eCall for Commercial Vehicles (HGV), buses and coaches

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Mick Trosh (SA Catapult)
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Agenda

• Act2 overview: objectives, partners, deliverables
• eCall for Commercial vehicles (HGV)
• Events & IVS and PSAP prototypes
• eCall for buses and coaches
• Type-approval and legislation amendments
• Cross-border eCall
• Future work
Activity 2: OBJECTIVES And PARTNERS
How eCall works

Legend:
- PSAP112: Emergency call centre 112
- MSD: Minimum set of data
- Data connection
- Voice connection

1. eCall trucks
2. eCall buses
3. eCall cars & light vehicles
4. eCall PTW (powered two wheelers)

The satellite indicates the precise location of the vehicle.

eCall
Immediately after the collision, the vehicle unit transmits the following data to PSAP 112: time and location of the collision, direction and number of passengers. The occupants may then communicate with the 112 operator.

* Mandatory deployment of eCall for Member States PSAP by 1 October 2017 applies to cars and light vehicles.

eCall for HGV, buses and coaches
Additional data (besides the MSD) may be necessary for the emergency services to be effective. For HGV (including dangerous goods), information on the quantity and type of cargo is the key and external sources of information, for example electronic documents such as ADR and CMR, could be vital.

For buses and coaches, the number of passengers is key and passengers list provided electronically could be very useful for the rescue services.

eCall for PTW
Due to the absence of a collision-indicating trigger, like the airbag trigger in passenger cars nowadays, a specific triggering method is necessary for PTW. This triggering system as well as the statistical injury prediction method will lead to a realistic minimum of false positives and an acceptable level of false negative calls to PSAPs.
Objectives (1)

Analysis of stakeholder needs and specification of interfaces
Objectives (2)

Prototype development and interfacing to existing information sources
Objectives (3)

Development of costs-benefit analysis for each of the specific vehicle groups
Objectives (4)

Recommendations on type approval legislation and next steps towards eCall implementation
Activity 2 partners
Sub-activities

• 2.1 Heavy goods vehicles carrying dangerous goods
• 2.2 Heavy goods vehicles carrying all other types of goods
• 2.3 Long distance buses and coaches
• 2.4 eCall cross-border cooperation with neighbouring countries
### All Activity 2 deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Completeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2.1 Draft specification of eCall for HGV (incl. Dangerous Goods)</td>
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<tr>
<td>D2.2 Prototype IVS and PSAP to demonstrate feasibility of eCall for HGV</td>
<td></td>
</tr>
<tr>
<td>D2.3 Draft specification of eCall for buses/coaches</td>
<td></td>
</tr>
<tr>
<td>D2.4 Final specification of interfaces for eCall for HGV (incl. DG)</td>
<td></td>
</tr>
<tr>
<td>D2.5 Final specification of interfaces for eCall for buses/coaches</td>
<td></td>
</tr>
<tr>
<td>D2.6 Recommendation to adjust type-approval and potential amendments to legislation</td>
<td></td>
</tr>
<tr>
<td>D2.7 Recommendations for implementation of eCall with neighbouring countries</td>
<td></td>
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</tbody>
</table>
Activity 2: eCall for Commercial Vehicles (HGV)
Why eCall for Commercial Vehicles?
Highly disruptive!
eCall working principle
Handling eCall from a Commercial Vehicle

- Operator receives an emergency call
- GPS location, vehicle type, license nr.
- CARGO INFORMATION
Benefits for emergency services

• Information on the cargo helps operator **make decisions on dispatching actions**
• Special tools, protective gear, deviations ...
Useful cargo information

- Consignor
- Carrier
- Phone numbers
- Type of Cargo, quantity
Dangerous goods (ADR)
Consignment note: CMR
Cargo information in IVS

- Cargo data
  - IVS (inside car)
    - Sensors
  - MSD (VIN, ...)
    - Voice

- EUCARIS
  - VIN
  - Vehicle data

- PSAP operator
  - Data
  - Voice

- Emergency Services
Cargo information from external source

- **EUCARIS**
  - VIN
  - Vehicle data

- **HGV information service**
  - Key
  - Cargo data

**PSAP**
- Operator
- Data
- Voice

**IVS (inside car)**
- MSD (VIN, key, ...)
  - Voice

**Sensors**

**Emergency Services**
Interoperability
Connectivity Everywhere
Cargo Databases in different countries

External Cargo Information Databases

PSAP

HGV Information Service

Security and Format aspects
Data format

- Single data format: e-CMR
- UN/CEFACT data model for standardised electronic consignment note and appropriate message schemas (under public consultation)
Bulc said she would like to see all EU member states adopt the protocol by the time her term ends in 2019.

