



Achieving a Digital Single Market for Connected Cars

eCall – implementation status, learnings and policy recommendations

A study for Vodafone – April 2016

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Foreword by Erik Brenneis, Director, Vodafone IoT



eCall is an important opportunity for government and industry to work together to reduce emergency services response times for motorists involved in accidents and to save lives in the EU. Vodafone fully supports the eCall initiative. As the European Commission develops policies to create a Digital Single Market for Connected Cars, we also think there is much to learn from Europe's experiences in implementing eCall.

I am very pleased to confirm that all of Vodafone's 12 EU mobile networks are able to recognise eCalls and are therefore 'eCall-ready'. However, as full eCall implementation requires action on the part of national governments, automotive manufacturers and mobile operators, Vodafone commissioned this study from SBD because we wanted to help address any remaining challenges that might exist before the eCall 'launch' date of 31 March 2018, when new cars type approved in the EU must be equipped with an eCall device.

Based on the findings, it is clear that the majority of EU Member States have moved quickly to ensure eCall readiness, and the study highlights a number of best practices in this respect. However, it is also apparent that some Member States still have much work to do.

For the significant majority of Member States where work still needs to be done, we still have time to ensure that the deployment is completed on time. However, for the others we risk running out of time if we do not finalise national eCall plans and start the deployment of the necessary PSAP upgrades within the coming months.

There are also a number of practical steps that industry and government can take to answer other questions often associated with eCall, and the study makes a number of additional recommendations to advance the debate here.

We hope this report will provide an insightful guide for those implementing eCall across the EU, and that European citizens and consumers benefit as a result.

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Abbreviations used in the report	Definition
HeERO 1, 2 & I	Harmonised eCall European Pilot – co-funded projects to support the implementation of eCall
MNO	Mobile Network Operator
OEM	Original Equipment Manufacturer - vehicle manufacturer
PSAP	Public Safety Answering Point – the physical location where emergency calls are first received
TCU	Telematics Control Unit - the in-vehicle eCall device
TPS-eCall	Third Party Services-supporting eCall – private eCall

1. Summary & policy recommendations



Executive summary



In the event of a crash, an eCall-equipped vehicle will automatically trigger an emergency call, which sends information on the accident, including location, to the emergency services. Studies have shown that eCall cuts emergency services response time by 50% in the countryside and 60% in built-up areas. However, although pan-European 112 eCall was conceived in the early 2000s, it took until April 2015 for the final piece of legislation to be passed, ensuring all new vehicle models type approved from 31st March 2018 will be equipped with eCall.

The EC continues to support the planning and deployment of eCall through various initiatives, including the European eCall Implementation Platform (EeIP) and the co-funded HeERO projects, but there is growing evidence that some stakeholders will struggle to achieve the mandatory deadlines for being eCall-ready, including Member States who are required to ensure that their PSAPs can process eCalls by 31st October 2017.

The main timing concerns are focused on a relatively small number of Member States who have yet to take decisive action towards the deployment of eCall, or who need to accelerate their activities:

22 Member States currently appear on track to enable the reception of eCalls by October 2017, although some hurdles remain:

Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Portugal, Romania, Slovenia, Spain, Sweden

6 Member States are at risk regarding their ability to enable reception of eCalls by October 2017, largely due to the lack of a clear national eCall strategy:

France, Malta, Netherlands, Poland, Slovakia, United Kingdom

Urgent activity is required if the outlying Member States are to have their PSAPs eCall-ready by October 2017. The recommendations and 5-point deployment plan outlined on the following pages are intended to provide best practice suggestions for how to move forward.

This report also makes a number of recommendations on 12 other questions that are often raised in relation to eCall, including how eCall will be managed in the vehicle's periodic technical inspection, numbering for eCall and how mobile operators will be informed when a specific vehicle is no longer in circulation and hence eCall support is no longer needed.

Member State policy recommendations



We identify two critical areas for Member States if they are all to meet their deadline of being eCall-ready by October 2017:

- Member States that do not currently have a *deployment plan for eCall* should urgently develop such a plan by **June 2016** at the latest. The end-to-end deployment process typically requires 18-24 months of dedicated activity, and so the risk of one or more Member States missing the deadline is already high.
- Member States should provide their *eCall routing tables* to network operators by **August 2016** to ensure that the networks are eCall-ready and tested by the end of 2016. There is currently no specific deadline for this task.

We also recommend that Member States should :

- Appoint an 'eCall champion' at the national level to be the focal point for all activities across stakeholders
- Ensure a primary role in the deployment of eCall for the relevant Ministry for PSAPs, as opposed to delegating eCall only to the Ministry of Transport
- Launch a stakeholder awareness campaign to explain that eCall legislation does not need to be transposed into national legislation (this was reported as a barrier by a number of respondents during the research for this report)

Putting the requirements into context:

- Experience has indicated that for the first 2 years of operations, one PSAP per Member State (with a back-up PSAP for resilience) should be sufficient to manage all eCalls.

Member States – best practice learnings

We have also identified best practice examples from early adopter Member States that provide tangible examples to help accelerate deployment of eCall in those Member States still developing their implementation plans in order to achieve the PSAP readiness deadline of October 2017:

Czech Republic



Informing its citizens about eCall

Romania



Demonstrating the value of an eCall champion in its model implementation

Spain



Developed a state-of-the-art technical solution

Germany



Cross-stakeholder forum for emergency call related matters, across highly complex federated states

Greece



Leveraging existing technology to provide an eCall solution at minimal cost

Hungary



Excellent cost-benefit analysis of eCall

Recommendations for residual issues

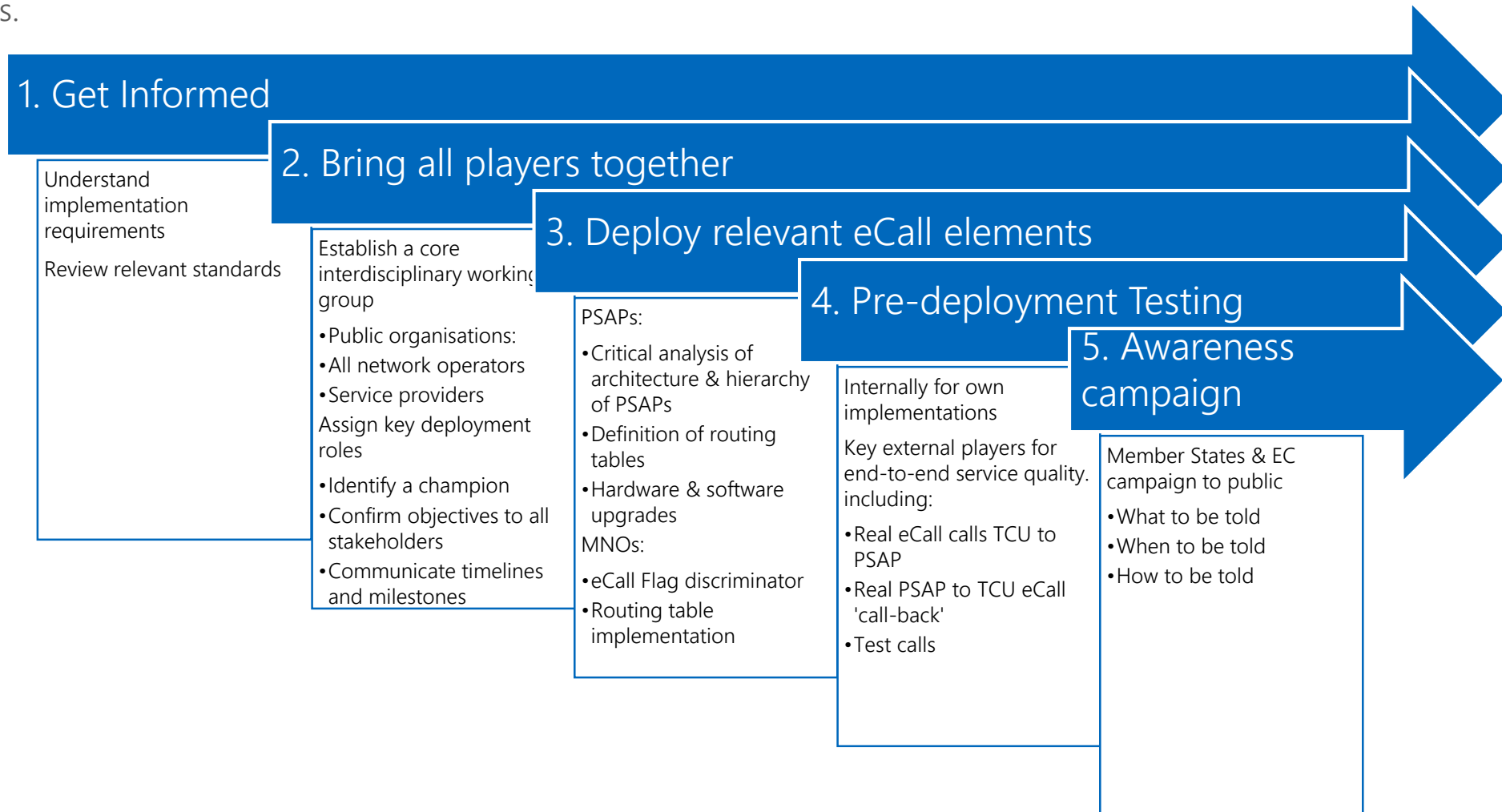


We make a further twelve suggestions to address open issues that are often raised in relation to eCall (see Section 5 for details).

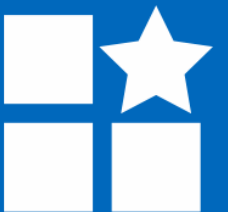
Issue	Recommendation	EC	Member State	MNO	OEM	Others
End of vehicle life	Strong action required by the EC to determine an appropriate solution ASAP	✓				
Periodic technical inspection	Strong action required by the EC to define open areas ASAP	✓				
SIM update procedure	A standardised process is required to ensure compatibility across all TCUs and MNOs	✓		✓	✓	TCU supplier
Open-access platform	Action required by the EC to ensure that the business planners from OEMs and other stakeholders are involved in the discussions, and not just the R&D engineers	✓				
False eCalls	Member States must ensure that they have included a dedicated process for managing false eCalls in their PSAP architecture, together with a national awareness campaign		✓			
2G switch-off & eCall over 4G	OEMs are recommended to equip their vehicles with a 2G/3G TCU whilst PSAPs should include eCall-over-LTE in their plans for receiving emergency calls via IP networks		✓		✓	
Testing 'real' eCall	PSAPs should conduct end-to-end testing with their MNOs using 112, the eCall flag, commercial equipment etc.		✓	✓		ETSI
National number exhaustion	Use of ITU supranational numbers should be an effective solution			✓		
Caller Line ID	The use of extraterritorial E.212 numbering fosters the presence of CLI for PSAP call-back to the vehicle			✓		
eUICC subscription update procedure	A standardised process is required to ensure compatibility across all TCUs, MNOs and Subscription Managers			✓		Subscription Managers, TCUs
Testing the inactive TCU state	Testing is required for the TCU to confirm the first-ever implementations of an inactive state				✓	TCU supplier
Operating costs	National Regulatory Authorities should review the per call costs charged to MNOs to ensure appropriate ex-ante regulation is in place					NRAs

A 5-point plan for implementing eCall

The basic steps for implementing eCall are relatively simple, as illustrated below. The challenge is in ensuring that the key players are all united and working together towards the final implementation objective and timeline. The complexity of working with all of those in the value chain can be quite significant at the Member State level, especially in ensuring transparent communication and resolving technical queries across different domains.

