>	<i>Description/outcome (web link to document when available)</i>
8 April	Telematics Forum GTP meeting	~ 20 Persons. Presentation of E-MERGE and establishment of liaison.
9 April 2002	Kick-off meeting	The meeting gave participants a chance to meet and discuss work package aims and prepare for the projects' upcoming actions.
17 April	MOST meeting	~ 20 Persons. Presentation of E-MERGE and establishment of liaison.
28 May 2002	Local Italian Workshop	Information and networking meetings: <ul style="list-style-type: none"> ▪ Milan public transport operator ATM ▪ Milan municipal police ▪ Italian GSM operator TIM
4-6 June 2002	"Surface Transport Technologies for Sustainable Development", Valencia	~ 500 persons. Presentation of E-MERGE via two posters at a dedicated poster display area. E-MERGE PPT presentations running at the ERTICO stand together with display of another two posters and distribution of leaflets to participants.
25 June 2002	E-MERGE Workshop	~ 50 persons. User needs workshop for Forum members
26 June 2002	Liaison meeting	Several E-MERGE partners participated in CGALIES plenary meeting and liaison has been established

<i>Date</i>	<i>Event/ presentation title</i>	<i>Description/outcome (web link to document when available)</i>
1-5 July 2002	AIT&FIA Barcelona	Car accident simulation was organised by RACC in the F1 circuit de Catalunya presenting the advantages of E-MERGE. Participation from fire brigade, medical emergency and rescue helicopters. E-MERGE presentation at the conference.
2 July 2002	SERMIC	Updates to the UK Police South East Region Motorway Inspectors conference (SERMIC). 20 delegates from the South East of England.
9 July 2002	SERTO	Presentation to the UK Police South East Region Senior Traffic Officers conference (SERTO) which 25 delegates from regional force responsible for policy with the regions strategic road network attended. E-MERGE will have a significant impact on policing operations due to the extensive road network, which is in effect featureless, and the high proportion of foreign drivers using the channel ports.
15 July 2002	UK Government meeting	Provided a response to a Government Report on Police Vehicle crashes and the impact that E-MERGE could have. There were 10 delegates at this meeting of key opinion formers within Sussex Police, both operational and fiscal.
25 July 2002	ITS UK Enforcement interest Group (EiG)	An update was given on the progress of E-MERGE to the ITS UK Enforcement interest Group (EiG). 27 members of this group including many service providers and equipment manufacturers from the UK attended the presentation.
3 September 2002	TRIMEX	Presentation of E-MERGE to the European commercial wide truck emergency call centre.
16-18 September 2002	e-Safety Congress Lyon	Presentation of E-MERGE to an audience of about 50. E-MERGE newsletters and leaflets distributed at the ERTICO stand.
16-18 September 2002	e-Safety Congress Lyon	E-MERGE mentioned in a presentation by Mizar about "Exploiting the golden hour".
17 September 2002	ETSI	E-MERGE and car manufacturer requirements presented at the ETSI conference in Sophia – Antipolis, France.
18 September 2002	ACPO Road Policing Business Area Operation Forum	Presentation on E-MERGE to the ACPO Road Policing Business Area Operation Forum. This is the major forum for UK Roads Policing with 35 delegates from the United Kingdom. Following the presentation the Chairperson has required a further presentation in January 2003.
24 September 2002	Driver Vehicle Licensing Agency (DVLA)	Presentation for the Driver Vehicle Licensing Agency (DVLA). Managers were briefed on E-MERGE.
September 2002	Automotive News Conference, Germany	Presentation of E-MERGE.
July – September 2002	PAG	Information about the development of the E-MERGE project provided to Representatives of the PAG (Premier Automotive group, Telematics)
July – September 2002	Security Fair in Stockholm	Information about the project on security fair in Stockholm.
July – September 2002	Fiat Auto	Workshop organised to present E-MERGE activities.

<i>Date</i>	<i>Event/ presentation title</i>	<i>Description/outcome (web link to document when available)</i>
July – September 2002	VW	Distribution of E-MERGE technical information internally in the VW Group.
July – September 2002	Liaisons	Meetings have been held with: <ul style="list-style-type: none"> - GAUSS (Galileo And UMTS Synergetic System), - MESA (Mobile Broadband for Emergency and Safety Applications), - The telematic forum GTP (Global Telematics Protocol), - OCG-EMTEL (Operational Co-ordination Group on Emergency Telecommunications)
8 October 2002	ERTICO vehicle eCall strategy group	Presentation planned for the newly established ERTICO vehicle eCall strategy group.
11 October	ZVEI meeting Frankfurt	Presentation of E-MERGE
15 October 2002	9th World Congress on ITS	Presentation given to approximately 50 participants at the special session 13 entitled “Emergency calls, to cross check experiences between the USA 911 and the European 112”. Furthermore, brochures and leaflets distributed from the ERTICO stand.
5 November 2002	ZVEI meeting Berlin	Presentation of E-MERGE
5 November 2002	IST 2002	Presentation given to approximately 150 participants at IST 2002 in Copenhagen.
26 November 2002	Telefonica Moviles	Presentation of the E-MERGE concept to Telefonica Moviles
18 December	112 service in Catalunya	Presentation of the E-MERGE concept to: 112 service in Catalunya
December	112 service in Madrid	Distribution of E-MERGE concept presentation to 112 service in Madrid
October – December 2002	German Ministry of Traffic	Presentation given about E-MERGE to representatives from the German Ministry of Traffic.
October – December 2002	TEGARON	Presentation given about E-MERGE to representatives from TEGARON.
October – December 2002	BOSCH Communication	Presentation given about E-MERGE to representatives from BOSCH Communication
October – December 2002	Czech Republic	Presentation of E-MERGE to the Ministry of Transport in the Czech Republic
October – December 2002	Country Hesse	Presentation of E-MERGE for the Ministry of economy and transport of country Hesse, Germany.
October – December 2002	UK 112/999 Liaison Committee	Presentation given about E-MERGE developments – resulted in a more detailed analysis of Fire Service information requirements
October – December 2002	EAEC 2003 Congress	Preparation of an abstract in order to present E-MERGE at the congress in Paris.
October – December 2002	Chief Officers of Police for England, Wales and Northern Ireland	E-MERGE presentation given. Present was also John Denham MP Minister of State for the Home Office.