She also reiterated the importance of more EU member states adopting the e-CMR (electronic consignment note) protocol, which allows for electronic filing of legal transport documents and billing. Late last year, France and Estonia joined just nine other members of the EU, along with Switzerland, in adopting the protocol.

Access to cargo information

• Decentralised
• Centralised (e.g. EUCARIS)
Cargo information Proxy

PSAP

Cargo information PROXY

request

e-CMR

HGVIS

request

e-CMR
(or other formats)
D2.4 Final specification of interfaces for eCall for HGV (incl. DG)

- TS16405 Schema A and Schema B
- e-CMR for cargo information
- Architectures: centralised or PKI-based
- Automatic triggering not trivial
Questions?
Activity 2: EVENTS & IVS and PSAP Prototypes
D2.2 Prototype IVS and PSAP to demonstrate feasibility of eCall for HGV

• Report on development
• IVS: 4
• PSAP: 8
• Implemented eCall for HGV (Schema A and Schema B)
• Test cases
ITS Strasbourg

• 19 - 22 June 2017
Demo tour: Torino, Italy

- SmartMobilityWorld 10-11 October 2017
Demo tour: Lisbon, Portugal

• 10 October 2017
Demo tour: Ljubljana, Slovenia

• 16 October 2017
Demo tour: Athens, Greece

• 24 October 2017
Demo tour: Ostrava, Czech republic

• 30-31 October 2017
eCall Testfest

- 9-13 October in Kranj, Slovenia
- > 80 registered participants
- Implementation of eCall for HGV
- Instructions for IVS and PSAP developers
BUSWORLD

• Survey on eCall for buses and coaches
Implementation and testing of eCall for HGV using CTAG IVS prototype

Jose Manuel Martínez
David Carro
Equipment

- Compliant with last eCall standard versions (ETSI, CEN, ISO)
- ETSI standards compliant tested in plug tests #2013 & #2014
- Independent power supply
- CAN BUS connection for automated triggering of eCalls.
- HMI: User interface (audio, mic and launch button) integrated in vehicle
- CTAG Data logger: connected to IVS and CAN BUS store all necessary measurements to KPI calculation
- Remote positioning of vehicles in real time
- Remote triggering of automated eCall by emulation of airbag CAN signal
Testing

- Schema A: the cargo information is included directly in the additional data field of the MSD messages
- Schema B: the cargo information is provided by an external source, commonly a web address of the transport company that is included in the MSD
- Testing plan included in *D2.2 Prototype IVS and PSAP to demonstrate feasibility of eCall for HGV*

Objectives:
- Check the performance of both implementations evaluating success rate of MSD transmissions targeting different scenarios
- Comparative study of success rates between both implementations A and B

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Weather conditions</th>
<th>Satellite visibility</th>
<th>GSM coverage/quality</th>
<th>Driving conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-001</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Normal</td>
</tr>
<tr>
<td>SC-002</td>
<td>Normal</td>
<td>Good</td>
<td>Weak</td>
<td>Normal</td>
</tr>
<tr>
<td>SC-003</td>
<td>Normal</td>
<td>Normal</td>
<td>High traffic load</td>
<td>Normal</td>
</tr>
<tr>
<td>SC-004</td>
<td>Bad</td>
<td>Bad</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>SC-005</td>
<td>Normal</td>
<td>Bad</td>
<td>Bad</td>
<td>Presence of tunnels</td>
</tr>
<tr>
<td>SC-006</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>High speed conditions</td>
</tr>
</tbody>
</table>
Testing

- Ongoing eCalls tested with two I_HeERO PSAPS Beta80 and Vitkovice
- Results and conclusions to be included as annex of D2.2 Prototype IVS and PSAP to demonstrate feasibility of eCall for HGV

