Draft

European e-Call functional specifications

In Vehicle System

Version 0.8

Working Document

Author :
Vehicle Functionality Working Group (ECIV)
(Chair Dr. W. Reinhardt, ACEA)

DOCUMENT CONTROL SHEET

Version History			
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1 Glossary *(to be reviewed later)*

API:	Application Programming Interface
+BAT:	Permanent voltage from vehicle's battery (e.g. 12 or 24V)
GPS:	Global Positioning System
GPRS:	General Packet Radio Services
GSM:	Global System for Mobile communications
FSD:	Full Set of Data.
HMI:	Human Machine Interface
IVS:	In Vehicle System. This is expected to be a module working either: - as a stand-alone solution for e-call (to be completed with connection, interfaces and antennas), - or as a system to provide necessary information to a customers mobile phone, - or as an add-on on existing on-board electronic device.
MSD:	Minimum Set of Data,
MS:	Member State (European)
PSAP:	Public Safety Answering Point
SP Identifier:	Private Service Provider Coordinate, if any.
UMTS:	Universal Mobile Telecommunication Service
NAD:	Network Access Device (e.g. a GSM or UMTS module)
MNO:	Mobile Network Operator
GNSS:	Global Navigation Satellite System

2 System overview

The objective of implementing the in-vehicle emergency call system (eCall) is to automate the notification of a traffic accident, wherever in the European Union, with the same technical standards and the same Quality of Services objectives by using the Mobile Telecommunication network (e.g. GSM) and a preassigned destination address (e.g. 112).

2.1 High level Functional Requirements:

- In the event of an accident the eCall system must determine whether or not to trigger an eCall.
- An eCall must be able to be triggered manually.
- Upon triggering an eCall the eCall system must try to send a Minimum Set of Data (MSD) to any given mobile network operator (MNO) with a preassigned destination address.
- The eCall system must also try to establish a voice connection between the vehicle and that preassigned destination address (e.g. a public safety answering point (PSAP) with 112)

'Actors': eCall 'system'
eCall user
Telecommunication network
PSAP

2.2 In-Vehicle Functional Requirements:

The vehicle unit is either an embedded unit with an integrated network access device (NAD, e.g. a GSM module) or a phone based solution, consisting of a standardized interface and a cellular phone. The interface could be Bluetooth or a standardized cable connection.

2.2.1 Phone based solution:

- IVS must be able to establish a connection with customer's mobile phone.
- IVS must relay information regarding the connection (mobile phone – vehicle) to the user (e.g. driver).
- IVS must detect when an 'eCall trigger' has been initiated.
- IVS must transmit via the connection the vehicle ID and other vehicle specific MSD content to customer's mobile phone.

´Actors: Vehicle
Mobile Phone (must provide position with the required accuracy and must put together the MSD)

2.2.2 Embedded solution:

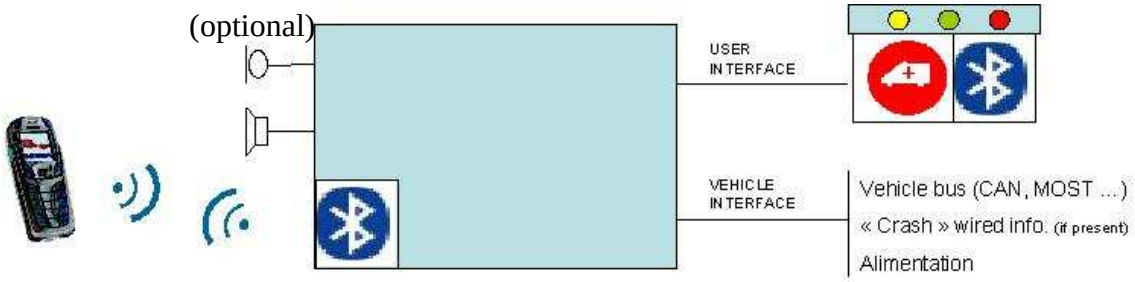
- IVS must detect when an 'eCall trigger' has been initiated.
- IVS must initiate eCall voice connection with mobile network operator (MNO).
- IVS must send the MSD to MNO.
- a voice connection is initiated between IVS and PSAP by the MNO in case of a disconnected eCall.