<i>Date</i>	<i>Event/ presentation title</i>	<i>Description/outcome (web link to document when available)</i>
October – December 2002	Wireless Car	Presentation given to Wireless Car in Göteborg Sweden.
9 January 2003	Mondial	Presentation of E-MERGE to representatives from Mondial group
9 January 2003	TISPOL	Presentation of E-MERGE to 8 senior police officers from 8 Member States
15 January 2003	Association of British Insurers	Presentation of E-MERGE to 30 members from motor insurers
17 January 2003	ARTIST	Participated and discussed E-MERGE at the Italian Telematic Architecture on Transport System
23 January 2003	POLIS meeting	Presentation of E-MERGE to about 30 cities
February 2003	PAG (Premier Automotive Group) centre of excellence	The “work in progress” of E-MERGE has been spread to the PAG (Premier Automotive Group) Centre of Excellence in Gothenburg
20 February 2003	e-Safety WG on eCall	E-MERGE strongly represented in meetings in the working group
7 March 2003	WERD	Presentation of E-MERGE to Western European Road Directors
11 March 2003	VW UK	Presentation to senior managers in charge of customer services
13 March 2003	UK Vehicle inspectorate	Presentation and discussion of how to avoid false in-vehicle eCalls
March 2003	ITS Congress in Prague	E-MERGE presentation given by two partners
27 March 2003	Dedicated validation meeting	Agreement on the structure of the validation work within E-MERGE
January – March 2003	1-1-2 services in Madrid.	Presentation of E-MERGE project
January – March 2003	1-1-2 services in Spain	Support given to 1-1-2 Catalunya for their presentation given on the E-MERGE project to all 112 services in Spain
January – March 2003	Volvo Car España, S.A.	Presentation of E-MERGE project
January – March 2003	Czech Republic	Presentation of E-MERGE to the Ministry of Transport of the Czech Republic
January – March 2003	Country Hesse	Presentation of E-MERGE to the Ministry of Interior
January – March 2003	PSAP, Offenbach	Presentation of E-MERGE
January – March 2003	Society of Automobile manufactures in UK	Presentation of E-MERGE
January – March 2003	SIGNANT	Presentation of E-MERGE
1 April 2003	E-MERGE / GTP meeting	Agreement on the use of GTP and discussion on open questions in relation to the use.
16 April 2003	E-MERGE / ETSI meeting	Discussion on the ETSI progress with E112 and how E-MERGE could make use of the specifications from ETSI. Finding alternative solutions together with ETSI for E-MERGE testing.
April 2003	Metropolitan Police	Presentation to the Metropolitan Police to ensure that their new communication protocol will be Emerge compliant. This was a strategic level meeting to senior Police officers in the service who are key opinion formers. Number addressed 3

<i>Date</i>	<i>Event/ presentation title</i>	<i>Description/outcome (web link to document when available)</i>
April 2003	Chief and Assistant Chief Fire Officers Assembly	Presentation to the Chief and Assistant Chief Fire Officers Assembly (CACFOA) this was a meeting of senior Brigade officers from throughout the UK in the implications of Emerge. Numbers address 25
7 May 2003	E-MERGE / ETSI meeting	Discussion with 12 ETSI representatives about the in-vehicle eCall and the possible solutions for piggyback riding on ETSI specifications. Identification of at least one solution that could be used before the adoption of E112.
May 2003	999 committee	Presentation/update to the 999 committee, very relevant as the CGALIES recommendations were discussed in detail with the PSAP telecom operators and Government hosted by ODPM.
May 2003	ACPO Road Police Operations Forum	Association of Chief Police Officers for England Wales and Northern Ireland Road Policing Operations Forum. Full presentation given to the key decision makers in the Police Service for road Policing in the UK. Number addressed 40
May 2003	Greater Manchester Police	One of the largest forces in the UK covering major conurbations in the heart of England, presentation on the implications Emerge has to urban road policing. Number addressed 60.
16-18 June	9th EAEC Congress	Preparation and presentation of the paper " <i>E-MERGE: PAN-European harmonisation of vehicle emergency call service chain</i> " for the 9 th EAEC Congress
26 June 2003	E-MERGE workshop	About 20 key stakeholders participated in the 2 nd E-MERGE workshop where the architecture and the specification document were discussed.
April – June 2003	Telefonica Móviles	Presentation of E-MERGE project progress to Telefonica Móviles in Madrid.
April – June 2003	Vodafone	Presentation of E-MERGE project to Vodafone.
April – June 2003	2nd Technical Symposium on Intelligent Vehicles	Presentation of E-MERGE project in the 2 nd Technical Symposium on Intelligent Vehicles, organised by STA (association of automotive technicians) within the International Motorshow held in Barcelona.
April – June 2003	AIT-FIA Conference Week	Distribution of the 1 st E-MERGE Newsletter to Automobile Clubs during the AIT-FIA Conference Week held in Marseille.
April – June 2003	Volkswagen Group	Proposal for the presentation of SEAT prototype at ITS Congress in Madrid internal presentations for Volkswagen Group.
April – June 2003	E-Plus, Vodafone, O2	Presentation of E-MERGE to three major German Telecom operators.
April – June 2003	Ministry of interior of the country Hesse	Presentation of E-MERGE to the Ministry of Interior of the country Hesse including the PSAP organisation fire brigade and the PSAP organisation police
April – June 2003	112 Dietzenbach	Presentation of E-MERGE to the PSAP 112 in Dietzenbach
April – June 2003	SAFETUNNEL	Description of E-MERGE project and architecture to SAFETUNNEL project manager; some synergies amongst the 2 projects can rise.
July 2003	Motor Industry Research Agency MIRA Nuneaton	Presentation about E-MERGE given

<i>Date</i>	<i>Event/ presentation title</i>	<i>Description/outcome (web link to document when available)</i>
August 2003		Briefing about E-MERGE to Lord Peter Imbert who is a member of the House of Lords, which is the Upper Chamber of the UK Government.
27 August 2003	ETSI meeting	Presentation of E-MERGE to ETSI
September 2003	Institute of Accident Traffic Investigators	Presentation about E-MERGE given
08 October 2003	E-MERGE demo Germany	Live demonstration of E-MERGE to emergency authorities and public officials. Presence of TV, radio and written press.
24 October 2003	ETSI conference	Presentation of E-MERGE at ITS conference at ETSI – About 75 people attended.
26 October 2003	E-MERGE demo Italy	Demonstration of E-MERGE to public officials and emergency authorities. Presence of written press.
12 November 2003	ANWB on eCall	Presentation of E-MERGE to ANWB
15-20 November 2003	ITS World Congress Madrid	Two E-MERGE presentations. Own stand with live demonstrations from two vehicles, PSAP receipt of MSD (simulated for Spain) and two service providers (Spain, NL) for FSD. Three videos running, leaflets, brochures etc.
01 December 2003	First 112 Conference Brussels	E-MERGE presentation. About 150 persons attended.
01-12 December 2003	COP9 Milan	E-MERGE presented at the City of Milan stand
5 December 2003	URBANIA, ITALY	Presentation of E-MERGE. About 35 persons attended.
23-26 December 2003	1st National Road Safety Congress, Verona	Presentation of E-MERGE.
	VTEC Spring, Milan	Presentation of E-MERGE

Table 11 E-MERGE workshops, conferences and meetings

All the main E-MERGE publications are listed in *Table 12*.

<i>Date</i>	<i>Type</i>	<i>Title / journal of publication</i> <i>Web link to document when available</i>
April 2002	Article	E-MERGE article in ERTICO News
24 May 2002	Website	Initialisation of project website www.E-MERGE.org
May /	Website	E-MERGE been added on CRFiat website: www.crfprojecteu.org
May 2002	Information leaflets	Information about the project has been sent out through a network of organisations called Telematics Valley, Gothenburg Sweden
May 2002	Article & Information leaflets	Distribution of E-MERGE article and information leaflets to all SEAT suppliers
April – June 2002	Article	SOS Alarm customer magazine
April – June 2002	Article on web	http://www.motormagasinet.net/nyheter/middle.htm?artid=58187&ramme=1 (web motor paper)
April – June 2002	Article on web	http://www.securityhotel.com (Security web page)

