eCall Implementation Roadmap for Finland

Workshop of the HeERO project, Budapest 12–13 December 2013

Risto Öörni, M.Sc.(Tech.)
VTT Technical Research Centre of Finland
Background

- eCall reduces road traffic fatalities and is one of the priority actions identified in the European ITS Action Plan
- eCall has been estimated to have potential to reduce fatalities in Finland by 4–8% (Virtanen 2005 and Sihvola et al. 2009)
- The standards of eCall are being validated in the European HeERO project (Harmonised eCall European Pilot, http://www.heero-pilot.eu), Finland is one of the pilot sites
- The current aim expressed by the EC is to have eCall functional in October 2015


Pan-European eCall

- When the sensors installed in the vehicle detect an accident or eCall is activated manually, the eCall in-vehicle system (IVS) opens a 112 emergency call to the public safety answering point (PSAP), sends the minimum set of data (MSD) and opens a voice connection between the vehicle and PSAP.

EN 16072: Pan-European eCall Operating Requirements
CEN TS 16454: eCall End to End Conformance Testing (prEN 16434 under drafting)

eCall flag: ETSI TS 124 008 (Table 10.5.135d)

Vehicle and PSAP:
EN 15722: eCall Minimum Set of Data
EN 16062: High Level Application Protocols

(Adapted from presentation given by Emilio Davila-Gonzalez, 24th October 2012, 19th World Congress on ITS, Vienna, Austria and a picture presented in Öörni, R. and Korhonen, T. 2014. eCall minimum set of data transmission – results from a field test in Finland. IET Intelligent Transport Systems, Article in press.)
Objectives

- To provide a description of the national implementation roadmap for eCall in Finland
- To present a short overview of the results of the Finnish eCall pilot
- The roadmap has been published as a technical report prepared for the Ministry of Transport and Communications Finland (http://urn.fi/URN:ISBN:978-952-243-350-3)
Methods used

- Roadmaps are versatile tools that can be used to plan and present future developments of technologies, businesses and products and services.
- Preparation of a roadmap typically involves collection of information on the current situation, the goal and the actions or developments necessary to achieve the objective.

Structure of the eCall implementation roadmap for Finland:

1. Present situation
2. Actions at European level
3. Actions in Finland
4. Goal
Preparation of roadmap and sources of information

Material collected from Internet

Opinions of Finnish stakeholders

EU level regulation for eCall

Material from EeIP, HeERO and HeERO2

Questionnaire to car OEMs, IVS manufacturers and car importers

eCall roadmap work

Data collection

1. Stakeholder meeting with public authorities

Revision and updating of roadmaps

Publication of roadmaps
## Main tasks related to implementation of eCall in Finland

<table>
<thead>
<tr>
<th>Main tasks and key stakeholders</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational guidelines and training of PSAP staff (ERC Administration, Emergency Services College, Police College of Finland)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End-to-end field tests as a part of implementation of eCall (ERC Administration, telecom operators, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of eCall reception and processing capabilities in PSAPs (ERC Administration)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation and testing of eCall discriminator in mobile networks (telecom operators)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of guidelines and coordination of implementation of eCall in mobile networks (Finnish Communications Regulatory Authority)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guidelines for installation of eCall in-vehicle systems and their periodic technical inspection (Finnish Transport Safety Agency TraFi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis of existing legislation and implementation of necessary changes (MinTc, MinInt and MinSoc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication related to eCall to citizens and stakeholder groups (MinTc, MinInt and MinSoc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance guidance of agencies working with eCall (MinTc, MinInt, MinSoc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
eCall stakeholders

- The key stakeholder in deployment of eCall is the Emergency Response Centre Administration.
- Other public sector stakeholders in the deployment of eCall in Finland include:
  - Ministry of the Interior
  - Ministry of Transport and Communications
  - Finnish Communications Regulatory Authority (Ficora)
  - Finnish Transport Safety Agency (TraFi)
- Private sector stakeholders identified in the roadmap:
  - Mobile network operators
  - Vehicle industry and vehicle importers
  - Service providers and equipment manufacturers
  - Standardization organisations
Discussion of results (1)

- The roadmap provides an insight into the future based on available information.
- The future events and their timings presented in the roadmap are ones which are considered likely and whose timing can be determined with some reasonable level of confidence – this does not mean that they are by any means certain.
- In general, the limitations of roadmapping methods include, but are not limited to:
  - tendency to assume linear development
  - technical and rational focus and
  - Implicit certainty assumed for events (Kappel 2001).