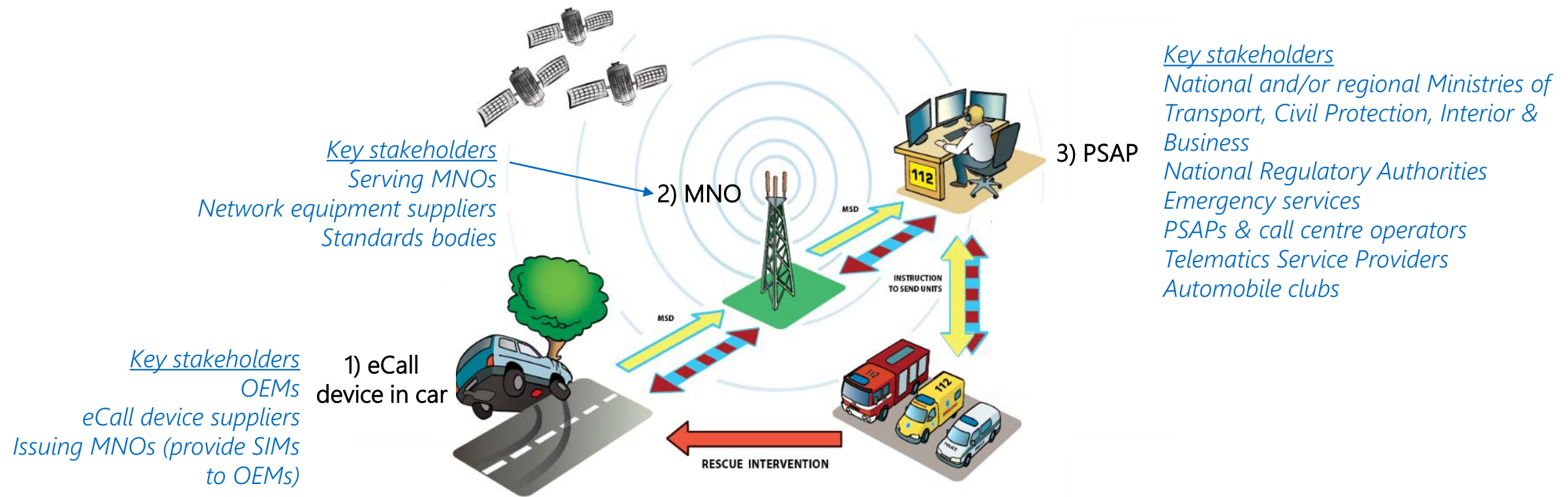


2. Introduction



eCall requires a co-ordinated approach across a range of stakeholders

One challenge for eCall has been the sheer number and different types of stakeholders required across the value chain for successful deployment, as illustrated below:



A key learning from the HeERO projects is that cross-competency working groups should be established at a national level to bring together specialists in regulatory affairs, the technical process and solution implementers. Examples include Czech Republic, Romania, Croatia where working groups have been created on eCall including the government contacts (PSAPs and NRA) and the MNOs.

Who needs to do what?



Despite the overall complexity, three stakeholder groups have a legal obligation to support the deployment of eCall:

Who`	Objective	Legislation title	Implementation deadline	Key requirements
Member States	Enable the reception of eCalls by the Public Safety Answering Points (PSAPs)	<i>DECISION No 585/2014/EU of the European Parliament and of the Council on the deployment of the interoperable EU-wide eCall service</i> (OJ L 164, 3.6.2014 p.6-9) – LINK	1 st October 2017	• Free of charge to end users • Emphasis on personal data protection • Fully deployed across each nation (subject to network coverage) • Emphasis on public awareness
OEMs	Equip new type-approved models with an embedded eCall device	<i>REGULATION (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC</i> (OJ L 123, 19.5.2015, p. 77–89) – LINK	31 st March 2018	• Device to be permanently installed • Automatic and manual triggering • Compatible with Galileo and EGNOS positioning systems • Optional support for private (TPS) eCall
MNOs	Enable the transmission of eCalls from the car to the PSAP	<i>COMMISSION RECOMMENDATION of 8 September 2011 on support for an EU-wide eCall service in electronic communication networks for the transmission of in-vehicle emergency calls based on 112 ('eCalls')</i> (OJ L 303, 22.11.2011, p. 46–48) – LINK <i>(The Recommendation states a deadline of 31st December 2014, but this was extended to 31st March 2016 in the Regulation referenced above.)</i>	31 st March 2016	• Recognise eCalls through the presence of the eCall discriminator (flag) • Route eCalls to the appropriate PSAP through routing tables supplied by the Member State

The risk of missing deadlines



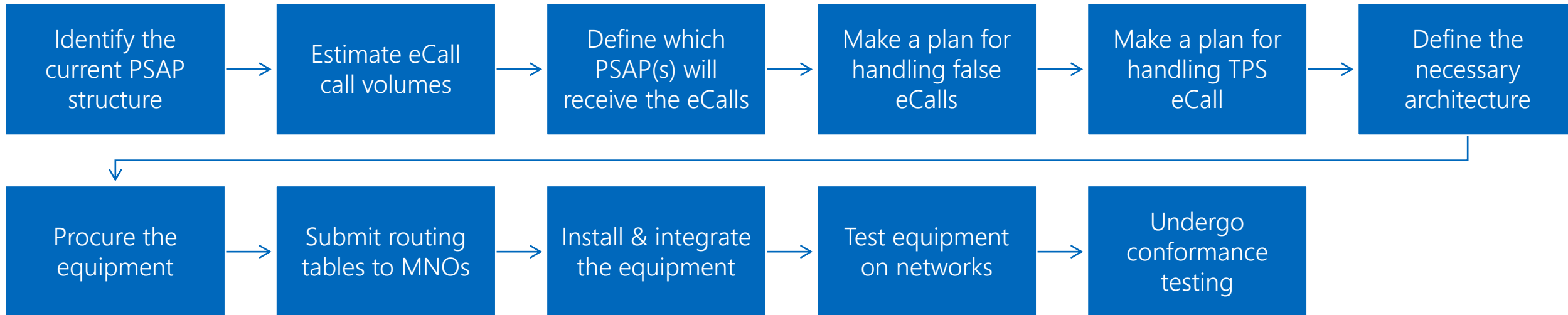
The OEMs and MNOs are on track to implement eCall, but a number of Member States face a challenge to be eCall-ready on time.

	Member States	OEMs	MNOs
Technical challenges	LOW It is relatively easy to upgrade individual PSAPs with the necessary modem to receive and decode eCalls	MEDIUM - Off-the-shelf eCall devices now available, but OEMs responsible to ensure reliable operation - Testing procedures not fully defined	LOW eCall has been supported in network software updates from the major equipment vendors since 2012 (Release 8)
Process challenges	HIGH - Deciding which PSAP(s) should receive eCalls - Unclear ownership of eCall implementation at a national level	LOW OEMs know how to develop in-car systems	MEDIUM Network operators need to rely on Member States to supply routing tables
Direct costs	MEDIUM Investment costs vary considerably by country depending on PSAP architecture	LOW Per vehicle cost is relatively low, but overall cost is very high when summed across all vehicles	LOW Network software is typically upgraded every 1-2 years, so support for eCall is typically added by default
Overall risk of missing deadline	HIGH for ensuring eCall-ready PSAPs to be ready in <u>all</u> Member States	LOW for meeting type approval requirements	LOW for eCall-ready networks

Implementation checklist for Member States



As described on the previous slide, Member States face a greater risk of missing their deadline for implementing eCall compared with the OEMs and network operators. This is because each country needs to develop its own solution based on its existing PSAP architecture and organisational structure, rather than simply implementing a common standardised approach. However, the experiences of the HeERO projects have resulted in a step-by-step guide that a Member State can follow in order to be eCall-ready:



In reality, however, each Member State is at a different level of deployment and readiness for eCall. The next chapter of this report seeks to confirm the implementation status of eCall in each Member State whilst the subsequent two chapters provide suggestions and recommendations of best practice for Member States and an overview of residual issues respectively.

3. Member States – readiness check



The EC has been in ongoing discussions with Member States regarding the difficulties that they face in deploying eCall and the status of implementation for several years. The last detailed EC survey was completed in 2012 (although some general information was also provided to the EC in 2014).

Nonetheless, general indications on the status of most Member States are known through their discussions with the EC, the participation in the HeERO projects, and from an Implementation Survey conducted for this report. The questionnaire developed to support this survey was undertaken across the 12 Member States where Vodafone has an operating company (Czech Republic, Germany, Greece, Hungary, Ireland, Italy, Malta, Netherlands, Portugal, Romania, Spain and UK).

This report categorises the eCall deployment status of Member States based upon the following criteria:

- *Involvement in HeERO projects & historic engagement with the eCall process*
- *Engagement with relevant stakeholders*
- *Existence of a clear national eCall strategy*
- *Technical readiness, in particular PSAP upgrade process has started*
- *Initiation of end-to-end testing*

A number of the respondent Member States were HeERO project participants, and as such, had a clear view on the scope and scale of the issues to be faced in achieving eCall upgrade. Furthermore, a number of respondents have elected to take advantage of the European Commission Connected Europe Fund's annual call inviting applications to obtain funding to achieve PSAP upgrade: these Member States are using the project as a mechanism to facilitate the necessary technical and strategic decisions around eCall deployment.

Those Member States who have yet to undertake any form of activity demonstrated the least knowledge regarding the process itself, the possible obstacles to be encountered, as well as the path for eCall deployment and the required future upgrades.