April – June 2002	Article	Article in Swedish newspaper http://www.norran.se/sektion_c.php?id=130455&avdelning_1=102&avdelning_2=102
September 2002	Email newsletter	E-MERGE project presented in the transportation Communications Newsletter.
July 2002	Newsletter	E-MERGE newsletter sent out to about 2000 stakeholders.
July – August 2002	Article in its@ertico	E-MERGE article in its@ertico distributed to about 800 organisations
July – September 2002	Articles	Article in Swedish magazines: Mälardalens-Bergslagens affärer (a regional business paper) Detektor (a security paper) Svensk Åkeritidning/Lastbilen (a truck and cargo paper) Skydd och Säkerhet (a security paper) Proffs (a paper for professionals on the roads) Motor Magasinet (a motor magazine)
October – December 2002	Interview	Interviewed by journalist from the “Fleet Owners Magazine” who has published an article about E-MERGE.
October – December 2002	Radio	Swedish Radio 4 interview concerning E-MERGE - with up to 500000 listeners.
October – December 2002	Article	Article prepared for its@ertico January issue
October – December 2002	Article	Article prepared for ITS International
January 2003	Article	Article published in the January issue of its@ERTICO and distributed to about 1000 ITS officials
September 2003	Newsletter	Issued and distributed 2 nd E-MERGE Newsletter
November 2003	VIDEO	General video about E-MERGE produced in English produced by ACPO
November 2003	VIDEO	Car related video about E-MERGE produced by SEAT
November 2003	VIDEO	Video about E-MERGE produced in German reflecting the German test site produced by Telmacon
November 2003	leaflet	Two page colour leaflet about the E-MERGE tests in UK
November 2003	leaflet	Two page colour leaflet about the E-MERGE tests in Italy
November 2003	leaflet	Two page colour leaflet about the E-MERGE tests in Spain
November 2003	leaflet	Two page colour leaflet about the E-MERGE tests in Germany
November 2003	leaflet	Two page colour leaflet about the E-MERGE tests in Sweden
November 2003	leaflet	Two page colour leaflet about the E-MERGE tests in NL
December 2003 – January 2004	Article	AIT&FIA magazine « Mobility »
December 2003 – January 2004	Short article in ITS@ERTICO	Reporting from Madrid
December 2003	Article	Article about E-MERGE in the New Scientist
December 2003 – February 2004	Radio	Radio interview about E-MERGE to Autoroute info (France)
December 2003 – February 2004	TV	TV spot about E-MERGE to TF 1 (France)
December 2003 – February 2004	TV	TV spot about E-MERGE to Cannes TV (France)
December 2003 – February 2004	TV	TV spot about E-MERGE to TF 1 (France)
December 2003 – February 2004	Radio	Radio interview about E-MERGE to Europe 1 (France)
December 2003 – February 2004	Radio	Radio interview about E-MERGE to BBC News (UK)

December 2003 – February 2004	TV	TV interview about E-MERGE to RTL TV (Belgium)
December 2003 – February 2004	TV	TV interview and spot about E-MERGE to Canal + (Europe & Spain)
December 2003 – February 2004	Article	Article in het belang van Limburg
December 2003 – February 2004	Article	Article in Cordis News
December 2003 – February 2004	Article	Article in Daily News
December 2003 – February 2004	Article	Article in Forskning & Fremsteg, Swedish science magazine.
December 2003 – February 2004	Article	Article in Maxwell (Delft University magazine)
December 2003 – February 2004	Article	Article by Colaborador Grupo Correo (Spain)
April 2004	Article	Article in Geinformatics
March 2004	Article	Article about E-MERGE in journalisti (Finland)
May 2004	Radio	Spot on radio 538 (Netherlands)
May 2004	Article	Article in de Telegraaf (Netherlands)

Table 12 E-MERGE Publications

4.10. Deliverables

In *Table 13* all deliverables produced and delivered by the project are listed (the interim reports are not included). All publicly available deliverables are downloadable on the following website: <http://www.E-MERGE.org/en/library/>

Deliverable number and title		Dissemination level
D1.1	Quality plan	Confidential, only for members of the consortium
This document describes the overall organisation of the E-MERGE project as well as the different means used by E-MERGE to produce high quality outputs meeting EC requirements.		
D1.2	Final report	Public
The present report.		
D2.1 and D2.2	General consumer needs and State of the Art	Public
This document identifies and describes the general consumer needs related to vehicle accident related emergency services by major European countries. It also provides a detailed overview on the country specific rescue chain partners, its capability and competencies, the interrelationship between the different stakeholders along the rescue chain and the related requirements.		
D3.0	Specification of the European in-vehicle emergency call	Public
This document "Specification of the European in-vehicle emergency call" describes all processes, minimum requirements, data and their transmission, protocols for all involved parties within an in-vehicle emergency call. This document is the basis for all further activities in the project E-MERGE and shows a recommendation for a European wide realisation bearing in mind the existing present available technology, laws and regulations. In the technical annex of this deliverable are included D3.1, D3.2, D3.3 and D3.4.		
D4.0	The E-MERGE developed system	Public
This document contains a description of the overall E-MERGE developed system in terms of: IVS, PSAP system and SP system including the communication protocol and coding. The deliverable thus includes all elements D4.1, D4.2 and D4.3 mentioned in the technical annex		
D5.1	Test site details and plans for field trials	Confidential, only for members of the consortium
The present report presents a general overview on what the E-MERGE project has specified for the vehicle originated emergency call management chain. It describes the intention for the testings, analyses the test sites involved in the project in terms of architectures and tests to be performed. Finally, this report describes also the plan for the trials which will guide the various phases of the project.		

<i>Deliverable number and title</i>		<i>Dissemination level</i>
D5.2	Performed trials and results	Public
The present report presents the activities of each test site as described within the D5.1 deliverable, with a description of the results of the activities performed. This report entails input for the evaluation activities planned in WP6.		
D6.1	E-MERGE validation plan	Restricted to other program participants
This document contains the validation plan and schedule to be used in the validation process for the project E-MERGE.		
D6.2	E-MERGE Test scenarios and procedures	Restricted to other programme participants
This document contains the test procedures to be used in the validation process.		
D6.3	E-MERGE Compiled evaluation results	Public
This document contains the validation results of the E-MERGE activities, and related business case elements for the deployment of eCall in Europe E-MERGE.		
D7.1	Project Fact Sheet	Public
This document gives an overall description of the E-MERGE project including main objectives, work to be done and contract details.		
D7.2	Dissemination and Use Plan	Public
This document describes the plans for dissemination of knowledge gained during the project as well as the exploitation plans of this knowledge.		
D7.3	Technology implementation plan	Public Part 1 & 2; Restricted Part 3
The Final Technology Implementation Plan covers the intentions for dissemination and exploitation of the industrial partners in E-MERGE.		

Table 13 E-MERGE deliverables

4.11. Project management and co-ordination aspects

The project management and co-ordination aspects aimed at providing sound internal project management with an efficient interface to Commission services to ensure that the project met the objectives set.

The Project Management for E-MERGE was structured and organised with two levels of management.

- E-MERGE *Steering Committee* - consisted of one representative of all E-MERGE consortium members responsible for all strategic decisions, such as changes in the E-MERGE workplan (technical annex) or consortium agreement or important changes in the E-MERGE quality plan; and
- E-MERGE *Management Team* – consisted of the project manager and the leaders of all work packages, responsible for the daily management of the project.

Each Work Package leader contributed to the management of their WP activities within the overall structure. This approach contributed to the consensus formation process as well as to an efficient way to solve problems together. Project management was operated according to quality assurance certificated to ISO 9002.

