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eCall Implementation Roadmap for Finland

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***Abstract*—The European in-vehicle 112 emergency call system eCall aims to reduce the number of road traffic fatalities in Europe. At present, the standards of eCall are being validated as part of the European HeERO project (Harmonised eCall European Pilot), and member states of the EU have also been advised to prepare for mandatory deployment of eCall. We outline the national implementation roadmap for eCall in Finland. In addition to information specific to Finland, the roadmap takes into account research results, regulation and other documents published at the European level. The roadmapping methods used in the study have certain limitations such as a tendency to assume linear development, technical and rational focus and implicit certainty assumed for events. These limitations have to be taken into account when utilizing the roadmap for the planning of activities or other purposes. The roadmap will have to be updated once the final results of the HeERO project become available, European-level regulations related to the deployment of eCall have been completed, and the update to the information system of Finnish public safety answering points is closer to completion.**

Keywords—eCall, implementation, roadmap, Finland

I. INTRODUCTION

The European in-vehicle 112 emergency call system, eCall [1-3], aims to reduce the number of road traffic fatalities in Europe [4]. 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 accident vehicle and the PSAP. The MSD contains information related to the accident vehicle such as exact location of the accident, which enables the PSAP to react to the incident in the most appropriate way. eCall has also been identified as a promising application to improve the safety of road users and to mitigate the consequences of accidents. At present, the standards of eCall are being validated as part of the European HeERO project (Harmonised eCall European Pilot) [5]. According to a proposal published by the European Commission, the current aim is to have eCall implemented for all PSAPs no later than 1st October 2015 [6]. There have also been plans to make the eCall in-vehicle unit mandatory in new type-approved vehicle models, namely in cars and light commercial vehicles [7]. Finland is involved in the HeERO project and is one of the EU member states to have signed the eCall Memorandum of understanding (MoU) [8].

The implementation of eCall in PSAPs and mobile networks is carried out at member state level. Member states of the EU have also been advised to prepare for mandatory deployment of eCall [7]. However, the need to have a national implementation roadmap for eCall in each member state is not being addressed by HeERO or other ongoing projects on the European level. Therefore, there was a clear need to prepare a national implementation roadmap for eCall in Finland.

II. OBJECTIVES

The objective of the paper is to provide a description of the national implementation roadmap for eCall in Finland. The main focus of the work is the pan-European eCall defined in European standards [1-3]. The paper is based on a technical report prepared for the Ministry of Transport and Communications Finland [9].

III. METHODS USED

Roadmaps are versatile tools that can be used to plan and present future developments of technologies, businesses and products and services. Roadmaps may be drafted for different purposes such as planning and foresight [10]. The main difference between roadmaps and other documents is the ability of roadmaps to present the temporal dimension of events and actions [10]. The structure used for the roadmap is presented in Fig. 1.

Fig. 1. Basic structure used for the implementation roadmap.

An overview of the process of building the roadmap with relevant Finnish stakeholders and data sources is provided in

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Fig. 2. The work was started with the collection of information related to eCall and its deployment. The roadmapping work took into account the opinions of Finnish stakeholders, European-level regulation and other documents related to eCall, material collected from the Internet, and the results of initiatives and projects related to eCall such as HeERO, HeERO 2 and EeIP (European eCall Implementation Platform). The viewpoints of Finnish public authorities were studied by organizing a stakeholder meeting when the first version of the roadmap became available. The views of vehicle manufacturers and equipment suppliers on the status of eCall development, eCall standardization, potential problems, and their expectations concerning the deployment of eCall were elicited from a questionnaire. In total, 10 responses were received from representatives of vehicle manufacturers, equipment suppliers and national ITS organizations. Finally, the roadmap was revised on the basis of comments received from different stakeholders and then published.