Discussion of results (2)

- The roadmap addresses the deployment of eCall but does not cover the lifecycle of the service over a longer term
  - mobile network technologies and emergency call functionalities provided by them may change in the long term
  - A specialist task force has been set up by ETSI (European Telecommunications Standards Institute) to study how requirements related to eCall can be supported in IP based LTE networks
  - Long lifecycles of vehicles when compared to lifecycles of mobile terminals are also a challenge; a vehicle produced in 2013 may still be in use in 2033
- The focus of the roadmap is in Pan-European eCall
  - integration of eCall with other ITS services is likely to remain as a research topic in the foreseeable future
Summary (1)

- eCall will be mandatory in new passenger cars and vans type-approved after 1st October 2015
  - A proposal for vehicle type approval requirements (COM 2013/316) is available at the EC web site
- The eCall discriminator will likely be available in Finnish mobile networks until 31st December 2014
- Capabilities to receive and process eCalls will be implemented until the end of 2015 in Finnish PSAPs (new information system of PSAPs is under development)
Summary (2)

- The key stakeholder in deployment of eCall in Finland is the Emergency Response Centre Administration.
- The other important stakeholders are:
  - Ministry of the Interior
  - Finnish Transport Safety Agency
  - Finnish Communications Regulatory Authority
  - Ministry of Transport and Communications
  - Mobile network operators
- End-to-end field operational tests should be carried out before full-scale roll-out of eCall.
Recommendations

- End-to-end field tests covering the whole eCall service chain
- Clear division of responsibilities and strengthening of cooperation between ERC Administration and other stakeholders working with eCall
- Participation in activities of European eCall Implementation Platform (EeIP) and standardization and architectural work related to eCall
- The roadmap should be updated as more information becomes available on:
  - the performance of the available eCall solutions and the whole service chain
  - progress of the related European regulation
  - the recommendations provided by the eCall pre-deployment project HeERO
Results of the Finnish eCall pilot
Finnish eCall pilot (2nd phase, 2013)

- IVS: two IVS prototypes (Gecko systems, and VTT mobile IVS)
- MNO: three mobile networks used, no implementation of eCall flag yet
- PSAP: VTT eCall testbed used, timetable of the real PSAP system development did not match with HeERO tests
Examples of results (1)

MSD success rate (HeERO KPI_003): Successful MSDs / all initiated MSDs

Estimation of confidence intervals suggests that statistically significant differences exist between mobile networks in MSD success rate.
Examples of results (2)

KPI_007A values:
- DNA mobile network
- IVS B (VTT mobile IVS)
- Location: Biologinkuja 5, Espoo, Finland

Duration of voice channel blocking was usually around 9 seconds for successful MSD transmissions

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Standard deviation</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>402</td>
<td>9,181</td>
<td>8,235</td>
<td>2,9152</td>
<td>2,424</td>
</tr>
</tbody>
</table>
Challenges and solutions

Challenges:
- Availability of suitable IVS (IVS X originally planned to be tested was not available due to problems related to NDA)
- Non-standard behaviour of IVS (IVS A)
- No eCall flag available
- No real PSAP available for testing

Solutions:
- Cooperation with prototype manufacturer and the in-band modem supplier
- Participation in the eCall testfest
- Testing of the interoperability of IVS, Mobile network and PSAP should continue at national level after HeERO
Conclusions and recommendations

- Preparation of the tests takes a lot of time with prototype providers; close cooperation and communication with prototype providers essential.
- Recommendation: Testing of the interoperability between IVS, mobile networks, and PSAPs should continue at national level after the European HeERO project has ended. The performance of the whole service chain should be tested when:
  - eCall IVS prototypes' problems fixed or real products available
  - eCall flag is implemented
  - new information system of Finnish PSAPs ready
Material related to eCall

- HeERO deliverables: [http://www.heero-pilot.eu](http://www.heero-pilot.eu)
  - D6.4: Implementation roadmap and guidelines for eCall deployment in Europe
  - D6.5: Recommendations for implementation and operation of eCall
- Other studies:
VTT creates business from technology