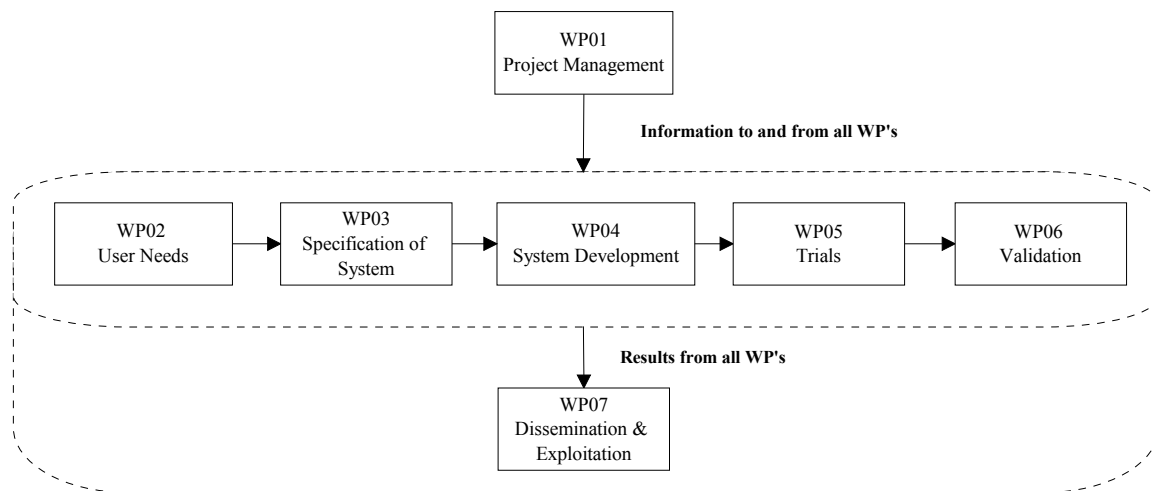


Figure 11 Project Work page structure

4.11.1. Quality Manual

At operational level, the management was based on the Quality Plan developed at the beginning of the project. All partners used this document as a reference ensuring the quality of all E-MERGE outputs. The quality Plan provided the following elements:

- Contractual references;
- Project objectives;
- Project organisation and responsibilities;
- Project documentation guidelines for management/progress reports and deliverables;
- Peer review process to assess deliverable quality;
- Cost Statements guidelines;
- Activity quality procedures (e.g. contract management, documentation control, documentation exchange rules and E-MERGE website); and
- Description of the project filing system.

4.11.2. Main problem encountered

The agreement to the architecture and principles was very difficult and time consuming mainly due to the complexity of the subject. Despite this problem, appropriate solutions were found by partners to all relevant issues during the project in order to meet project objectives. Collaboration between partners and willingness to achieve relevant results were always the focus of the E-MERGE team.

5. Overall conclusion

The E-MERGE cross-border testing proved successful with 100% error-free testing along the entire service chain. It appeared from the testing that using SMS for the transfer of data was not recommended as gamma tests showed that the time for transferring data between the different elements within E-MERGE differed from 2 to 260 seconds, which is not acceptable. E-MERGE therefore developed a specification for sending the minimum set of data in the open 112 voice channel as so-called “data over voice”. This also ensures that the dataset (Minimum Set of Data - MSD) reaches the operator that handles the 112 voice-call.

In addition to the test results themselves, a survey of the test sites provided some insight into user acceptance of such a system. Overall, it was felt that E-MERGE adds significant value to rescue operations, especially in more complex situations where the adequacy of the first initiated response to an incident is of prime importance.

Based on the project’s investigations, a full-scale deployment of the E-MERGE system is expected to lead to a decrease in fatalities and severe injuries in traffic accidents as follows:

- Fatality: 5% reduction
- Severe Injuries: 10% reduction to light injuries
- Light Injuries: No positive effect foreseen

That level of reduction would mean 2000 lives saved each year and a saving of nearly €4 billion each year in related social and health costs and lost “public” income calculated for the European Community. The savings will be related mainly to three stakeholder groups:

- Public authorities (medical, market productivity, congestion);
- Insurance companies (medical, legal costs, market productivity, administration costs);
- Individual drivers (medical, legal costs, market and HH productivity).

The necessary investments are around 20 BLN Euro which means that pay-back period will be around 4 years. Without European enforcement the implementation will take at least 10 years before the benefits can be achieved totally. The major challenge is that the costs and the benefits are divided amongst several organisations. Therefore implementing the solution requires a clear strategy and some central coordination to make sure that all stakeholders are motivated to turn this system into a pan-European success.

Major Quantified Benefits and stakeholders:

1. Vehicle Manufacturer: Additional Value to the market, 400-600 Euro per vehicle;
2. Public Authorities: Lower costs for social security and saving tax income;
3. Insurance Companies: Less payments on claims;
4. Individual Drivers: Less payment on on-covered costs;
5. Public Authorities: Lower medical costs;
6. Equipment manufacturer: Create a new 1,2 tot 1,5 BLN Euro market on IVS; and
7. Telco Operators: Increased penetration of handset subscriptions and dual SIM-subscriptions.

Major Cost areas:

1. Individual driver: Buying and Installing the IVS;
2. PSAP, EA and Service Providers: Adjusting the call centres;
3. Vehicle Manufacturer, Insurance Companies and Service Providers, Adjusting the back-offices; and
4. Vehicle Manufacturers, PSAP, EA, Service Providers: Training of staff

The following major findings are:

1. Piggyback on E112 technical upgrading is crucial for deployment of eCall at PSAP side, limits necessary investments at PSAPs;
2. Independent of specific local situations it is clear that most benefits >80% involved with car crashes are within the three leading stakeholders:
 - a. Public Authorities (Market productivity, medical, congestion);
 - b. Insurance Companies (Market productivity, Medical and legal costs, Administration costs);
 - c. The individual driver (Market productivity, uncovered cost and quality of live);
3. Benefits and Costs are unequally divided amongst the stakeholders;
4. Local differences make one overall business case less relevant, especially for the PSAPs; and
5. The PSAP play a centre role in the E-MERGE system, however their concrete benefits will be hard to quantify. However, one should note that despite the fact that their position is crucial their benefits only form a small part of the total benefits. The investments needed however are very clear (adjusting the call centre and back-office).

Potential Routes to Deployment

With the E-MERGE tests successfully completed, deployment now depends on the coordinated adoption of the architecture. However, Member States must ensure in the first stage the complete implementation of E112 in Europe. Secondly, PSAPs will then need to upgrade their E112 solution to handle also the E-MERGE minimum set of data.

The project consortium has identified three potential paths to deployment for the E-MERGE eCall solution:

- A preferred volunteer approach involving all stakeholder groups where deployment is ensured through a Memorandum of Understanding (MoU) with clear deployment targets. This approach is currently taken within the eSafety Forum Driving Group eCall;
- If the volunteer approach fails or is seen as delaying the process, an alternative approach could be that Member States and the EC create a directive on eCall; or
- Alternatively or in addition to this, the deployment process could be accelerated if an extra star in the European New Car Assessment Programme (EuroNCAP) for telematics safety services was introduced with eCall as the first telematics safety service.

The willingness and commitment of key players is critical for the implementation of the potentially life-saving solution offered by E-MERGE, thus making efforts such as the MoU important steps towards success. Cooperation must be encouraged between the vehicle manufacturers, telecom operators, the EC and Member States (in particular the emergency agencies, the public PSAPs and the private PSAPs operating under the regulation of a public

body). Other relevant parties such as the insurance industry, automobile clubs and other related industries must also be solicited to achieve a full and even cooperation for the project. An EC communication and potential directive could help ensure Member State commitment and contribute to convince these countries of the benefits that such an investment has to offer. The momentum for such a directive already exists within the European Commission, with the White Paper “European Transport Policy for 2010: Time to Decide” targeting a 50% reduction in road victims by 2010 — a goal that can be achieved partly through the implementation of systems such as E-MERGE.