Actors: Vehicle
eCall User
Telecom Network

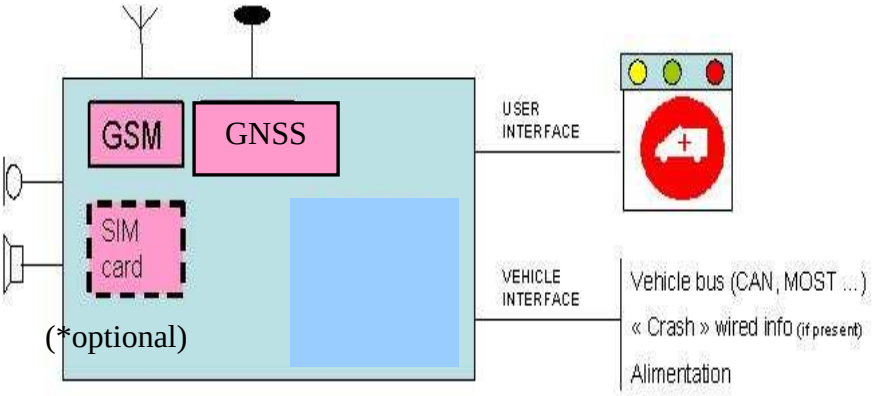
2.3 Interfaces

Are described below the two vehicle interface configurations, according to the e-call solution.

Example for phone based configuration:



Embedded configuration:



(* use of eCall system without a SIM-Card must be possible)

3 Functional Specification

The In Vehicle system must fulfil the specific OEM automotive requirements:

3.1 User-Interface Elements

The eCall system consists of the following elements:

1. 112-button (SOS)
   This button starts and ends the manual emergency call. The manual call will only be started when the button is pushed for at least 2 seconds.

   A call will be aborted or ended immediately when pushing the button for at least 1 second during a call or the initiating of a manual or automatic call.

   By starting a call, an acoustic feedback (beep for 0.5 sec) will be played.
   By ending/aborting a call an acoustic feedback (2 beeps in 0.5 sec) will be played
   The call must be given the highest priority.

2. System status indication with colour status light or alphanumerical display. The following status should be indicated:

   Yellow – Indicates that no mobile phone is connected to the eCall system.
   Blinking Yellow – The light blinks yellow if the Bluetooth connection is being in progress.
   (Green – The eCall system is powered ON and ready to make calls.)
   Blinking Green – The light blinks green to indicate a call is being connected or in progress.
   Red – This signals that your eCall system may not be functioning properly.

   all colours to be discussed of dimming and blending character

3.2 Arming and desarming

The system is armed when ignition is ON, and disarmed when ignition is OFF.