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Comments/Procedure</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI_001</td>
<td>Number of automatically initiated eCall</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>KPI_002</td>
<td>Number of manually initiated eCall</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>KPI_003</td>
<td>Success rate of completed eCalls (using long number)</td>
<td>An eCall is considered as completed when the vehicle occupants and the PSAP operator are able to establish communication and the MSD content was correctly decoded and presented in the PSAP's interface.</td>
<td>%</td>
</tr>
<tr>
<td>KPI_004</td>
<td>Success rate of received MSDs</td>
<td>The MSD is received even if it is correctly decoded or not</td>
<td>%</td>
</tr>
<tr>
<td>KPI_005</td>
<td>Success rate of correct decoded MSDs</td>
<td>The MSD was received and is correctly decoded by the PSAP</td>
<td>%</td>
</tr>
<tr>
<td>KPI_006</td>
<td>Time until MSD is presented in PSAP's interface</td>
<td>Starts when the call is triggered and stops when the MSD data is presented in PSAP's interface. This KPI must be measured and provided by the PSAP operator</td>
<td>s</td>
</tr>
<tr>
<td>KPI_007</td>
<td>Time needed to transmit the MSD message</td>
<td>Starts when IVS starts to send the MSD message and stops when IVS receives an AL-ACK signal. This KPI must be measured and provided by the PSAP operators</td>
<td>s</td>
</tr>
<tr>
<td>KPI_008</td>
<td>Success rate of established voice transmissions</td>
<td>The voice channel must be enabled during the call event if the MSD was transmitted/decoded successfully or not</td>
<td>%</td>
</tr>
<tr>
<td>KPI_009</td>
<td>Success rate of call-backs launched by PSAP</td>
<td>The PSAP is able to call back the IVS when the connection is lost</td>
<td>%</td>
</tr>
<tr>
<td>KPI_010</td>
<td>Rate of MSD retransmissions needed</td>
<td>This KPI determines whether or not the PSAP operator needs the IVS to retransmit the MSD message due to failures during transmission or decoding process</td>
<td>%</td>
</tr>
<tr>
<td>KPI_011a</td>
<td>Success rate of access to cargo information using an external source (only for Schema B)</td>
<td>PSAP operator must be able to access to the cargo information through an external source specified by the IVS in the MSD message</td>
<td>%</td>
</tr>
<tr>
<td>KPI_011b</td>
<td>Success rate of access to cargo information using an external source when more than 1 cargo is carried by the vehicle (only for Schema B)</td>
<td>If there is more than one cargo loaded in the vehicle, the PSAP operator must be able to access all cargo information through the external source specified by the IVS in the MSD</td>
<td>%</td>
</tr>
<tr>
<td>KPI_012a</td>
<td>Success rate of cargo information decoding (only for Schema A)</td>
<td>The cargo information must be correctly specified in the additional fields of the MSD message</td>
<td>%</td>
</tr>
<tr>
<td>KPI_012b</td>
<td>Success rate of cargo information decoding when more than 1 cargo is carried by the vehicle (only for Schema A)</td>
<td>If there is more than one cargo loaded in the vehicle, the additional data fields of the MSD must contain the information related to all the cargo</td>
<td>%</td>
</tr>
</tbody>
</table>
Questions?
Activity 2.5 Long Distance Buses and Coaches

Mick Trosh
(Satellite Applications Catapult)
Activity description

Sub-activity 2.3 Long distance buses and coaches.
A study on eCall for long distance buses and coaches will make a strong contribution to increasing road safety. Knowing if a long distance bus or a coach is carrying 5 or 45 passengers at the time of a collision can have vast impact on the emergency team readiness to handle rescue missions efficiently.

<table>
<thead>
<tr>
<th>Task 1</th>
<th>Passenger count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- from reliable <strong>external</strong> sources through dynamic passenger data</td>
</tr>
<tr>
<td></td>
<td>(where passenger lists/db exist)</td>
</tr>
<tr>
<td></td>
<td>- Estimation at any point of the journey</td>
</tr>
</tbody>
</table>

| Task 2            | eCall Activation mechanism - for bus & coach                                   |

Deliverables

<table>
<thead>
<tr>
<th>Deliverable 2.3</th>
<th>Draft specification of eCall for buses/coaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliverable 2.5</td>
<td>Final specification of interfaces for eCall for buses/coaches</td>
</tr>
</tbody>
</table>
Discussion Agenda

• Context setting
• Method
• Finding’s
• Conclusions
Commercial Vehicle Vs Bus and Coach
Differences
Buses and Coach Differences

Bus

- More local routes
- Specific timetable and routes
- Passengers on demand at bus stops
- Tickets on bus or before entry
- No Seat Belt requirement
- Standing allowed
- Unsecured passenger luggage
- Potential limited connectivity
Coaches

