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Author(s) Tarkiainen, Mikko; Kulju, Minna; Aaltonen, J.
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eCall receiving - the PSAP operator user experience

Mikko Tarkiainen^{1*}, Minna Kulju¹, Jukka Aaltonen²

1. VTT, P.O.Box 1300, FI-33101 Tampere, FINLAND,
tel. +358 40 539 9384, mikko.tarkiainen@vtt.fi
2. Emergency Response Centre Administration, Finland

Abstract

The development of eCall is moving towards deployment but there have been very little discussion from the PSAP operator perspective. As a part of TeleFOT project a detailed test was conducted to gather the first impression of a PSAP operator about eCall receiving and handling. The study focused the time frame from the receiving of an eCall to the PSAP system until the risk analysis was done by the operator. The results provide new insight into the deployment eCall in PSAPs and designing of eCall specific training for the operators.

Keywords: eCall, PSAP operator, usability evaluation, user experience

Introduction

eCall technology aspects has been covered in many forum and publications, but the end-user point of view especially from the operator side is still missing from the discussion. Therefore, TELEFOT eCall test in Finland focused on eCall receiving and handling in the Public Safety Answering Point (PSAP). The test was conducted by VTT in cooperation with Ministry of the Interior, Emergency Response Centre Administration (the PSAP operator in Finland) and The Police College of Finland. The actual test session was held in the Emergency Response Centre Administration (ERC) training facility in May 2011.

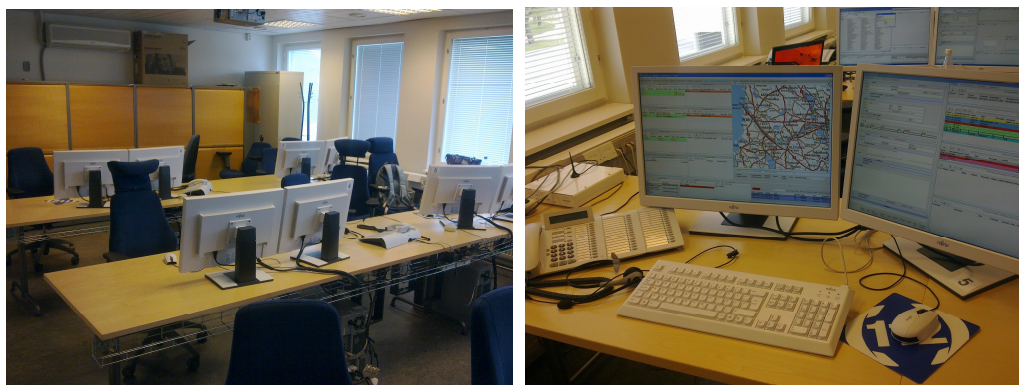


Figure 1 - eCall test facility: Emergency Response Centre Administration training class.

eCall and Emergency Response Centres in Finland

eCall can be either generated manually by vehicle occupants or automatically via activation of in-vehicle sensors when an accident occurs. When activated, the in-vehicle eCall system establishes a 112-voice connection with the PSAP. At the same time, an eCall minimum set of data (MSD) – including key information about the accident such as time, location and vehicle description – is sent to the PSAP operator. [1]

In Finland, the Emergency Response Centres (ERC) take care of all calls for urgent emergency assistance with a single emergency number (112). After receiving an emergency call, ERC operator evaluates the need for assistance (the risk assessment), alerts the appropriate unit(s) from police, rescue forces, ambulance services or social officials to deal with the emergency situation and advises the caller on how to proceed. The handling of eCalls in ERC will be similar to a normal emergency call. The only significant difference is that eCall provides some additional data (location, vehicle information etc.) automatically for the ERC operator. [2]

Implementation of eCall receiving functionality

Already before TeleFOT project VTT had developed (Java) PC software which can generate simulated eCall MSD-messages for the eCall test bench [3]. During 2011 the eCall simulation software was installed into the operating system in the Emergency Response Centre Administration (ERC) training class and the PSAP user interface in the training class had been modified to show incoming eCall MSD-message content for the TELEFOT eCall test.

The eCall MSD-message content was presented in PSAP user interface (UI) in mainly textual form and location was presented in the map view. Only mandatory fields of MSD were used. The following eCall MSD-message content was presented in PSAP user interface (in Finnish):

- Automatic activation: *“eCall” text*

- PositionCanBeTrusted: “*position ok*” or “*position unreliable*” text
- Vehicle type: text (see example below)
- VIN-number: *vehicle information decoded to text; e.g. vehicle brand, model, year*
- Vehicle propulsion storage type: text (see example below)
- Timestamp: *text*
- Vehicle location: *presented in the map view*
- Vehicle direction: *text ; e.g. N (north), NE (north-east), E, ES, S, SW, W, WN*

Most of the information from eCall MSD was shown in the ERC system UI field from which the text is automatically forwarded to the dispatched units. The size of the text field was limited; therefore the presented text was very short. For example, the following information describing the eCall originating vehicle was presented in the test: “*bus, NE, diesel, Volvo 9500, 2009*”.