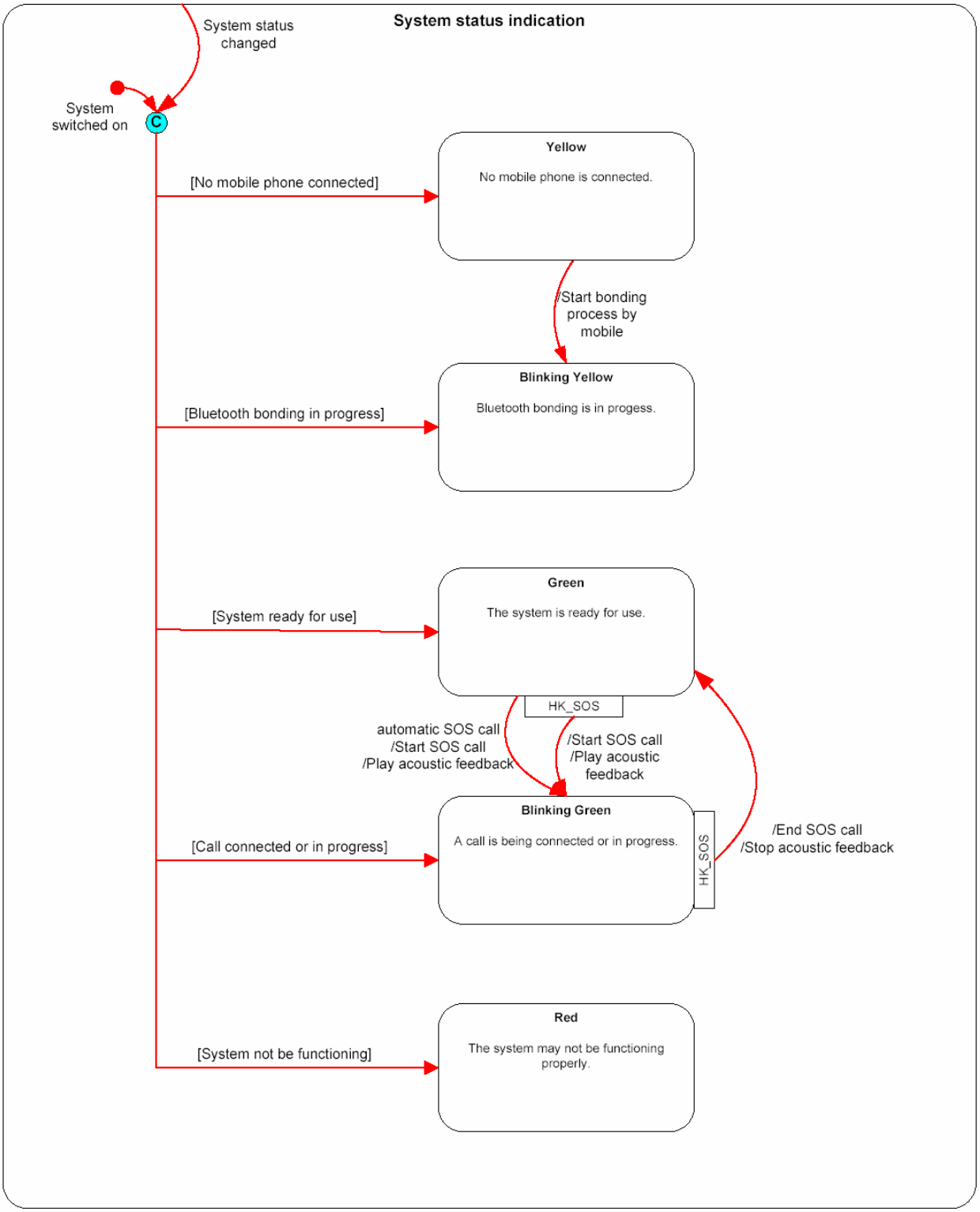
3.3 Manual activation

3.3.1 Manual triggering State chart

Manual triggering via a SOS button inside the vehicle pushed by the driver or passenger

(Statechart to be provided by Mr. Lenart ?)

3.3.2 *Human Machine Interface for phone based Bluetooth solution*



3.3.3 Statecharts

3.4 Automatic activation

3.4.1 *Triggers*

Automatic triggering generated by a „crash signal“, created in the airbag control module or in case of vehicles without airbag systems from …. (to be provided by Mr. Holthuisen/Mr. Liske)

The „crash signal“ can be:
- airbag deployment
- other crash information status (→ a severe accident has happened), e.g. created in the airbag control module without deployment of an airbag (e.g. rear crash), in responsibility of the manufacturer of the specific vehicle.

3.4.2 HMI

tbd

3.4.3 Statecharts

tbd

3.4.4 Call Back functionality

The IVS must try to reestablish an interrupted call unless the preassigned destination address (e.g. PSAP) has terminated the call intentionally.