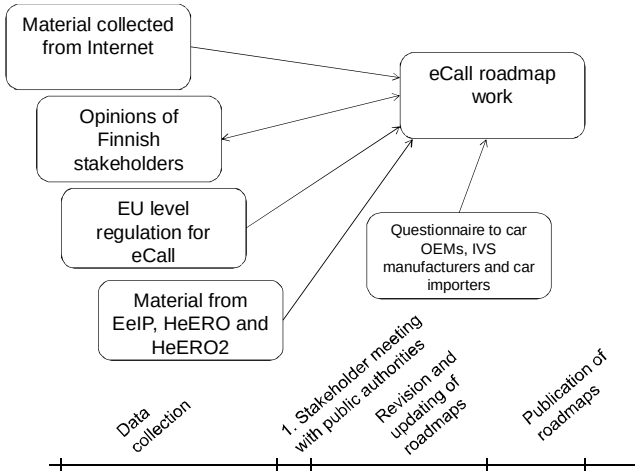

Fig. 2. Overview of the process of building the roadmap and data sources used.

IV. Results

A. Background information used to build the eCall implementation roadmap

The roles of the stakeholders in the eCall service chain have been determined on the basis of a national eCall framework for Finland, input received at the 1st stakeholder meeting (Fig. 2) and other communication with relevant public authorities and other stakeholders. The general objectives for eCall deployment in Finland and the targeted schedule are based on European-level regulation and standards related to eCall.

The overall conditions for deploying eCall in Finland and related public sector organizations have been described in the national eCall framework for Finland published in 2006 [11]. The general conclusion of the study was that eCall is an additional channel for notification of road traffic related emergencies, and no major changes would be required because of eCall to the operating procedures of other agencies except the PSAP.

The general objectives of the deployment of eCall in Finland have been derived from European-level regulations and other documents [6-7, 12-13], and from related standards [1-3]. This also applies to the schedule planned for deploying the service. Achieving a fully operational eCall service within the schedule defined at the European level was seen as an important objective also in Finland.

The technical readiness of eCall for full-scale deployment is under study as part of the HeERO project [5], which aims to validate the standards developed for pan-European eCall and to provide a roadmap for deployment of eCall in Europe. At present, some results of the project such as the evaluation results from the first pilot round have been completed. The evaluation results from the second pilot round and recommendations and roadmap for eCall deployment will be available at a later date.

B. eCall implementation road map for Finland

The eCall implementation roadmap for Finland is illustrated in Fig. 3, which documents the actions of various stakeholders as horizontal bars, and in Table 1, which explains the activities and their timing carried out by stakeholders.

Finland has implemented the common European emergency number E112 and has 10 PSAPs at present [14]. All PSAPs in Finland are operated by the Emergency Response Centre Administration, which is a public authority operating under the Ministry of the Interior. The information system used by Finnish PSAPs is being upgraded, and the new information system used by PSAPs is expected to be available during 2015 and to have eCall features implemented in it.

Implementation of the eCall discriminator [13] is tasked to mobile network operators (MNOs). At present, there are three MNOs operating in continental Finland (DNA, Elisa and Sonera). The Finnish Communication Regulatory Authority (Ficora) is the Finnish telecommunications regulator operating under the Ministry of Transport and Communications. It has the responsibility for regulating eCall implementation in mobile and fixed-line telecommunication networks.

The Ministry of Transport and Communications and Ministry of the Interior are responsible for performance guidance of agencies in their own sectors. They also have a joint responsibility for promotion of eCall and dissemination of eCall information in Finland, possible changes required to national legislation due to eCall, and reporting on the progress of eCall implementation to the European Commission as part of the reporting related to the European ITS directive [15].