Finally, EuroNCAP provides motoring consumers with a realistic and independent assessment of the safety performance of some of the most popular cars sold in Europe. To date, the European Commission, five Member States, as well as various motoring and consumer organisations in every EU country, backed up this rating system. Should EuroNCAP choose, for example, to add a star for those cars equipped with the E-MERGE capability, this could provide an important push towards full deployment and implementation - as it would therefore introduce a higher safety rating system.

6. Project data and contact details

Project Data

Contract: IST-2001-34061 - E-MERGE

Starting date: 01 April 2002 **Duration:** 24 months

Total Cost: 4,261,879 EURO **EC Contribution:** 2,037,268 EURO

Project URL: <http://www.E-MERGE.org>

Project Participants:

Participant name	Participant short name	Country
European Road transport Telematics Implementation Coordination Organisation S.C.R.L.	ERTICO	B
Adam Opel AG	Opel	D
Dienstleistungs GmbH KG	GDV	D
Telmacon – consulting and Telecommunication Consulting and Solutions	Telmacon	D
Volvo Technological development	VTD	S
SOS Alarm Sverige AB	SOS Alarm	S
Comuni di Milano	MILANO	I
Peugeot Citroen Automobiles (PSA)	PSA Peugeot-Citroen	F
ACASERVI S.A.	RACC	E
SEAT S.A.	SEAT	E
MIZAR Automazione S.p.A.	MIZAR	I
C.R.F. Societa Consortile per Azioni	CRF	I
Office of the Deputy Prime Minister	ODPM	UK
Association of Chief Police Officers United Kingdom	ACPO	UK
Gap Gemini Ernst & Young	CGE&Y	NL

**THE PROJECT DELTA HAS BEEN SUPPORTED BY THE
EUROPEAN COMMISSION UNDER THE AUSPICES OF THE
5TH FRAMEWORK IST PROGRAMME.**



Project Co-ordinator:

Name: Michael Nielsen
Organisation: ERTICO – ITS Europe
Address: Avenue Louise 326
1050 Brussels (Belgium)

Tel: (32-2) 4000749
Fax: (32-2) 4000701
e-mail: m.nielsen@mail.ertico.com


APPENDICES

Appendix A – Cover pages from all deliverables

<i>Deliverable number and title</i>		<i>Dissemination level</i>
D1.1	Quality plan	Public
D1.2	Final report	Public
D2.1 and D2.2	General consumer needs and State of the Art	Public
D3.0	Specification of the European in-vehicle emergency call	Public
D4.0	The E-MERGE developed system	Public
D5.1	Test site details and plans for field trials	Confidential, only for members of the consortium
D5.2	Performed trials and results	Public
D6.1	E-MERGE validation plan	Restricted to other programme participants
D6.2	E-MERGE Test scenarios and procedures	Restricted to other programme participants
D6.3	E-MERGE Compiled evaluation results	Public
D7.1	Project Fact Sheet	Public
D7.2	Dissemination and Use Plan	Public
D7.3	Technology implementation plan	Public Part 1 & 2; Restricted Part 3

Appendix B – Information dissemination material

Newsletters



Newsletter • Issue 1 July 2002


Join the E-MERGE Forum

To encourage the widest possible participation in the project and to gain consensus on proposed solutions, the E-MERGE project has created a dedicated Forum. Members of the Forum:

- receive regular progress reports
- have access to all important documents
- are encouraged to provide comments and reactions
- are invited to participate in future workshops

Membership in the Forum is open to all interested organisations, although it is envisaged to be of particular interest to car manufacturers, service providers, automobile clubs, public authorities, emergency operators, civil protection authorities and related industries such as equipment manufacturers and supply providers. Membership is free, including attendance to the workshops. Members of the Forum will be responsible for their own travel, accommodation and other costs for attending the workshops. Already at this stage the E-MERGE Forum has 04 members representing all stakeholders. If you would like to join the Forum, please complete the application form that is available on the project website www.e-merge.org

Developing the Pan-European Harmonised Vehicle Emergency Call Service Chain



In this issue:

- The Project
- Basic Concept
- Specific Steps
- Detailed Objectives
- First E-MERGE Workshop
- E-MERGE Forum
- Project Milestones
- Project Consortium

















Project Milestones

Project Duration	1 April 2002 to 31 March 2004
Common system specifications	November 2002
Communication protocol definition	November 2002
Operational procedures	November 2002
Architecture of the E-Call system	November 2002
Vehicle system definition	April 2003
E-Call service centre system definition	April 2003
PSAP system definition	April 2003
2nd E-MERGE Workshop	25 April 2003
Performance trials and results	January 2004
Completed evaluation results	March 2004

Project Consortium


ERTICO (Coordinator) • ACPD • Cag Overall Ernst & Young • City of Milano • C.R.F. • DTU • ODV • ONI Ordair (Cyp) • Uster Automation • PSA Peugeot Citroën • RACC • SEAT • SCS Alarm AB • Telecom • VTD (Moto)

Major subcontractors: KLFD • Borsari

www.e-merge.org

CONTACT:
E-MERGE Coordinator and ERTICO Project and Development Manager
Michael Nielsen • Tel + 32020 400 07 48 • m.nielsen@ertico.com
© 2002 All rights reserved
Copyright © Copyright IST 2001/02

Co-financed by the European Commission DG Information Society under the IST Programme 



Newsletter

Co-financed by the European Commission DG Information Society under the IST Programme 

With the large volume of traffic in and between European countries, there is an urgent need for a common European vehicle E-Call solution that can quickly and reliably secure that a manual or automatic E-Call receives a service centre and ultimately results in the efficient dispatch of assistance. The E-MERGE project's overall objective is to ensure the availability and functioning of such a vehicle-based E-Call system from any vehicle anywhere in Europe. The project is co-financed by the European Commission Information Society Directorate General under the IST Programme.

Basic concept

In order to secure the building of a common European vehicle E-Call solution, a pan-European approach is needed, and the right stakeholders need to agree together on common standards and procedures. The E-MERGE project has therefore formed a project consortium that includes key players such as car manufacturers, public authorities and service providers as well as established forums open to all interested parties (see page 4).

The project's overall objective is to ensure the availability and functioning of vehicle-based emergency call systems from any vehicle anywhere in Europe via the direct point of a harmonised standardised vehicle E-Call (V-ECall). The E-MERGE solution receives the information provided by a vehicle E-Call to the emergency service provider by adding such details as vehicle data, vehicle location, subscriber data, activation data, vehicle status and so forth (see Figure).

The main tasks of E-MERGE are therefore to develop, test and validate common specifications for the vehicle emergency call at all levels along the vehicle emergency call chain and to ensure that the technical, organisational and business structure is suitable for a Europe-wide take-up of the solution. E-MERGE is not trying to build a second European emergency call but is merely aimed at ensuring that current E-Call systems are harmonised across Europe and that the additional information which can be relayed from vehicles can be used in case of emergency. To that end, E-MERGE will also coordinate its efforts with the EC-sponsored coordination group COALES, which has prepared a specification of an enhanced emergency call ("E-112") that includes location information.