Positioning of Member States

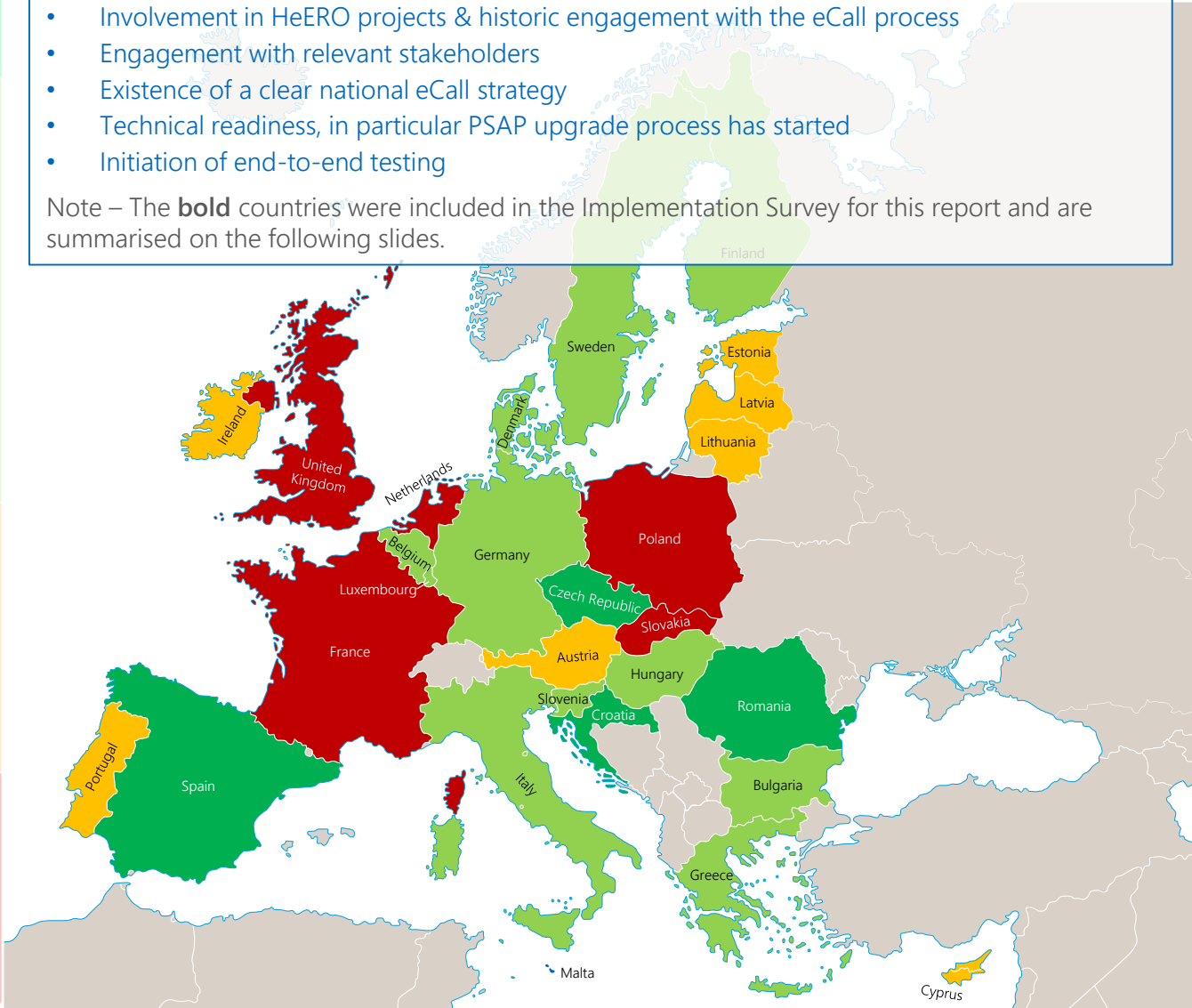


Innovators	Croatia	Member States which have consistently led the debate technically and organisationally for the deployment of eCall, by participating in the pre-deployment projects for eCall, and who have continued developing the initial work.
	Czech Republic	
	Romania	
	Spain	
Early Adopters	Belgium	Member States which have proactively been engaged in pre-deployment projects, fostering understanding of technical and organisational challenges that need to be overcome to deploy eCall.
	Bulgaria	
	Denmark	
	Finland	
	Germany	
	Greece	
	Hungary	
	Italy	
	Luxembourg	
	Slovenia	
	Sweden	
Late Adopters	Austria	Member States which have taken active steps more recently to ensure that they will be eCall-ready in time for the deadline.
	Cyprus	
	Estonia	
	Ireland	
	Latvia	
	Lithuania	
	Portugal	
At Risk	France	Member States which do not appear to be actively engaged with eCall, even if they may have engaged with initial work on eCall deployment.
	Malta	
	Netherlands	
	Poland	
	Slovakia	
	United Kingdom	

The Member States can be categorised into 4 groups according to their involvement in the eCall implementation process to date, considering:

- Involvement in HeERO projects & historic engagement with the eCall process
- Engagement with relevant stakeholders
- Existence of a clear national eCall strategy
- Technical readiness, in particular PSAP upgrade process has started
- Initiation of end-to-end testing

Note – The **bold** countries were included in the Implementation Survey for this report and are summarised on the following slides.



Member States – best practice learnings

We have also identified best practice examples from early adopter Member States that provide tangible examples to help accelerate deployment of eCall in those Member States still developing their implementation plans in order to achieve the PSAP readiness deadline of October 2017:

Czech Republic



Informing its citizens about eCall

Romania



Demonstrating value of an eCall champion in its model implementation

Spain



Developed a state-of-the-art technical solution

Germany



Cross-stakeholder forum for emergency call related matters, across highly complex federated states

Greece



Leveraging existing technology to provide an eCall solution at minimal cost

Hungary

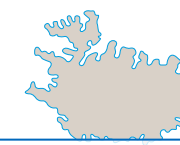


Excellent cost-benefit analysis of eCall

Czech Republic

Innovators	Croatia	Type of PSAP	14 regionally-based PSAPs
	Czech Republic		
	Romania		
	Spain		
Early Adopters	Belgium	Process of overall PSAP upgrades	The Czech Republic participated in pre-deployment projects and has embarked upon the necessary upgrades to make it eCall-ready, though not fully implemented. It participates in the EC's Connecting Europe Facility (CEF) funding initiative to complete the deployment
	Bulgaria		
	Denmark	Expected eCall change to PSAP	The necessary PSAPs have been identified and the technical changes and operational requirements are ready to be rolled out
	Finland		
	Germany		
	Greece		
	Hungary	Status eCall upgrade deployment & remaining risks	Ready to complete upgrade to eCall and awaiting conformity assessment specifications for completion
	Italy		
	Luxembourg		
	Slovenia		
Sweden	Late Adopters	Best practice application of eCall upgrade	Czech Republic has been a beacon nation for eCall deployment, leading activities with all of the stakeholders in the Member State and beyond
Austria			
Cyprus		Existence of clear champion	Czech Republic has clear Governmental champions that are cross departmental
Estonia			
Ireland			
Latvia			
Lithuania			
Portugal	At Risk	Engagement of wider stakeholder audience	Czech Republic has led the way in informing the citizen
France			
Malta		Participation in eCall pilots (i.e. HeERO)	HeERO & I_HeERO
Netherlands			
Poland			
Slovakia			
United Kingdom			

The Czech Republic, Romania and Spain have lead the deployment of technical innovations for PSAPs



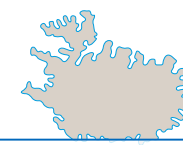
Romania

Innovators	Croatia	Type of PSAP PSAPs are county-based Process of overall PSAP upgrades Romania was a pre-deployment project partner, leading with PSAP development and also addressing the needs of the citizens with the development of an aftermarket eCall device. Expected eCall change to PSAP Existing architecture to be used Status eCall upgrade deployment & remaining risks Ready for deployment – just awaiting conformity assessment specifications for completion Best practice application of eCall upgrade Romania has developed a single PSAP with back-up solution Existence of clear champion Romania has a clear champion which is the administration body responsible for the PSAP Engagement of wider stakeholder audience Romania has staged a number of high profile events which received media coverage Participation in eCall pilots (i.e. HeERO) HeERO	
	Czech Republic		
	Romania		
	Spain		
Early Adopters	Belgium		
	Bulgaria		
	Denmark		
	Finland		
	Germany		
	Greece		
	Hungary		
	Italy		
	Luxembourg		
Late Adopters	Slovenia		
	Sweden		
	Austria		
	Cyprus		
	Estonia		
	Ireland		
	Latvia		
	Lithuania		
At Risk	Portugal		
	France		
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		

The Czech Republic, Romania and Spain have lead the deployment of technical innovations for PSAPs