The test session

In the test pre-defined eCall MSD-messages were sent by hand straight to the ERC-system followed by separate manual voice calls. All emergency calls in the test were made by Emergency Response Centre Administration and The Police College training personnel, who organises similar sessions when training PSAP operators. Test scenarios for the accidents, from which eCalls was coming, were predefined by the Emergency Response Centre Administration, The Police College of Finland and VTT. The test scenarios covered following accident types:

- driving off the road by a single passenger car on rural road
- head-on collision of two passenger cars on rural road
- previous accident hit by another car
- driving off the road by a bus on rural road
- pile-up collision of three passenger cars on a motorway and at the same time collision on a near-by rural road between two passenger cars

eCalls scenarios were mixed into normal emergency calls, including faulty calls. During the test, operators received approximately one eCall in relation to three normal emergency calls. eCall receiving test was done with two experienced PSAP operators, but who didn't have any previous experience of eCalls. Both had been working in a ERC as an operator (2 years, 5 years) and were used to receive and handle emergency calls. Before the test participants were shortly briefed about eCall and the eCall MSD data (location, vehicle data, etc.) that automatically comes available in the ERC system UI when an eCall (phone call) is answered. The operators were monitored by two VTT researchers during the test session. The length of the actual test session, receiving of emergency and eCalls, was about half an hour in total. After the test session all participants, including operators and training instructors (the callers of the emergency calls/eCalls) were interviewed.

Results

The goal of the eCall test was to assess the impacts of eCalls to the functions of an ERC operator and compare the handling eCalls to normal 112 emergency calls. The study focused the time frame from receiving of the eCall in ERC-system until the risk analysis was done by the operator. Especially, utilisation of information delivered in the recently standardised eCall Minimum Data Set [4] was studied.

Observation

The observation focused to the handling of the eCalls. When comparing to the handling of normal 112 emergency calls, no significant deviation was noticed. Automatically received eCall MSD data about the vehicle type and the direction of the vehicle was not used by the operator in all scenarios. This indicated lack of training with eCalls.

Interviews

The participated ERC operators and Emergency Response Centre Administration and The Police College training instructors, who implemented the scenarios by making the emergency and eCalls, were interviewed after the test session. The interviews covered the issues that were planned as the research questions before the test. Both ERC operators and the training instructors had quite similar feedback about the eCalls, MSD-data and the test scenarios. The following table includes the original research questions and the results from the observations and interviews in condensed form. The most significant and mostly raised issue with eCalls was the lack of information about vehicle speed (or impact), which is essential information in the risk assessment. This information is not currently available in the eCall MSD-data.

Table 1 – Research questions and main findings from the study.

<p><i>How PSAP operators experienced the handling of a eCall compared to a normal 112 emergency call?</i></p> <ul style="list-style-type: none"> • No major difference to normal 112 emergency calls <ul style="list-style-type: none"> ○ If location information in eCall can be trusted, it can accelerate the handling ○ Information about vehicle type (e.g. bus) can be utilised in the risk assessment
<p><i>Were there any specific problems or shortcomings in handling of eCalls?</i></p> <ul style="list-style-type: none"> • In general, the ERC operators in the test had too little information about functionality of eCall [training needed]

<ul style="list-style-type: none"> ○ What triggers an automatic eCall? ○ How much faulty eCall are expected? ○ How accurate is the location information and how operator should understand the location if the low confidence in position is indicated? ○ How fast after an accident eCall (voice call) is opened? ○ How operator should to talk with vehicle occupants that are not prepared to communicate after the crash? ● eCall MSD does not include information about vehicle speed (or impact) that is essential information in the risk assessment. ● eCall comes from fixed in-vehicle device. Operator should recognise the difference compared to emergency call from a mobile phone (e.g. speaker cannot step out of the vehicle and continue the call).
<p><i>Was the eCall MSD content useful for the operator and was it presented clearly?</i></p> <ul style="list-style-type: none"> ● Location information was clear (on the map). But the vehicle information and the direction of the vehicle was not used by the operators. The reason for this was both the presentation of the data (as a text string) and the too short training before the test session.
<p><i>ERC operator views on automatic vs. manual eCall.</i></p> <ul style="list-style-type: none"> ● General opinion of the ERC operators was that manual eCalls should not come to the PSAP. [manual eCalls were not included into the test scenarios]

Conclusions

The TELEFOT eCall receiving tests was done in a PSAP training centre with experienced PSAP operators. The PSAP system and user interface (with only minor eCall presentation modifications), as used in all PSAP centres in Finland, was utilised in the test. Receiving of eCalls was tested in a training session, in which eCalls were mixed with normal 112 emergency calls.

The participants considered test session realistic enough, although it was quite short. The test gave new insight into the eCall from the PSAP operator perspective.

Acknowledgement

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