Specific steps

The E-MERGE project will identify needs and requirements of all actors in the emergency call chain – drivers, vehicle and equipment manufacturers, service centres, public safety answering points (PSAP) and emergency agencies (see page 4).

Detailed objectives

Other main objectives of the E-MERGE project are to remove current cross-border and language problems and to make an interoperable solution covering the vehicle of Europe and including all European vehicle manufacturers, which after the project will be adopted by the involved vehicle manufacturers, E-Call service centres, PSAPs and emergency agencies. The more detailed objectives of the E-MERGE project are described below.

Identify stakeholder needs and requirements:

Identify stakeholder needs and requirements that fully represent and identify their requirements of drivers, car manufacturers, service providers, PSAPs and emergency agencies.



Figure: When an E-Call is generated by an on-board system, a standardised dedicated vehicle emergency call number is dialed to send a data message via a virtual Private Network to an E-Call service centre, which then connects to a Call Centre. The E-112 call solution will also serve as a back-up, with E-MERGE providing a backup solution for the co-existence of E-112 and commercial vehicle emergency call services.

System validation:

validate the system via "black box" tests and real-life testing

E-MERGE take-up:

support the take-up of the E-MERGE solution in both participating and non-participating countries via a project Forum; all public and commercial organisations providing vehicle emergency call services should in time adopt the E-MERGE specifications

Analyse social/institutional issues:

this will include such issues as data privacy

Organisational options and business case:

develop organisational options and a business case for a pan-European E-Call network

Standardisation:

draft and if possible submit to appropriate standards bodies both a technical standard for implementation of European E-Call services and

Dissemination:

promote adoption of the agreed business solution across Europe via the defined dissemination tasks

First E-MERGE workshop

The E-MERGE consortium held its first workshop for E-MERGE Forum members on 25 June 2002 at ERTICO in Brussels. The workshop was planned to take place one day before the COALES meeting in Brussels, as E-MERGE aims to cooperate with and benefit from the work done by the COALES initiative and therefore wanted to attract as many COALES members as possible to the workshop.

More than 50 people attended the workshop, including representatives of vehicle manufacturers, service providers, PSAPs, emergency agencies, public authorities, equipment manufacturers and the European Commission. Issues presented by the consortium and discussed within the Forum were project objectives, general European consumer and stakeholder needs and the first view on a general E-MERGE architecture and solutions. The workshop participants gave valuable input that will be used as guidelines in the project's future work. More workshops are also planned to involve as much as possible the Forum members in the work.

Define technical specifications:

provide one common specification for a pan-European vehicle E-Call service to be used by all actors in the emergency call chain, including message content and for data, exchange protocols, databases, location relevancy, etc.

Achieve Europe-wide consensus on E-MERGE solution:

vehicle manufacturers, E-Call centres, PSAPs and emergency operators participating in the project will develop the E-MERGE specifications after the dissemination phase

Define operational procedures and arrangements:

define operational procedures and other arrangements for all stages of E-Call handling (eg vehicle to service centre, service centre to PSAP, service centre to other service centre, PSAP to emergency agency)

System test preparation:

at least one vehicle from each of five different European vehicle manufacturers will be adapted for testing in different scenarios and locations across the test area in Europe.

www.e-merge.org

Join the E-MERGE Forum 

E-MERGE testing begins end 2003 through beginning 2004

Now that significant progress has been made on defining the architecture, the most important milestone in the E-MERGE project will be to develop the E-MERGE systems as it have it implemented by the vehicle manufacturers, PSAPs as a service provider involved in the project. Development and implementation will be done in a number of vehicles to Volvo, SEAT, Opel and Fiat, and the full system will be installed and validated by service providers and PSAPs in Sweden, Spain, Germany, UK, Italy and partly in the Netherlands. E-MERGE testing will be carried out starting at the end of 2003 through the beginning of 2004.

First successful tests already done in Sweden

In the beginning of September, the first real live E-MERGE tests were performed. The in-vehicle eCall, consisting of both the minimum set of data and the voice (generated from a Volvo vehicle), reached the SOC Alarm PSAP operator, who asked to the driver, visualised the minimum set of data in the SOC Alarm IT operating system and displayed the location of the vehicle.

Project Milestones

Project Duration	1 April 2002 to 31 March 2004
Common system specifications	Available
Communication protocol definition	Available
Operational procedures	Available
Architecture of the eCall system	Available
Vehicle system definition	October 2002
eCall service centre system definition	October 2002
PSAP system definition	October 2002
Performance and results	January 2004
Completed evaluation results	March 2004

Project Consortium

ERTICO (coordinator), ACPO - City General Ernst & Young, City of Milano, C.E.P., DTUR, GDV, GH Odegar (Opel), Hilar Association, PSA Peugeot-Citroen, RACC, SEAT, SOC Alarm AS, Telesece, VTD (Volvo). Major subcontractors or contributors: NLPD - Bosch Communication Center



Developing the Pan-European Harmonised Vehicle Emergency Call Service Chain



In this Issue:
 E-MERGE Use Cases Defined
 eCall Group Adopts Architecture
 112 To Be Used For All Calls
 Minimum Data Set Agreed
 Testing News

www.e-merge.org

CONTACT:
 E-MERGE Coordinator and ERTICO Project and Development Manager
 Michael Nielsen • Tel: +33(0)3 498 87 48 • m.nielsen@ertico.com

A Project cofinanced by the European Commission DG Information Society under the IST Programme

The E-MERGE project, which aims to develop a common pan-European in-vehicle emergency call (eCall) available to all vehicle users, has made significant progress since its first workshop in June 2002. Based on the European Commission's recommendations concerning E112, suggestions for an E-MERGE architecture have been put forth and the principles behind the future architecture for a Europe-wide eCall has been adopted by the eSafety Forum Driving Group on an eCall.

Use cases, architecture defined

To clarify the requirements for an E-MERGE architecture, the consortium first defined operational cases for automatic and manual eCall. The included cases where persons were unable to speak (silent calls), calls needing translation, Good Samaritan calls and car malfunctions, leading to a life alarm. Based on these use cases and the requirements given by the stakeholders, together with the E112 architecture, the E-MERGE consortium worked out different possibilities for an eCall architecture. Following a critical analysis of the requirements and stakeholders' views, E-MERGE partners were able to select the most appropriate architecture.

Following a successful presentation and discussion of the suggested architecture at the second E-MERGE workshop, all key stakeholders agree present, as well as the adoption of the principles behind the architecture by the eSafety Forum Driving Group on an eCall. The consortium is confident the architecture reflects the needs and requirements of all concerned parties: drivers, car manufacturers, service providers, Public Safety Answering Point (PSAP) as a emergency agencies.

Finally the resulting E-MERGE architecture ensures that the Europe-wide emergency number 112 is used for all in-vehicle emergency calls (rather than a local number), whether generated automatically or manually. The eSafety Forum Driving Group on eCall has also adopted the use of 112 for all in-vehicle emergency voice communications, reinforcing the importance of this aspect of the architecture.