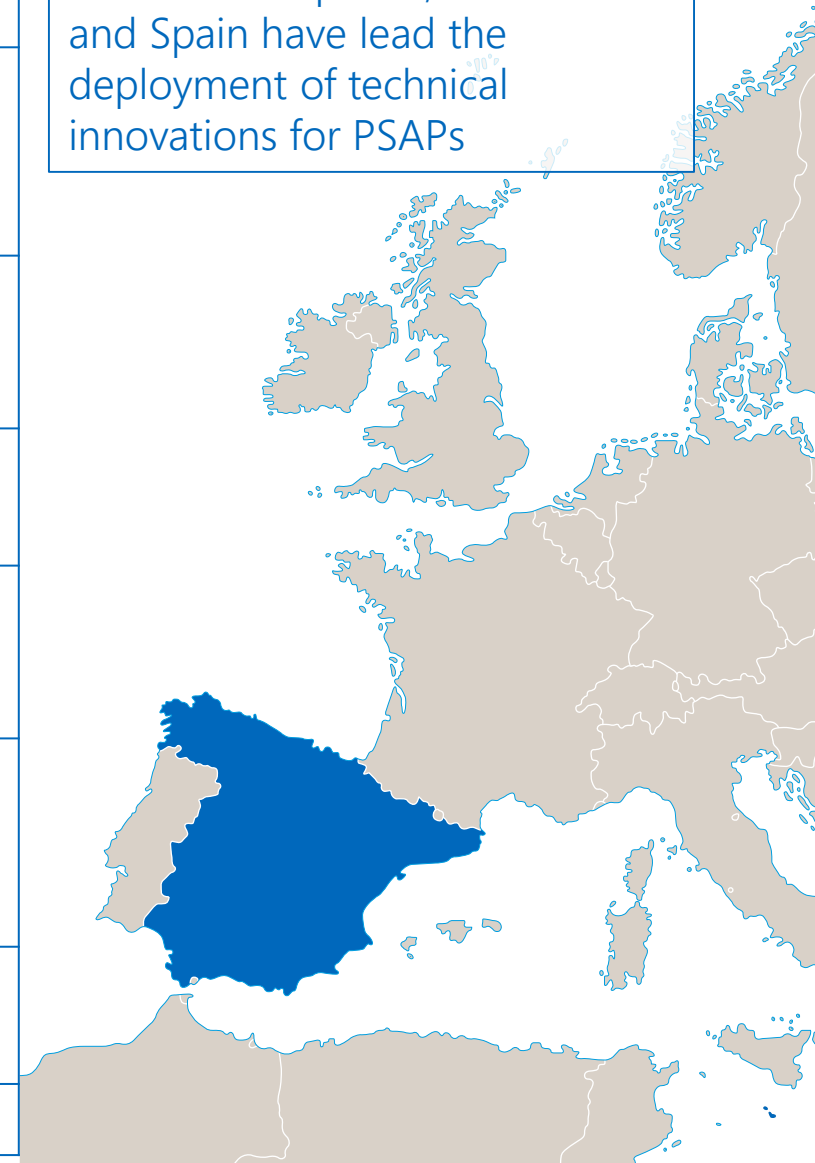


Spain

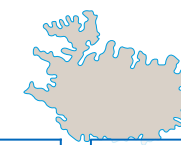


Innovators	Croatia	Type of PSAP	PSAPs are based on federated regions
	Czech Republic		
	Romania		
	Spain		
Early Adopters	Belgium	Process of overall PSAP upgrades	Spain was engaged in a pre-deployment project with a federated Member State solution. The total developed solution, which includes Traffic Authority engagement, is regarded as state-of-the-art.
	Bulgaria		
	Denmark	Expected eCall change to PSAP	Spain decided in October 2015 that each regional PSAP would receive the relevant eCall. The more innovative solution developed as part of HeERO2 was not selected.
	Finland		
	Germany		
	Greece	Status eCall upgrade deployment & remaining risks	eCall deployment strategy now confirmed - requires regional updates to PSAPs within a challenging timeline
	Hungary		
	Italy		
	Luxembourg		
	Slovenia	Best practice application of eCall upgrade	Spain provided a reference design for countries with federated states with a solution capable of handling eCalls for all regions
	Sweden		
Late Adopters	Austria	Existence of clear champion	Spain has a champion which has gathered the necessary technical support (i.e. the national Highway Authority). The authority will continue to provide the technical support through the upgrade process.
	Cyprus		
	Estonia	Engagement of wider stakeholder audience	Spain has staged a number of high profile events which received media coverage
	Ireland		
	Latvia		
	Lithuania	Participation in eCall pilots (i.e. HeERO)	HeERO2
	Portugal		
At Risk	France	Participation in eCall pilots (i.e. HeERO)	HeERO2
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		

The Czech Republic, Romania and Spain have lead the deployment of technical innovations for PSAPs



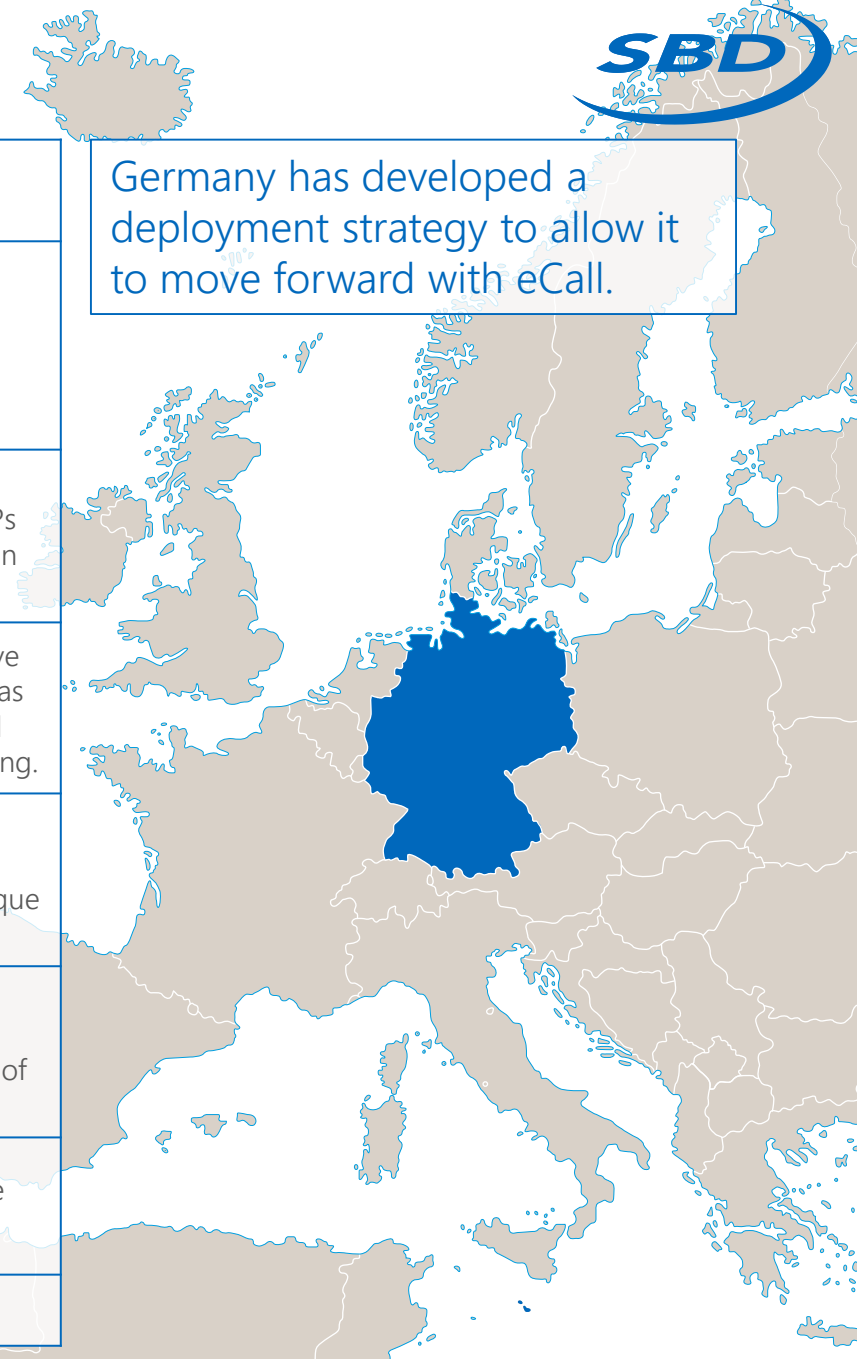
Germany



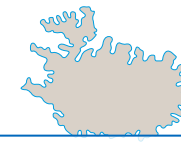
Innovators	Croatia
	Czech Republic
	Romania
	Spain
Early Adopters	Belgium
	Bulgaria
	Denmark
	Finland
	Germany
	Greece
	Hungary
	Italy
	Luxembourg
	Slovenia
	Sweden
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	Estonia
	Ireland
	Latvia
	Lithuania
	Portugal
	France
At Risk	Malta
	Netherlands
	Poland
	Slovakia
	United Kingdom

Type of PSAP	A minimum of 2 different PSAP architectures which are based around each of the 16 Länder.
Process of overall PSAP upgrades	Germany was part of pre-deployment projects which established a high level of knowledge concerning eCall. They participate in the CEF funding initiative to complete deployment, including 620 PSAP upgrades for overall deployment across Germany.
Expected eCall change to PSAP	With the number of PSAPs to be upgraded (620), the technical challenges will be significant. Many of the PSAPs will achieve these upgrade by installing a server solution in front of the existing architecture.
Status eCall upgrade deployment & remaining risks	Germany has a considerable logistical challenge to achieve its PSAP upgrade within the available timeline, but now has a view on what is required. A technical review was started for 50 sample PSAPs during March 2016 and this is ongoing.
Best practice application of eCall upgrade	The solution now evolving reflects the highly complex federated state requirements. This is being achieved through a multi-stakeholder forum. This approach is unique for Member States.
Existence of clear champion	Germany has a lead Länder, and whilst there is no clear national champion, a national implementation group has been formed – however, there is still a considerable level of effort required from the relevant PSAPs.
Engagement of wider stakeholder audience	Germany is now starting this process, however this will be complicated with the different Länder.
Participation in eCall pilots (i.e. HeERO)	HeERO & I_HeERO

Germany has developed a deployment strategy to allow it to move forward with eCall.



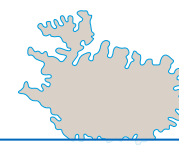
Greece



Innovators	Croatia	Type of PSAP	One level 1 PSAP
	Czech Republic		
	Romania		
	Spain		
Early Adopters	Belgium	Process of overall PSAP upgrades	Greece was part of pre-deployment projects and has established a high level of knowledge concerning eCall. It participates in the CEF funding initiative for the further development of eCall future technology
	Bulgaria		
	Denmark	Expected eCall change to PSAP	Greece has sourced a new PSAP system which will include eCall functionality
	Finland		
	Germany	Status eCall upgrade deployment & remaining risks	The PSAP will be able to receive eCalls with its new system and there appears to be sufficient time and engagement in the current deployment project to achieve this goal.
	Greece		
	Hungary	Best practice application of eCall upgrade	Greece utilised existing technology to provide an initial eCall solution at minimal cost. This has now been superseded by the new PSAP
	Italy		
	Luxembourg	Existence of clear champion	Greece has champions both inside and outside of Government, facilitating the deployment of eCall whilst the government deals with Greece's financial issues
	Slovenia		
Late Adopters	Sweden	Engagement of wider stakeholder audience	Greece has made a very good start in engaging the stakeholders with videos and discussions across all stakeholder groups including the citizen
	Austria		
	Cyprus	Participation in eCall pilots (i.e. HeERO)	HeERO & I_HeERO
	Estonia		
	Ireland		
	Latvia		
At Risk	Lithuania		
	Portugal		
	France		
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		