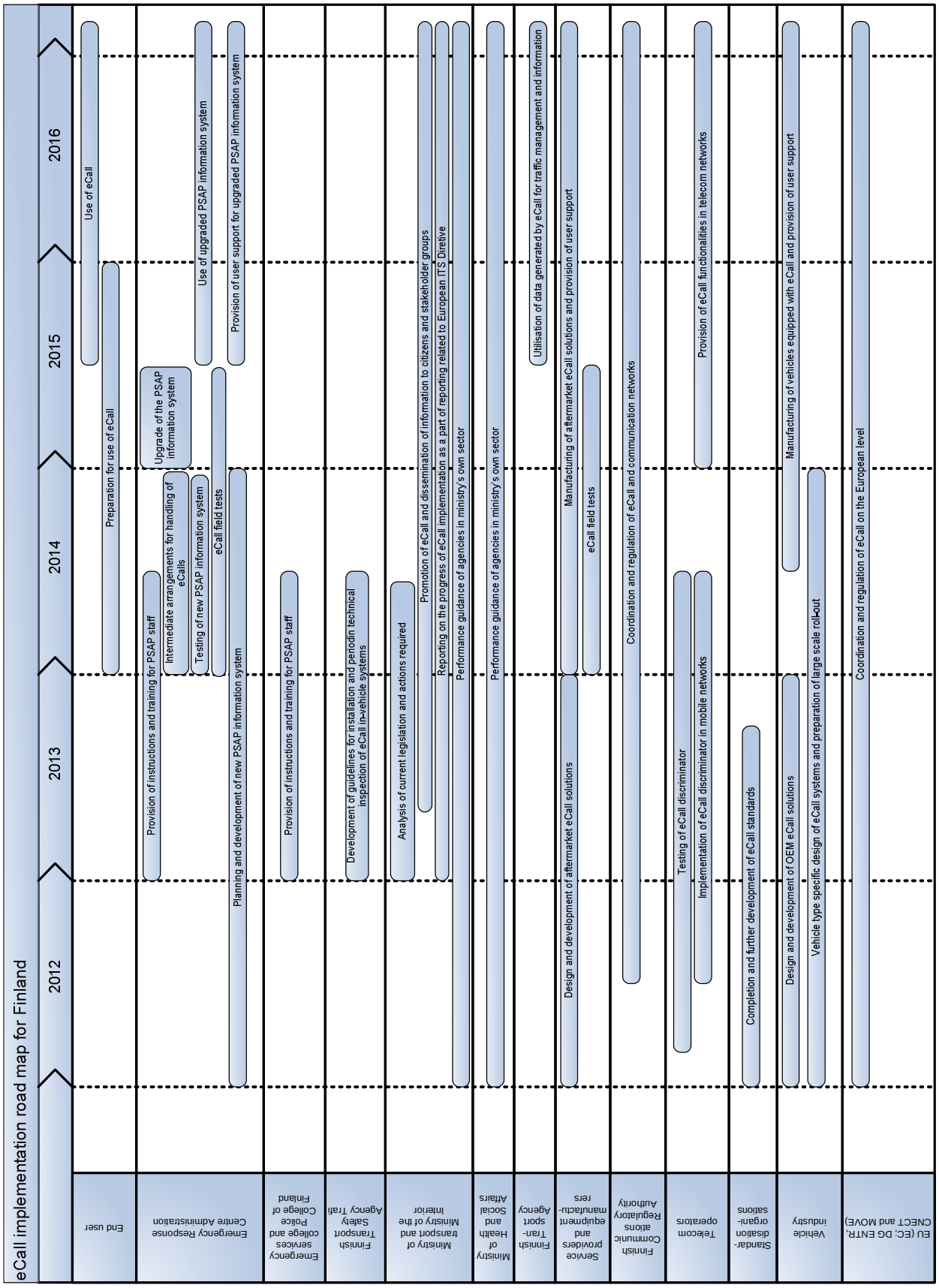

Fig. 3. eCall implementation road map for Finland.

TABLE I. COMPONENTS OF THE ECALL IMPLEMENTATION ROADMAP FOR FINLAND.