Minimum data set decided

The information elements to be provided directly from the vehicle to the PSAPs - that is being either a public body or alternatively a private organisation working under the conditions set by the local government - have been suggested by the emergency agencies and agreed on by the E-MERGE consortium based on their relevance in an emergency rescue situation. These data have furthermore been discussed in the eSafety Forum Driving Group on eCall which also agree that emergency calls shall send the following minimum set of data from the vehicle directly to the PSAP:

- "When" via time stamp
 - "Where" via satellite location (GPS position) including the direction of driving
 - "Who" via vehicle description (color, line identification (LI), colour, make and model including, for example the vehicle identification number (VIN)
 - "Where" to obtain more information: its service provider identifier (IP address, including for example telephone number and country code)
- In addition, E-MERGE recommends that the following information be delivered to the PSAP: as it would ensure that the PSAPs, in the case so one answers the voice connection (driver accident or has left the car), would not consider the call a silent call but would treat it as any emergency call.
- "How severe" via eCall qualifier (source of the trigger - manual or automatic including what type of sensor, or if available, the number of sensors)

Emergency call process using E-MERGE

The E-MERGE recommended architecture for pan-European in-vehicle eCalls is represented in the figure at the right. The following provides a basic overview of this process.

1. The IVS (in-vehicle system), that is the generating agent of the eCall, sends the emergency call to a PSAP via the 112 voice channel, consisting of two elements: first a pure voice connection based on 112, the second entails sending the minimum data set through the already established voice channel using GSM / GPRS / UMTS.
2. The eCall (data + voice) goes through the mobile network and is first handled by the telecom operator. The telecom operator recognizes that the call is an emergency call and has the responsibility to attach the call with the CLI (color line identification). At the same time the telecom operator as a result of E112 will add the mobile location at a least effort principle into the location server database. After the emergency call handling, the telecom

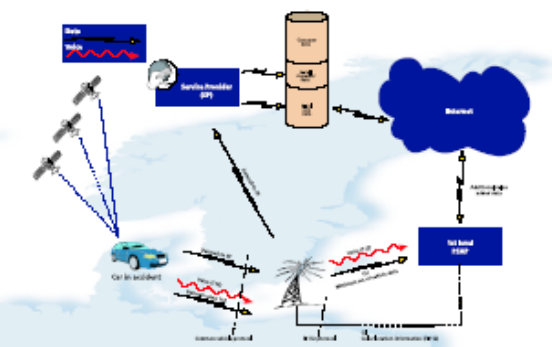


Figure: E-MERGE recommended architecture for pan-European in-vehicle eCalls

- operator delivers the eCall to the appropriate PSAP via the fixed line network.
- The PSAP receives two different types of communication via the fixed line network on a common channel: the first case is data communication delivered to a commonly agreed vehicle protocol while the second case is a normal voice communication. The minimum set of data plus the CLI are delivered as transparent data together with the 112 voice call. At the same time the Telecom Operator passes the mobile call location to the PSAP using a specific mobile location protocol (E112).
- The PSAP transmits acknowledgement of data received to the IVS and interprets and visualizes the returned data set.
- In case the user is a subscriber of a premium service provider (SP), the IVS sends a full data set via a telecom provider to the SP after receiving acknowledgement from the PSAP.
- The SP receives the data message and starts handling procedures, adding the additional eCall data to the SP database in order to enable these data available for the PSAPs.
- The SP transmits acknowledgement of data received to the IVS.
- (Only valid if subscriber to SP) If assistance is needed, the PSAP uses a call line number provided in the HDLS to contact the SP who then starts a conference call with the driver.
- (Only valid if subscriber to SP) The PSAP accesses the SP eCall specific database in order to obtain the additional data set directly from the SP.
- The PSAP operator acknowledges the received data.
- The PSAP operator acknowledges the emergency details to the most appropriate rescue centre.
- (Recommended) The PSAP communicates to the SP the involved rescue centre, to allow the SP to be able to provide additional post-accident services. This communication could happen via fixed line network as a simple phone call between the operator, or via Internet. In this last case the PSAP operator can access the SP specific eCall database and enter all available information about the involved rescue centre.

www.e-merge.org

Brochures

E-MERGE

Developing a Pan-European Harmonised Vehicle Emergency Call Service Chain

With the large volume of traffic in and between European countries, there is an urgent need for a common European vehicle E-Call solution that can quickly and reliably ensure that a manual or automatic E-Call reaches a service centre and ultimately results in the efficient dispatch of assistance. The E-MERGE project's overall objective is to ensure the availability and functioning of such a vehicle-based E-Call system from any vehicle anywhere in Europe.

The Project

E-MERGE is a project of the IST Programme of the European Commission Directorate General for the Information Society. Project participants will help implement a common European vehicle E-Call solution by developing an extended 112 call, or X-Ecall, that sends to the E-Call service centre such information as vehicle data, heading, vehicle status, and subscriber and activation data.

E-MERGE will work with the EC-sponsored coordination group CGALIES, building on its findings and recommendations regarding specifications for an enhanced E-Call (E-112), which includes location information. CGALIES is developing, for example, implementation guidelines for wireless call location information (to be published by the EC in the second quarter of 2002).

The E-MERGE system must be seen as complementary to CGALIES as shown in the figure below. E-MERGE provides a vehicle E-call with extended information that gives additional information to the emergency services. E-MERGE ensures that drivers are able to select usage of the E-112 emergency call number of the E-Call function. E-MERGE is not trying to build a second European emergency call but is merely aiming at ensuring that current E-Call systems are harmonised across Europe and that the additional information that can be retrieved from vehicles can be used in case of emergency.

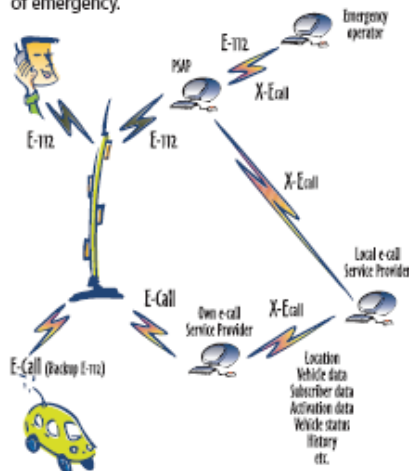


Figure: When an E-Call is generated by an on-board system, a commercial dedicated vehicle emergency call number is dialled to send a data message via a Virtual Private Network to an E-Call service centre, which then creates an X-Ecall. The E-112 call solution will also serve as a back-up, with E-MERGE providing a futureproof solution for the co-existence of E-112 and commercial vehicle emergency call services.

Initial Actions

E-MERGE will first identify the needs and requirements of all actors in the E-Call chain — drivers, vehicle and equipment manufacturers, service centres, PSAPs (public service answering points) and emergency agencies (e.g. police, fire, rescue services). Then it will establish the required technical and organisational framework and suggest business and commercial solutions related to the establishment of pan-European vehicle E-Call services and systems — including the creation of X-Ecall and pan-European service roaming between E-Call service centres. Specifications will be defined for technical elements, including message content and formats, exchange protocols and databases. In addition, all developments will work toward a harmonised vehicle E-Call system based on the adaptation of existing technology and systems. Operational procedures and arrangements for all stages of E-Call handling will also be defined, and cross-border and language problems will be addressed.

System interoperability will be tested in vehicles from five European vehicle manufacturers (using a sixth as an observer) in different scenarios and locations at five European trial sites. These will involve local E-Call service centres, PSAPs and emergency agencies. Social and institutional issues such as data privacy will be investigated, and organisational options and the business case for a pan-European E-Call network will be defined. Finally, scenarios for European E-Call service chain deployment and for the adoption of the agreed business solution across Europe will be assessed.