Hungary



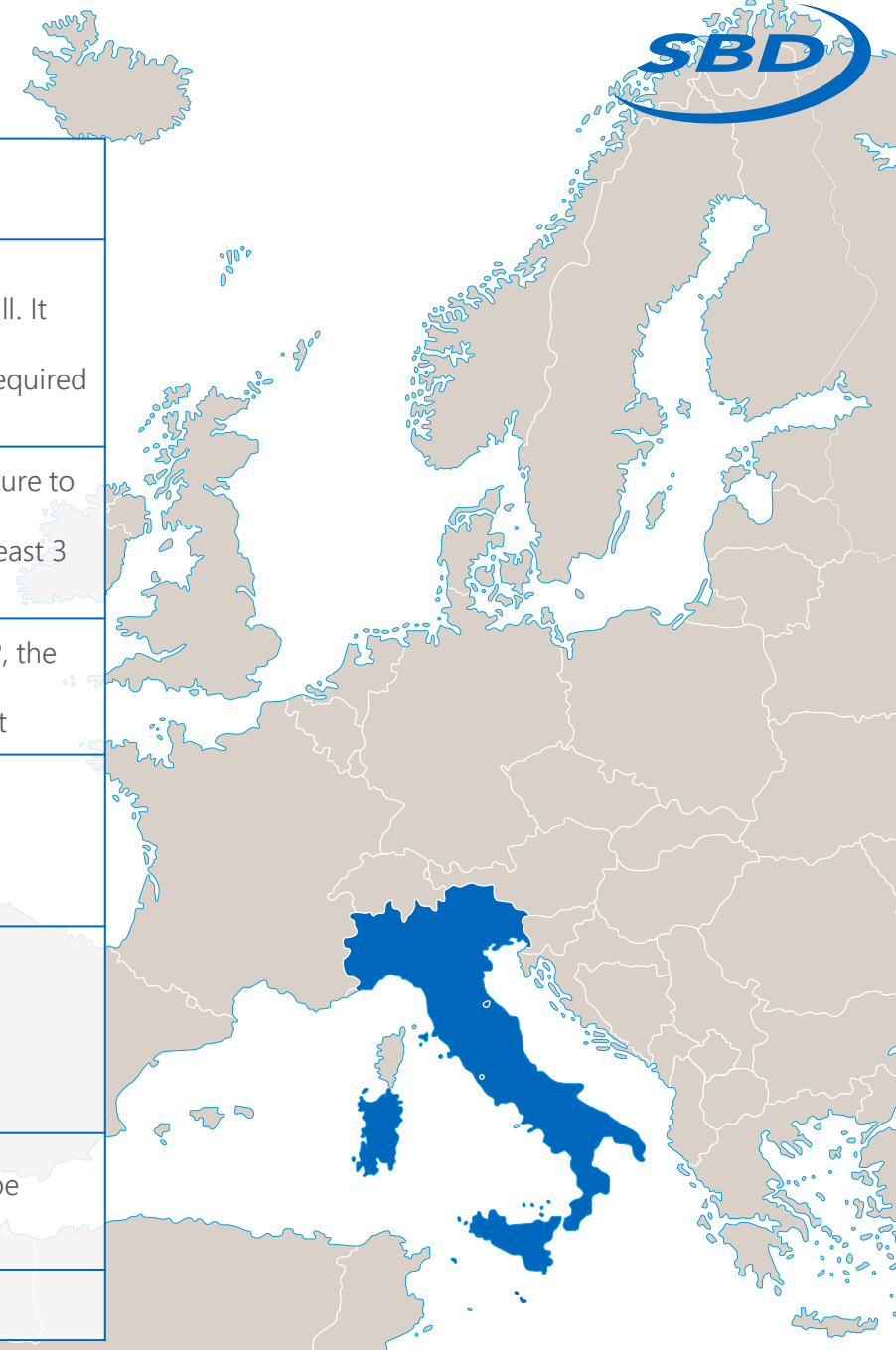
Innovators	Croatia
	Czech Republic
	Romania
	Spain
Early Adopters	Belgium
	Bulgaria
	Denmark
	Finland
	Germany
	Greece
	Hungary
	Italy
	Luxembourg
	Slovenia
	Sweden
Late Adopters	Austria
	Cyprus
	Estonia
	Ireland
	Latvia
	Lithuania
	Portugal
	France
At Risk	Malta
	Netherlands
	Poland
	Slovakia
	United Kingdom

Type of PSAP	One level 1 PSAP and 42 level 2 dispatch centres
Process of overall PSAP upgrades	Hungary were associate partners in the HeERO2 project and used the knowledge in the procurement and commissioning of a new PSAP system
Expected eCall change to PSAP	Hungary has installed a new PSAP system which will support eCall
Status eCall upgrade deployment & remaining risks	The PSAP can receive eCalls with its new system - just awaiting conformity assessment specifications for completion
Best practice application of eCall upgrade	Hungary has carried out excellent cost benefit analysis of eCall, which is the most recent in Europe
Existence of clear champion	Hungary has had strong Governmental support for eCall and most ITS applications and has completed the commissioning of its new PSAP ready for eCall
Engagement of wider stakeholder audience	Hungary staged an eCall workshop in 2014, in which their work was shared with the rest of central Europe.
Participation in eCall pilots (i.e. HeERO)	HeERO2 Associate Partner

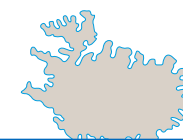
Hungary has used assistance from the HeERO2 project to develop its eCall solution.



Innovators	Croatia	Type of PSAP	Regionally-based with 3 PSAP architecture options
	Czech Republic	Process of overall PSAP upgrades	Italy was part of pre-deployment projects and has established a high level of knowledge concerning eCall. It participates in the CEF funding initiative to progress deployment. As Italy is federated, decisions are still required as to the PSAP architecture.
	Romania		
	Spain		
Early Adopters	Belgium	Expected eCall change to PSAP	Italy has yet to choose the appropriate PSAP architecture to be able to handle eCall across Italy. This decision is complicated by the federated nature of Italy, with at least 3 different possible architectures
	Bulgaria		
	Denmark	Status eCall upgrade deployment & remaining risks	Although a technical solution exists for a central PSAP, the lack of a clear national eCall strategy creates a very challenging timeline for Italy to finalise its deployment
	Finland		
	Germany	Best practice application of eCall upgrade	N/A
	Greece		
	Hungary	Existence of clear champion	Italy has champions, however the federated regions complicate the decision-process
	Italy		
	Luxembourg	Engagement of wider stakeholder audience	Italy has made a start in one region but this is yet to be spread to the other regions of Italy
Late Adopters	Slovenia		
	Sweden	Participation in eCall pilots (i.e. HeERO)	HeERO & I_HeERO
	Austria		
	Cyprus		
	Estonia		
	Ireland		
	Latvia		
	Lithuania		
At Risk	Portugal		
	France		
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		

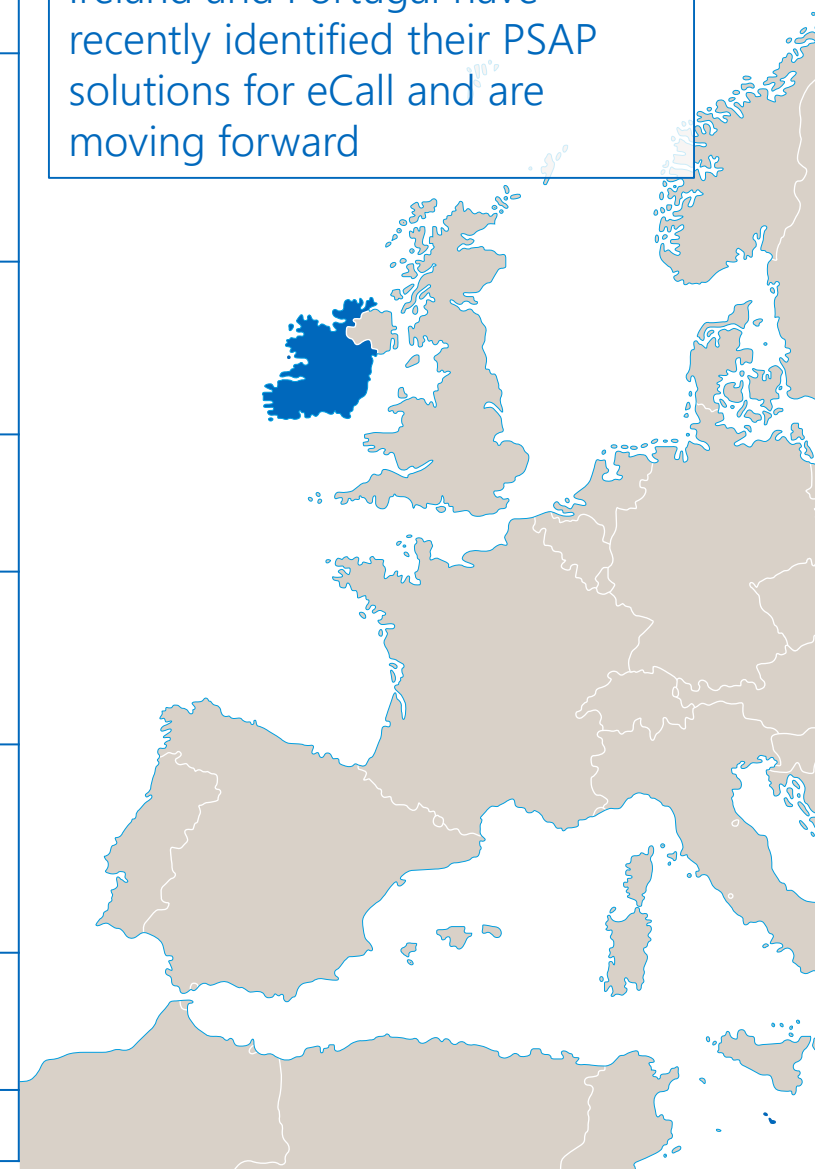


Ireland

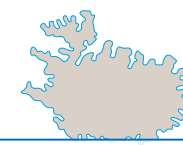


Innovators	Croatia	Type of PSAP	3 PSAPs regionally-based across the country
	Czech Republic		
	Romania		
	Spain		
Early Adopters	Belgium	Process of overall PSAP upgrades	Ireland is a late starter compared to other Member States, but participates in the CEF funding initiative to further its deployment of eCall
	Bulgaria		
	Denmark	Expected eCall change to PSAP	Ireland is in a tendering process for the PSAP provider to be renewed in 2017.
	Finland		
	Germany		
	Greece	Status eCall upgrade deployment & remaining risks	Ireland has started its eCall upgrade process via its operational contract for the PSAP operator – however, there is little room for project slippage within the timeline
	Hungary		
	Italy		
	Luxembourg		
	Slovenia	Best practice application of eCall upgrade	N/A
	Sweden		
Late Adopters	Austria	Existence of clear champion	Ireland has a clear champion who is being supported by the Department of Communications, Energy and Natural Resources, along with the Department of Transport, Tourism and Sport and the PSAP contractor
	Cyprus		
	Estonia	Engagement of wider stakeholder audience	Ireland has yet to start this process
	Ireland		
	Latvia		
	Lithuania	Participation in eCall pilots (i.e. HeERO)	I_HeERO
	Portugal		
At Risk	France		
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		