- Tend to travel longer distances
- Cross borders
- Mandatory fitment of seat belts
- No standing passengers
- Secured luggage
- Pre paid tickets
- Passenger data
- Limited Connectivity
<table>
<thead>
<tr>
<th>UC Ref</th>
<th>Requirement: Short Definition</th>
<th>Explanation</th>
<th>PERFORMANCE METRIC</th>
<th>Demonstrator Must Have (M)/Should have (S)/Could Have (C) Won’t Have (W)</th>
<th>Full System Must Have (M)/Should have (S)/Could Have (C) Won’t Have (W)</th>
<th>Test Plan Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>MUST HAVE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UC 1</strong></td>
<td><strong>STRATEGIC ISSUES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UC 1.1</strong></td>
<td>Legal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11001</td>
<td>The user requires that the final specification relates to specific relevant types of vehicles.</td>
<td>These UR’s are specific only to EU Categories M2 &amp; M3 vehicles. Defined as vehicles with more than 8 passenger seats including the driver</td>
<td>M</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11002</td>
<td>The user requires that this specification relates to buses.</td>
<td>Defined as vehicles with more than 8 passenger seats including the driver. These vehicles in most cases travel on shorter routes and: • Operate to a timetable • On specific routes • Semi random, unplanned stops at passengers request to alight or embark at marked bus stops • Little or no use of seat belts • Generally, no passenger data available, Except, where ticketing is prepaid for example on a card (Oyster Card-London),</td>
<td>M</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Critical User Requirements Identified
Connectivity Everywhere
eCall for Buses and Coaches

• Number of Passengers
Passenger Numbers-Potential Solutions

Coaches

• Passenger Databases

Buses and Coaches

• Passenger Counting Technology
  – IR
  – CCTV

• Data from Canbus-Air Suspension
Rollover

• Has the vehicle rolled over?
• AND
• How many times?
Potential Sources of Information

- Telematics Devices
- Rollover Devices
- CanBus
Manual Activation

• eCall Button Placement for Driver
• Additional eCall buttons for passenger use
Specification - Proposals

• Schema A: Where specific Information is loaded onto IVS
  – Manually
  – Automatically from Vehicle Sensors

• Schema B: Where URL is provided as part of the MSD, which links to an external data source for additional information.
Further Work - Recommended

- Triggering Issues
- Access to Bus and Coach Operator Databases
- Connectivity Everywhere
  - eCall over Sat Comms?
Any questions?

Thank you for your attention!
Activity 2.6: Recommendation to Adjust Type Approval and Potential amendments to Legislation

Mick Trosh
(Satellite Applications Catapult)
Discussion Agenda

• Legislation reviewed
• Findings
• Conclusions
Activity description

• Recommendations to Adjust Type Approval and Potential amendments to Legislation
Legislation Reviewed

- Regulation (EU) 2015/758; which relates to the type approval requirements for the deployment of an eCall in-vehicle system in light passenger cars.

- Commission Delegated Regulation (EU) 2017/79; which details the technical requirements and test procedures for the EC Type Approval of motor vehicles with respect to their 112-based eCall in-vehicle systems including the separate technical units and components.
Legislation Reviewed Cont’d

- European Community Whole Vehicle Type Approval (ECWVTA): Directive 2007/46/EC
- ATEX Regulations (affecting vehicles working in explosive atmospheres)
- ADR Regulations (Relating to the carriage of dangerous goods)
- Data Protection Legislation
Vast Majority of Legislation

• Very little difference to that of light passenger vehicles,

• However, may need slight amendment to reflect uniqueness of commercial vehicles, buses and coaches

• Will require further work re: Triggering
Main Issue: ATEX Regulations

• Relating to vehicles working in potentially explosive atmospheres e.g. Petrol Tankers
• Requirement to de-power all electrical equipment when loading UNLESS
• Specific Requirements met
• eCall requirement to remain powered for 1 hour, post main battery disconnection
Overall Conclusion

• Whilst the vast majority of the legislation outlined will only require minor amendment and updating, the main issue is related to those vehicles subject to the ATEX Regulations (Hugely Complex), for example petrol tankers.
• These regulations have specific technical requirements that must be complied with when operating in explosive atmospheres and any eCall IVS will need to be compliant.
• It is therefore recommended that expert guidance is sought, prior to the writing of the eCall technical specification for these types of vehicles
• Further work required to ensure that any connection to an external data is compliant with Data Protection Legislation
Any questions?

Thank you for your attention!
Activity 2: Cross-border eCall
D2.7 Recommendation for implementation of eCall with neighbouring countries

- Identified use cases
- (Pan-European) eCall and ERA-GLONASS
- Interoperability testing needed
- HGV cargo information: challenge!
Activity 2: Future work
eCall Triggering

- Automatic triggering criteria (airbag, cargo sensors ...)
- Button placement
- Passengers (misuse)
Access to Cargo information

• Architecture?
• Security and Privacy issues
• e-CMR adoption
ADR / ATEX

- Need additional expert work
- Costly implementation
Buses and coaches

- Passenger count!
- On-board sensors / systems
- External databases: difficult to implement!
- Satellite connectivity
Questions?
Thank you for your attention!