Stakeholder	Activity	Start	End
End user	Use of eCall	07/2015	Not defined
End user	Preparation for use of eCall	01/2014	12/2015
Emergency Response Centre Administration (http://www.112.fi)	Provision of instructions and training for PSAP staff	01/2013	06/2014
	Upgrade of the PSAP information system	01/2015	06/2015
	Intermediate arrangements for handling of eCalls	01/2014	12/2014
	Testing of new PSAP information system	01/2014	12/2014
	Use of upgraded PSAP information system	07/2015	Not defined
	eCall field tests	01/2014	06/2015
	Planning and development of new PSAP information system	01/2012	12/2014
	Provision of user support for upgraded PSAP information system	07/2015	Not defined
Emergency Services College (http://www.pelastusopisto.fi) and Police College of Finland (http://www.polamk.fi)	Provision of instructions and training for PSAP staff	01/2013	06/2014
Finnish Transport Safety Agency Trafi (http://www.trafi.fi)	Development of guidelines for installation and periodic technical inspection of eCall in-vehicle systems	01/2013	06/2014
Ministry of Transport and Communications (http://www.lvm.fi) and Ministry of the Interior (http://www.intermin.fi)	Analysis of current legislation and actions required	01/2013	06/2014
	Reporting on the progress of eCall implementation as a part of reporting related to European ITS Directive	01/2013	Not defined
	Performance guidance of agencies in ministry's own sector	01/2012	Not defined
Ministry of Social Affairs and Health (http://www.stm.fi)	Performance guidance of agencies in ministry's own sector	01/2013	Not defined
Finnish Transport Agency (http://www.liikennevirasto.fi)	Utilization of data generated by eCall for traffic management and traffic information	07/2015	Not defined
Service providers and equipment manufacturers	Design and development of aftermarket eCall solutions	2011	12/2013
	Manufacturing of aftermarket eCall solutions and provision of user support	01/2014	Not defined
	eCall field tests	01/2014	06/2015
Finnish Communications Regulatory Authority (http://www.ficora.fi)	Coordination and regulation of eCall and communication networks	06/2012	Not defined
Telecom operators	Testing of eCall discriminator	02/2012	06/2014
	Implementation of eCall discriminator in mobile networks	07/2012	06/2014
	Provision of eCall functionalities in telecom networks	01/2015	Not defined
Standardization organisations	Completion and further development of eCall standards	01/2012	09/2013
Vehicle industry	Design and development of OEM eCall solutions	2011	12/2013
	Vehicle type specific design of eCall systems and preparation of large scale roll-out	2011	12/2014
	Manufacturing of vehicles equipped with eCall and provision of user support	07/2014	Not defined
EU	Coordination and regulation of eCall on the European level	2003	Not defined

V. Discussion of results

The roadmap provides an insight into the future based on available information. However, neither future events nor their timing are by any means certain, even though they can be considered likely or their timing can be determined with some reasonable level of confidence.

In general, the limitations of roadmapping methods include, but are not limited to, their tendency to assume linear development (for example, assumption of linear growth of markets), their technical and rational focus and implicit certainty assumed for events [10]. These limitations have to be taken into account when using roadmapping methods for planning of deployment and forecasting the future of ITS services such as eCall.

VI. Final remarks

The roadmap presented in the paper reflects currently available information and will need to 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, and the recommendations of the eCall pre-deployment project HeERO.

The roadmap presented in the paper addresses the deployment of eCall but does not cover the lifecycle of the service over a longer term. The long-term evolution of eCall and the components of the eCall service chain is clearly a research topic of its own. For example, 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 (Internet Protocol) based LTE (long-term evolution) networks [16]. The long lifecycles of vehicles when compared to lifecycles of mobile terminals are also a challenge. For example, a vehicle produced in 2013 may still be in use in 2033.

The focus of the roadmap is on pan-European eCall. Connections of eCall to other ITS services such as provision of real-time traffic information are mentioned but not discussed in detail. The implications of eCall for deployment of other ITS services have been partly addressed by architectural work such as the European ITS Framework Architecture FRAME [17] and ongoing efforts such as the HeERO project. However, integration of eCall with other ITS services is likely to remain a topic for research and development in the foreseeable future.

The final results of the HeERO project will provide more guidance on the performance of the solution described in the standards of pan-European eCall. They will also indicate the content and scope of changes required to the standards, and what their implications are for the schedule of deployment.

The regulation needed for mandatory deployment of eCall in vehicles seems to be moving forward. The European Commission has published a draft version of the amendment to the vehicle type approval directive which makes eCall mandatory in new M1 and N1 class vehicle types type-approved after 1st October 2015 [18].

VII. Summary

The paper presents an overview of the national eCall implementation roadmap for Finland. In addition to information specific to Finland, the roadmap takes into account research results, regulation and other documents published at the European level.

The limitations of the roadmapping methods mentioned in the discussion above should be taken into account when utilizing the roadmap for the planning of activities or other purposes. The roadmap should be updated once the final results of the HeERO project become available, European-level regulations related to the deployment of eCall have been completed, and the update to the information system of Finnish PSAPs is closer to completion.

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