Ireland and Portugal have recently identified their PSAP solutions for eCall and are moving forward



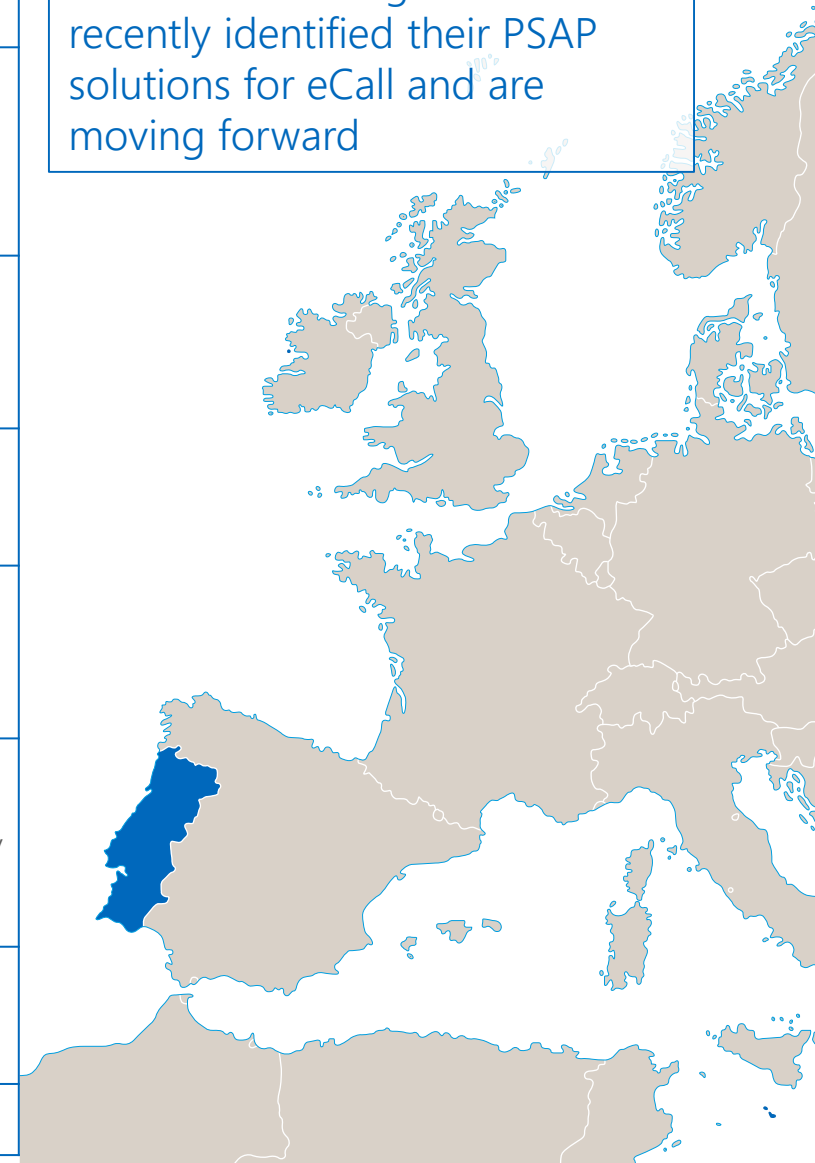
Portugal



Innovators	Croatia
	Czech Republic
	Romania
	Spain
Early Adopters	Belgium
	Bulgaria
	Denmark
	Finland
	Germany
	Greece
	Hungary
	Italy
	Luxembourg
	Slovenia
	Sweden
Late Adopters	Austria
	Cyprus
	Estonia
	Ireland
	Latvia
	Lithuania
	Portugal
At Risk	France
	Malta
	Netherlands
	Poland
	Slovakia
	United Kingdom

Type of PSAP	PSAPs are regionally-based
Process of overall PSAP upgrades	Portugal had not directly engaged in any eCall developmental work before the CEF funding initiative, although its communications regulator has kept close contact with the pre-deployment projects. Portugal has a full deployment plan ready for 2017.
Expected eCall change to PSAP	Existing architecture to be upgraded with equipment that has already been sourced.
Status eCall upgrade deployment & remaining risks	Ready to start the upgrade process - there appears to be sufficient time and engagement in the current deployment project to achieve this goal.
Best practice application of eCall upgrade	N/A
Existence of clear champion	Portugal has a clear ministerial champion who has brought together sufficient technical partners to ensure the necessary upgrades can take place
Engagement of wider stakeholder audience	Not achieved yet
Participation in eCall pilots (i.e. HeERO)	I_HeERO

Ireland and Portugal have recently identified their PSAP solutions for eCall and are moving forward



Malta

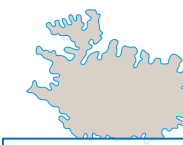


Innovators	Croatia	Type of PSAP Process of overall PSAP upgrades Expected eCall change to PSAP Status eCall upgrade deployment & remaining risks Best practice application of eCall upgrade Existence of clear champion Engagement of wider stakeholder audience Participation in eCall pilots (i.e. HeERO)	6 PSAPs in Malta Malta has not made any significant progress concerning the deployment of eCall. N/A Malta has not started to develop a plan for deploying eCall. N/A N/A N/A N/A
	Czech Republic		
	Romania		
	Spain		
Early Adopters	Belgium		
	Bulgaria		
	Denmark		
	Finland		
	Germany		
	Greece		
	Hungary		
	Italy		
Late Adopters	Luxembourg		
	Slovenia		
	Sweden		
	Austria		
	Cyprus		
	Estonia		
	Ireland		
	Latvia		
At Risk	Lithuania		
	Portugal		
	France		
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		

Malta has not engaged with eCall yet.



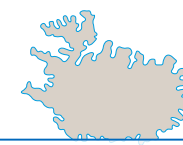
Netherlands



The Netherlands was an early innovator for planning the deployment of eCall but it appears to have lost impetus.

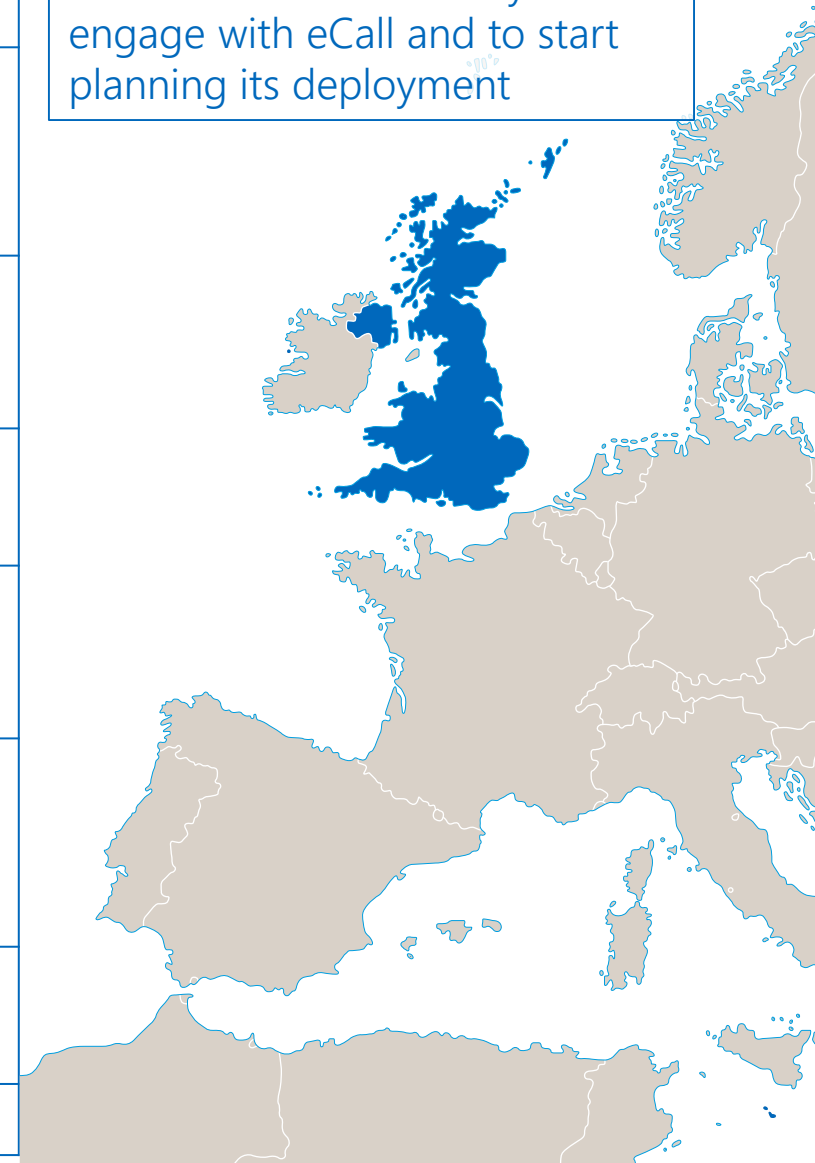
Innovators	Croatia	Type of PSAP	One level 1 PSAP with multiple level 2 PSAPs
	Czech Republic		
	Romania	Process of overall PSAP upgrades	Netherlands was an active participant in pre-deployment projects, however a change in the lead ministry appears to have resulted in a significant reduction in engagement
	Spain		
Early Adopters	Belgium	Expected eCall change to PSAP	Existing architecture to be used
	Bulgaria		
	Denmark	Status eCall upgrade deployment & remaining risks	Deployment progress has stalled
	Finland		
	Germany	Best practice application of eCall upgrade	Netherlands led the way in the development of eCall and the management of false eCall solutions, coupled with initial HGV eCall pre-deployment work. However, this work has not been progressed.
	Greece		
	Hungary	Existence of clear champion	Netherlands does not appear to have a clear eCall champion at present
	Italy		
	Luxembourg	Engagement of wider stakeholder audience	Netherlands had made significant efforts in wider engagement by hosting high profile events, however this has reduced.
	Slovenia		
Late Adopters	Sweden	Participation in eCall pilots (i.e. HeERO)	HeERO
	Austria		
	Cyprus		
	Estonia		
	Ireland		
	Latvia		
	Lithuania		
At Risk	Portugal		
	France		
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		

United Kingdom



Innovators	Croatia	Type of PSAP	Distributed level 1 PSAP system with 6 call-receiving centres, all of which will require an upgrade to receive eCalls
	Czech Republic		
	Romania		
	Spain		
Early Adopters	Belgium	Process of overall PSAP upgrades	UK was one of the lead nations for eCall development from 2002 to 2007. Since then it has had limited engagement with the eCall process and does not appear to have a plan for making its PSAPs eCall-ready.
	Bulgaria		
	Denmark		
	Finland		
	Germany		
	Greece		
	Hungary		
	Italy		
	Luxembourg		
	Slovenia		
Late Adopters	Sweden	Expected eCall change to PSAP	None defined at this time
	Austria		
	Cyprus		
	Estonia		
	Ireland		
	Latvia		
	Lithuania		
	Portugal		
	France	Status eCall upgrade deployment & remaining risks	Not started yet
	Malta		
	Netherlands		
	Poland		
	Slovakia		
	United Kingdom		
At Risk		Best practice application of eCall upgrade	N/A
At Risk		Existence of clear champion	There is a clear line of responsibility for eCall in the UK, but no champion for the overall process has been appointed to date
At Risk		Engagement of wider stakeholder audience	No activity
At Risk		Participation in eCall pilots (i.e. HeERO)	No participation

The UK still needs to fully engage with eCall and to start planning its deployment



4. Lessons learned for Member States



Member States – deadlines already at risk



The biggest challenge for Member States is to plan which PSAPs should receive eCalls and then to develop the optimum PSAP architecture. If these decisions are left too late then there is a real risk that the PSAPs will not be ready by the October 2017 deadline and that the network operators will not receive the routing tables in time.