3.5 Localization

Reference point is vehicle geometric vehicle centre

3.5.1 Location accuracy (according to US E911)

+-150m 95% of the time
+-50m 67% of the time
90% confidence for both

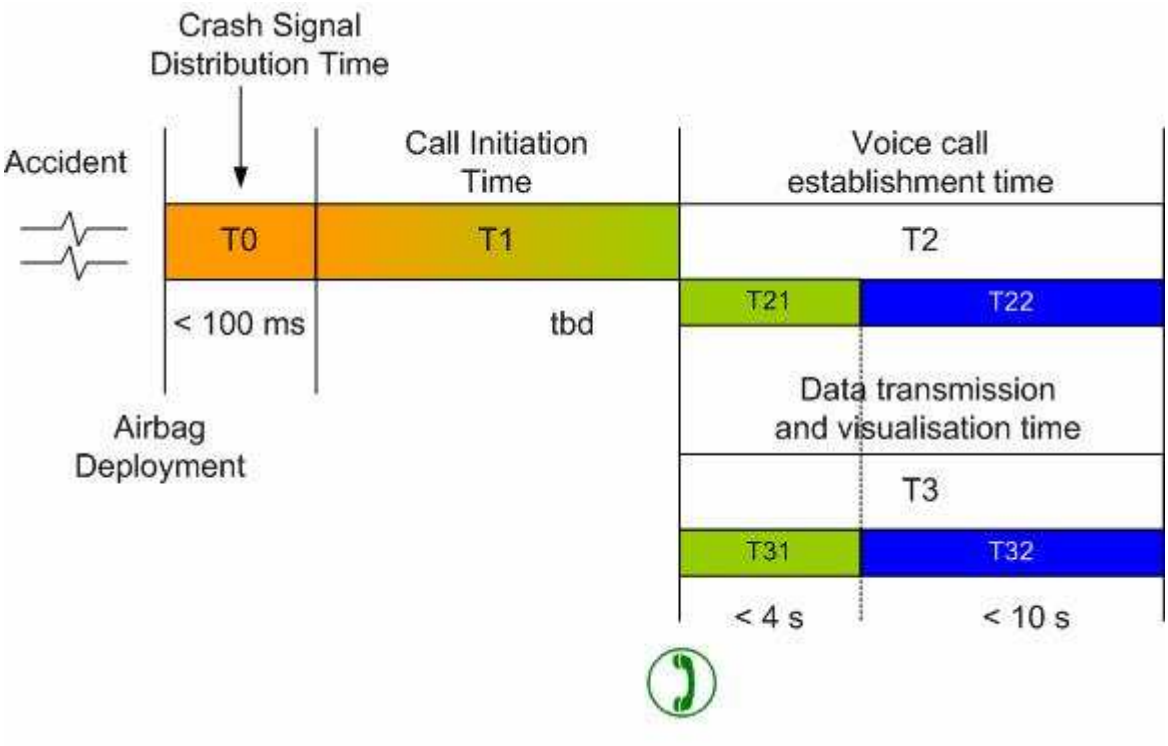
3.5.2 Direction of travel

Direction of travel to be calculated from the last 3 positions.

3.5.3 Confidence on Location accuracy

If the position can not be calculated with the required accuracy (e.g. in a tunnel) the system should indicate this with the confidence bit in the MSD.

3.6 Timing



(Timing must be discussed)

3.7 MSD-Format

Name	Bit		Description
Vehicle identification	119 Bit	17 char a 7 Bit	VIN number is expected as the best unique identifier through the vehicle industry
Time stamp	16 Bit		N x 1,3 Seconds per day
Trigger Type	1 Bit		as a minimum a indication stating if the eCall has been manually or automatically initiated
Location	20 Bit 20 Bit 8 Bit 1 Bit		GNSS Position Latitude (10m) GNSS Position Longitude (10m) Direction of Travel (calculated form the last 3 positions) Confidence Bit (0 = no confidence in position accuracy)
Service Provider	32 Bit	4 x 8 Bit	Optional Service Provider IP Address in IP V4 Format,
Full Set of Data attached	1 Bit		if not equal 0 additional information can be transmitted by XML-Format in the Full Set of Data (FSD)
Sum:	218 Bit		

Footnote:
according to ISO/ETSI 32 characters a 7 Bit (=224Bit) can be transmitted via UUS/ISDN without any delay to the PSAP.

3.8 FSD-Format

Tbd.

4 Annex

4.1 Corresponding documents

Reference to Extended Bluetooth Hands-free-Profile
Reference to ETSI eCall standard
Reference to ISO 3779 / SAE J272

4.2 VIN

Vehicle Identifikation Number Passenger car
(according to ISO 3779 and SAE J272)

Example DaimlerChrysler:
Verwendung/Applications: USA/Kanada mit/with Code 494/460
Andere Länder mit/other countries with Code 986

W	1. – 3. digit	WMI – World Manufactuerer Identifier of the manufacturer DaimlerChrysler AG, Stuttgart
D		
D		
A	4. digit	Line: siehe Blatt 3 / see sheet 3
J	5. digit	he 4. character of type designation encoded: see sheet 3
7	6. – 7. digit	(e.g. 199.378)
8		The last two characters of Mercedes-Benz type designation
X	8. digit	3) Restraint system code (see sheet 3)
2	9. digit	check digit
3	10. digit	model year code see sheet 4)
M	11. digit	production plant (siehe Seite 5 / see sheet 5)
1	12.-17. digit	Fortlaufende, aufsteigende 6-stellige Zählnummer (identisch mit der 12. – 17. Stelle der “EG-Fahrgestellnummer) sequential number, rising from 000001 to 999999
2		
3		
4		
5		
6		