User Forum

The first E-MERGE User Forum Workshop is scheduled for 25 June in Brussels. It is open to all companies interested in the in-vehicle emergency call chain — vehicle manufacturers, equipment suppliers, telecom operators, insurance companies, service providers, call centres, PSAPs, emergency operators and others.

Project Consortium

ERTICO (coordinator) • ACPO • Cap Gemini Ernst & Young • City of Milano C.R.F. • DTLR • GDV • GM OnStar (Opel) • Mizar Automazione • PSA Peugeot-Citroën • RACC • SEAT • SOS Alarm AB • Telmacon • VTD (Volvo)
Major subcontractors: KLPD • Renault

Co-financed by

European Commission
Information Society
Directorate General
IST Programme



Contact E-MERGE Coordinator and ERTICO Project and Development Manager Michael Nielsen,
Tel: +32 (0) 2 400 07 49, m.nielsen@mail.ertico.com



Benefits to Deployment

• The use of the enhanced emergency response system will allow emergency responders to receive real-time information on the location of the emergency and the status of the emergency. This information can be used to dispatch the appropriate resources and to provide the emergency responders with the most efficient route to the emergency. The use of the enhanced emergency response system will also allow emergency responders to receive real-time information on the status of the emergency and the status of the emergency responders. This information can be used to provide the emergency responders with the most efficient route to the emergency.



The use of the enhanced emergency response system will allow emergency responders to receive real-time information on the location of the emergency and the status of the emergency. This information can be used to dispatch the appropriate resources and to provide the emergency responders with the most efficient route to the emergency. The use of the enhanced emergency response system will also allow emergency responders to receive real-time information on the status of the emergency and the status of the emergency responders. This information can be used to provide the emergency responders with the most efficient route to the emergency.

The use of the enhanced emergency response system will allow emergency responders to receive real-time information on the location of the emergency and the status of the emergency. This information can be used to dispatch the appropriate resources and to provide the emergency responders with the most efficient route to the emergency. The use of the enhanced emergency response system will also allow emergency responders to receive real-time information on the status of the emergency and the status of the emergency responders. This information can be used to provide the emergency responders with the most efficient route to the emergency.

For further information about E-MERGE or the eCall Forum, Drilling George (DG) on eCall please contact:

Michael Nelson
 E-MERGE Coordinator, Centre DG-4a
 BRICO - 15 Long
 327 68 88 87 88
 michael.nelson@brico.com

Project Sponsor List



A project co-funded by the European Commission DG Information Society under the IST Programme
 under contract IST-2001-34061

E-MERGE

Enhanced emergency response

through deployment of E-MERGE compliant eCalls



Videos

Four videos has been produced by the E-MERGE consortium partners:

- German demonstration of eCall (Telmacon)
- E-MERGE eCall functionality in Germany (Telmacon)
- SEAT usage of E-MERGE eCall (SEAT)
- UK E-MERGE eCall functionality inclusive emergency handling and response (ACPO)

To obtain a copy please contact

ERTICO – ITS Europe

Av. Louise 326

B 1050 Brussels

Email: m.nielsen@mail.ertico.com

Posters



www.e-merge.org

Co-financed by the European Commission DG
Information Society under the IST Programme



The Current Situation

- 40,000 deaths on Europe's roads each year
- emergency services are delayed by inaccurate locations
- seriously injured unable to make the necessary call
- not all calls use pan-European E112 number
- information about accident severity may not be available

After E-MERGE Implementation

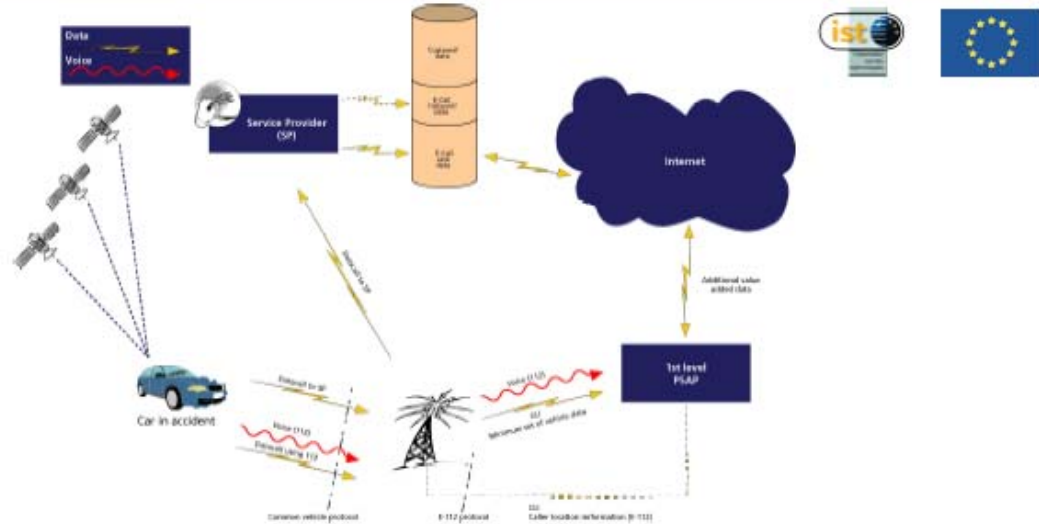
- pan-European E112 number used for all in-vehicle calls
- common protocol will enable efficient data transmission
- automatic calls will include information necessary to send aid
- additional data (location, severity) enables targeted services
- *faster, more efficient emergency service delivery saves lives!*



E-MERGE

www.e-merge.org

Co-financed by the European Commission DG Information Society under the IST Programme



Emergency call process using E-MERGE

1. The IVS (in-vehicle system), the eCall generating agent, sends the emergency call to a PSAP via the 112 voice channel. It establishes a pure voice connection and sends the minimum data set using GSM / GPRS / UMTS.
2. The eCall (data + voice) goes through the mobile network and is first handled by the telecom operator. It recognises the call as an emergency call and must enrich the call with the CLI (caller line identification). At the same time, the telecom operator as a result of E112 will add the mobile location as a best effort principle into the location server database. After the emergency call handling, the telecom operator delivers the eCall to the appropriate PSAP via the fixed line network.
3. Via a common channel, the PSAP receives the minimum set of data plus the CLI as transparent data (following the established protocol) together with the 112 voice call. At the same time the telecom operator pushes the mobile caller location to the PSAP using a specific mobile location protocol (E112).
4. The PSAP transmits acknowledgement of data received to the IVS and interprets and visualises the minimum data set.
5. In case the user is a subscriber of a private service provider (SP), the IVS sends a full data set via a telecom provider to the SP, after receiving acknowledgement from the PSAP.
6. The SP receives the data message and starts handling procedures, adding the additional eCall data in the SP database in order to make these data available for the PSAPs.
7. The SP transmits acknowledgement of data received to the IVS.
8. (Only valid if subscription to SP) If translation is needed, the PSAP uses a toll free number, provided in the MDS, to contact the SP who then starts a conference call with the driver.
9. (Only valid if subscription to SP) The PSAP accesses the SP eCall specific database in order to obtain the additional data set directly from the SP.
10. The PSAP operator elaborates the received data and dispatches the emergency details to the most appropriate rescue centres.
11. (Recommended) The PSAP communicates to the SP the involved rescue centres, to allow the SP to provide additional post-accident services. This communication could happen via fixed line network as a simple phone call between the operators, or via Internet. In this last case, the PSAP operator can access the SP specific eCall database and enter all available information about the involved rescue centres.



Photos

Enclosed on CD Rom and made available for download on www.e-merge.org