Experience in the HeERO pre-deployment projects has shown that a Member State will require approximately 2 years to achieve the necessary technical and organisational changes to receive eCall, without considering the PSAP conformity testing process that has still to be defined. Member States should therefore have already at least started the detailed planning process if they are going to achieve the PSAP readiness deadline.

However, by analysing participation in the HeERO projects and the Implementation Survey described previously in this report, 6 Member States are judged to be at risk of missing the PSAP implementation deadline based on the status of their current activities.

A number of factors dictate the type of PSAP architecture deployed, based upon the geographic divisions for the emergency services, coupled with country or regional administrative boundaries. The correct assessment of which architecture to deploy is crucial, in order to determine the appropriate hardware and software upgrades necessary for the relevant PSAPs, as well as the necessary training for the PSAP operators to process eCalls. Moreover, a strategic decision on how to handle the reception of standardised TPS eCalls has to be determined, so as to specify the type of technical upgrade required in addition to the proprietary TPS eCall solutions supported by a number of Member States today.

Once these decisions have been made, the implications on the technical upgrade choices are direct. In the simplest terms, this can range from the provision of a server solution in front of the existing PSAP architecture, to the provision of an entirely new PSAP. Achieving the upgrade to eCall requires a high degree of system integration; this aspect is often overlooked /under-scoped during the planning stage.

Member States – key factors to consider



A number of factors influence and impact on the PSAP architecture choices made by Member States, as witnessed in the previous pilot projects, including:

Complexity for the Member State in the management of the 112 calls

- This aspect is especially true where the Member State is federated, as each region may have autonomy concerning the management of 112 calls. This autonomy increases considerably the level of complexity for harmonised eCall deployment.

Existing and age of PSAP architecture

- The path of technical evolution for 112 (based upon devices and cellular network technology) is typically already defined.
- Member States have to decide how to integrate the relevant eCall technical requirements based upon their stage of progression.

Current arrangements for the management of 112 calls

- Some Member States (e.g. Sweden, the United Kingdom and Ireland) already contract-out the level 1 PSAP handling of 112 calls. These pre-existing contractual obligations require consultation and analysis to understand the most appropriate path for a successful migration to eCall based on 112.

Concern over the number of false or inappropriate calls

- The reception of false calls at the PSAP is not a new phenomenon: studies across Europe indicate that the level of false calls to PSAPs are approximately 90%, and in some Member States even higher.
- The concern expressed by some Member States is that the provision of the manual activation button in the vehicle will raise the possibility of false calls additionally. This valid concern will require careful consideration in the treatment of calls as well as the sizing of the architecture.

eCall upgrades may be delayed as part of a rationalisation of PSAPs

- A number of Member States are making plans to reduce and/or consolidate the number of PSAPs in order to save money from their core 112 service. These reviews are independent from the deployment of eCall but may affect the timelines for eCall updating since deployment becomes part of a much larger project.

Member States – lessons learned



We identify seven key learnings for Member States that can help facilitate implementation of eCall by October 2017, as follows:

1. *Those Member States that have not already published their eCall routing table should do so by August 2016 (as it will take MNOs an estimated 4 months to integrate and test the routing table)*
2. *One eCall PSAP is sufficient for the first two years of operations, with up to two agents required*
3. *Member States should carry out a stakeholder awareness campaign in advance of implementation, as some incorrectly believed that further national legislation was required before work could start*
4. *A coordinated response is required at Member State level involving the Ministry of Transport and the Ministry responsible for PSAPs*
5. *A cross-competency working group, led by an eCall 'champion' should be established at a national level to bring together specialists in regulatory affairs, the technical process and solution implementers*
6. *Member States should consider the use of a secure data storage facility for sharing of location information between the PSAP and the emergency service*
7. *Member States should consider the provision of VIN decoder software as part of their eCall deployment*

5. Residual eCall issues



Recommendations for residual issues



This chapter addresses 12 open issues that are often raised in relation to the deployment of eCall. In the main these issues are not directly resolved by the additional technical specifications being developed by the EC through delegated acts (the first of which will be adopted by June 2016) and generally impact several stakeholders.

Issue	Recommendation	EC	Member State	MNO	OEM	Others
End of vehicle life	Strong action required by the EC to determine an appropriate solution ASAP	✓				
Periodic technical inspection	Strong action required by the EC to define open areas ASAP	✓				
SIM update procedure	A standardised process is required to ensure compatibility across all TCUs and MNOs	✓		✓	✓	TCU supplier
Open-access platform	Action required by the EC to ensure that the business planners from OEMs and other stakeholders are involved in the discussions, and not just the R&D engineers	✓				
False eCalls	Member States must ensure that they have included a dedicated process for managing false eCalls in their PSAP architecture, together with a national awareness campaign		✓			
2G switch-off & eCall over 4G	OEMs are recommended to equip their vehicles with a 2G/3G TCU whilst PSAPs should include eCall-over-LTE in their plans for receiving emergency calls via IP networks		✓		✓	
Testing 'real' eCall	PSAPs should conduct end-to-end testing with their MNOs using 112, eCall flag, commercial equipment etc.		✓	✓		ETSI
National number exhaustion	Use of ITU supranational numbers should be an effective solution			✓		
Caller Line ID	The use of extraterritorial E.212 numbering fosters the presence of CLI for PSAP call-back to the vehicle			✓		
eUICC subscription update procedure	A standardised process is required to ensure compatibility across all TCUs, MNOs and Subscription Managers			✓		Subscription Managers, TCUs
Testing the inactive TCU state	Testing is required for the TCU to confirm the first-ever implementations of an inactive state				✓	TCU supplier
Operating costs	National Regulatory Authorities should review the per call costs charged to MNOs to ensure appropriate ex-ante regulation is in place					NRAs

Recommendations on residual eCall issues



End of Vehicle Life

Problem Statement

Since the SIM is inactive on the network, an MNO does not know when the eCall service no longer needs to be supported for a specific device, such as when a vehicle is scrapped or exported out of the EU.

This situation causes difficulties in managing mobile network resources, such as:

- Direct costs associated for the maintenance of subscriptions (e.g. maintaining subscriber details live on network, associated software licensing and recurring annual costs for these subscriptions)
- Inefficiencies on the re-assignment of phone numbers.

Operators therefore need a reliable indicator for when they can stop supporting a specific device/vehicle.

Context

Confirmation of the end of a vehicle's life could be obtained in different ways, including:

- The development of a process in which information on the scrapping, exporting or sale of individual vehicles is communicated to relevant stakeholders, with operators obtaining timely information on their ability to deregister SIMs for eCall.
- Using the presence/absence of regular registrations on the network due to test calls as a proxy for vehicle 'life' status. In this way, during the regular periodic testing (e.g. every 1 to 2 years), the eCall-only device would place a test call, registering on the network. This registration would maintain the validity of the device/SIM on the network. The lack of cyclical test calls could be a de facto indication of a vehicle no longer requiring eCall because it has been scrapped or exported out of the EU. The eventual time period for the cyclical tests would need to be defined formally based upon the periodical technical inspection standards for eCall.

Recommendations

The decision on a common means to determine the 'life' status of individual devices/SIMs must be established ASAP.

Given that this decision would require the implementation of a new process across multiple stakeholders, the EC is best-placed to address these questions, ensuring the relevant participations.



Recommendations on residual eCall issues



Periodic Technical Inspection

Problem Statement

In-car systems, such as the TCU, can and do go wrong from time to time. There is therefore a need to define an appropriate testing regime over the lifetime of the car, whilst ensuring a feasible approach across very different national testing regimes and avoiding inflicting unnecessary “burden” for implementation.

This balancing act is complicated given the extensive value chain engaged in the delivery of an end-to-end eCall.



Context

Many different scenarios for the testing have been explored to date:

- From generating “real” 112 eCalls during the testing regime to simulating eCalls using a long number.
- Detailing which process elements are most crucial to test: call from the TCU, Minimum Set of Data (MSD) transmission, call-back to the TCU, mobile network simulation, vehicle diagnosis etc.
- Identifying the relevant physical hardware to test: microphone, in-band modem, SIM, etc.

In addition, key open questions need to be addressed such as:

- Who is going to pay for such calls?
- Who would host the PSAP simulator server (e.g. the testing authorities themselves or their partners?)

Recommendations

The EC will issue delegated acts which should specify the scope and detailed technical requirements for this testing (June 2016). It is crucial that all the questions and relevant details for implementation are finalised by this date, in order to provide a uniform approach across Europe.

Recommendations on residual eCall issues

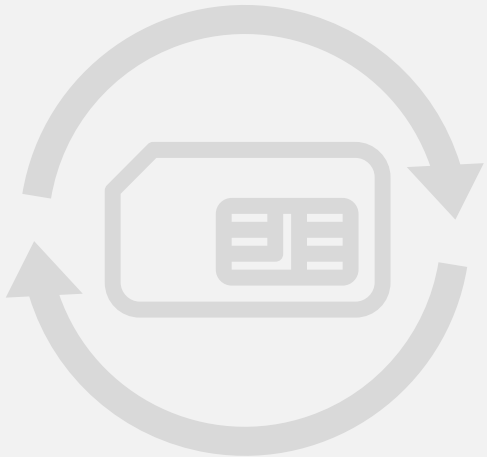


Standardised SIM Update Procedure

Problem Statement

Since the SIM is in an inactive state normally (except for a triggered eCall), it must be “woken up” to receive any updates, including general technical updates, subscription related issues, etc.

The method for achieving this has been only partially detailed to date, which could cause fragmentation and difficulties in ensuring interoperability across solutions given that OEMs and their suppliers have already started development of their TCUs.



Context

The SIM has the ability to call two non-emergency numbers: a test eCall number and a reconfiguration number. This functionality is important because it “wakes” up the eCall SIM, registering it on the network, and enabling it to receive relevant updates.

The current standards specify this functionality but do not detail key implementation aspects such as:

- Who would initiate this call (e.g. technician or user)
- How the call would be physically triggered
- Who would receive and manage the reconfiguration call
- Who would send the update to the TCU
- Who would pay for the reconfiguration call
- How long the TCU should remain awake

A potential solution could be for the TCU to stay awake for a short time after a test eCall so that the MNO can download any SIM updates.

Recommendations

In order to ensure smooth deployment and interoperability for pan-European eCall solutions, the general process and roles for reconfiguration calls should be defined in a common manner.

This would require collaboration from the relevant stakeholders including (OEMs, TCU device manufacturers, MNOs, etc.). The EeIP could be a valid platform for determining how to address these questions.

Recommendations on residual eCall issues



Open-access Vehicle Platform

Problem Statement

Much debate has focused on the possibility of the eCall TCU providing a basis for the development of additional applications through an “open vehicle platform” (i.e. ...*an interoperable, standardised, secure and open-access platform for possible future in-vehicle applications or services*).

OEMs have made representations to the EC against the idea of making vehicle data available through an in-car interface for safety and cyber security reasons. Third parties would like access to the vehicle for new services and do not want the OEMs to have control over who can access what data.

Context

The EC has been tasked within the eCall Type Approval legislation with assessing the different options for promoting and ensuring an “open vehicle platform”. It must determine whether further legislation is necessary to support this platform development by 2017.

The EC is currently discussing the open vehicle platform through its C-ITS Platform whose main task is to plan the deployment of V2X technology in Europe together with the OEM’s R&D divisions. The Platform has agreed 5 guiding principles relating to access to vehicle data, but ‘strong disagreement’ on important topics, coupled with a ‘lack of trust’, remain between OEMs and independent service providers. The decision on the nature of the open vehicle platform needs to balance the different (and often opposing) interests of the stakeholders.

The Commission is consulting with stakeholders and is in the process of awarding a contract for a deep dive into technical, legal and costs/benefits regarding the proposed solutions.

Recommendations

The EC is urged to review the planned costs/benefits analysis of the open-access platform with the business planners from OEMs and other stakeholders, and not just the R&D engineers who typically support the EC’s C-ITS Platform.



Recommendations on residual eCall issues

False eCalls

Problem Statement

Whilst automatically-triggered eCalls are generally considered to be a reliable indicator of a 'real' emergency, the opposite is true of manual eCalls.

Some telematics service providers indicate that in their experience of offering private emergency call services, false calls can account for more than 90% of all the manual eCalls received.



Context

Potential technical solutions to filter out false eCalls were examined in some detail in the HeERO 2 project:

Solution A

Placing an intermediate PSAP in front of the level 1 PSAP to receive all 112 and TPS eCalls. This could be operated by a private company, such as a motoring club or telematics service provider, or it could be a government-controlled entity such as a Traffic Control Centre.

Solution B

Locate all of the elements in the PSAP room itself and route all eCalls to a dedicated call handling position outside of the PSAP command and control environment. The eCalls are screened at that location, and not released into the PSAP command and control environment until the call taker is satisfied that it is a 'real' eCall.

Public Education

Public education is key to providing the correct information to citizens, so that there is clear understanding on what eCall is, when it should be used and more importantly, when it should not be used.

Recommendations

Member States must ensure that they have included a dedicated process for managing false eCalls in their PSAP architecture and that the infrastructure is sized appropriately.

The EC can also play a role in fostering the exchange of good practice for handling false calls between Member States.

Existing good practice in this area can be found in the work undertaken by the Government of the Czech Republic, the FIA, ÚAMK and the rescue services of the Czech Republic. For example, two public events were attended by over 200,000 people publicising eCall in the Czech Republic, along with the creation of an excellent eCall [video](#).

The EC can also play an important role by funding a pan-European public information awareness campaign on this topic.

Recommendations on residual eCall issues



2G switch-off & eCall over 4G

Problem Statement

eCall has been specified and standardised for 2G and 3G networks, with the type approval requirements leaving it open to the OEM to decide which technology(s) to support.

On the other hand, eCall has not been specified for LTE networks yet as the technology does not include a voice channel. OEMs are therefore unable to equip their cars with a 112 eCall system that is compatible with latest network technology. Furthermore, PSAPs will require different interfaces for receiving voice and data from an LTE-only TCU in the future.

2G 3G 4G

Context

A 2G-only TCU represents the lowest cost option for an OEM to satisfy its eCall requirements. However, it is likely that network operators will start to switch off their 2G networks over the 10+ year lifetime of a typical car and there are already geographic areas with 3G coverage but no 2G.

Alternatively, a 3G-only TCU would represent a slight cost increase to OEMs, but there is still a chance that 3G networks could be switched off before 2G, and there are relatively large geographic areas with 2G coverage but no 3G.

The analysis on how eCall can most appropriately evolve to address LTE is being finalised. ETSI created a special taskforce on the migration of eCall transport, which has issued a technical report on eCall for VoIP ETSI TR 103 140 V1.1.1 (2014-04). This report provides recommendations on the road forward for standardisation, as well as different migration possibilities. Standardisation activities within 3GPP will be necessary to support eCall features in IMS Release 13 or later: updates to CEN/EN standards will also be needed.

Recommendations

OEMs are recommended to equip their vehicles with a multi-network generation TCU (e.g. 2G&3G).

PSAPs should include eCall-over-LTE in their upgrade plans for receiving emergency calls and location data via IP networks.

Recommendations on residual eCall issues



Testing 'real' eCall

Problem Statement

Past pilot testing (including the HeERO projects) that have provided indications on the robustness of the eCall solution have generally relied on pre-commercial grade equipment and have simulated many important aspects, which affect the veracity of the results for full deployment of 'real' eCall on commercial grade equipment.

Some stakeholders have also underlined the necessity of testing calls generated by a vehicle circulating outside of its home country and in a cross-border situation due to concerns on the reliability of appropriate generation and routing of calls.

Context

During field tests of in-band modem transmission from pre-commercial grade devices, in most cases the quality of the transmission was strong (greater than 90% in the HeERO testing) but in a few cases errors of transmission were encountered. These errors were attributed to the incompatibility of some pre-commercial grade devices with network echo canceller equipment.

From the operator side, the verification of MSD transmission based upon the configuration of network features (e.g. factors that make voice better but transmission of data across the in-band modem worse) would be useful. These include echo cancellation, as well as voice quality enhancement features.

Other examples of gaps between pilot tests and 'real' eCalls include the use of:

- Long number test numbers to call the PSAP (rather than 112 and the eCall flag to route calls to the appropriate PSAP)
- Fully active TCUs (as opposed to TCUs with inactive state that only register to the network when an eCall is triggered)
- Mobile phones to initiate calls (as opposed to TCUs)

Recommendations

Testing of implemented, commercial grade equipment is considered important to verify any implementation difficulties from the different parties.

PSAPs are encouraged to conduct testing with their relevant operators (as well as the other parties) to ensure that seamless deployment occurs. Particularly relevant testing would include:

- Real PSAP to TCU eCall 'call-back' calls
- Real eCall calls from TCU to PSAP

ERTICO, in conjunction with ETSI, should continue to stage pre-deployment testing, covering all aspects of the value chain and interoperability testing on an annual basis.

Recommendations on residual eCall issues

National Number Exhaustion

Problem Statement

National regulatory authorities have raised concerns relating to the exhaustion of mobile network numbering resources allocated to a single country over the medium to long term.

This concern is based upon the sheer number of cars to be connected each year, the length of time for which the resources need to be maintained, and the existing gap in understanding when a specific eCall device/SIM can be retired.



Context

eCall devices will be assigned phone numbers (MSISDN/E.164) and IMSIs (E.212) based upon the contract between the issuing MNO and the OEM.

The type of resources assigned to a specific eCall device will depend upon the issuing MNO's allocation and management of numbering resources either using:

- National numbers associated to a single country (with the according country prefix), or
- Supranational numbers.

The costs of call-back from the PSAP to the vehicle will reflect the different numbering solution employed: domestic call, international call in roaming and supranational calls.

Recommendations

A number of approaches to mitigate number exhaustion concerns are available:

- Rely on numbering according to the 15 digit ITU-T recommendation
- Use of supranational numbering for eCall has significant benefits, as it does not place any strain on national E.164 number allocations and allows OEMs to realise economies of scale associated with their operations.
- Ensure a process for determining end of vehicle life for the retirement of individual devices/SIMs and numbering resources.

Recommendations on residual eCall issues



Caller Line Identification - CLI

Problem Statement

If an eCall voice connection to a PSAP drops abnormally for more than 2 mins, then the relevant PSAP will attempt to call-back the vehicle.

The ability to make this PSAP-initiated call relies on the availability of the Caller Line Identification (CLI), provided by the serving MNO.

Some stakeholders have raised concerns relating to the consistent availability of Caller Line Identification (CLI).

Context

A CLI could be unavailable for eCall for those calls made in "limited service state" (e.g. when there is a inability or problem to register on the network but an emergency call is made).

One possible occurrence of a limited service state is when the SIM card's issuing operator does not have network coverage in an area of its home country and so the call is made on an alternate operator's network. In this case, the two operators do not have roaming agreements in place where the exchange of additional information (e.g. CLI) is specified.



Recommendations

The use of extraterritorial E.212 numbering with capability to roam on multiple national networks will address this concern. This will foster a more consistent provision of CLI information, although it may increase the cost of call backs to the PSAP.

In any case, PSAPs are also recommended to obtain an alternative phone number for the caller in case they leave their vehicle after an accident or the TCU becomes inoperable.

Recommendations on residual eCall issues



eUICC Subscription Updates

Problem Statement

Given that eCall should be functional in a vehicle for its full lifetime (e.g. 10-20 years), it is important to have the ability to seamlessly manage changes in subscription characteristics and contracts between the OEM and the MNO (including the change of subscription from one operator to another).

It is unlikely that an OEM will change MNO for an eCall-only device, but they may want to change the MNO if the device is switched from eCall-only to one supporting value-added services.



Context

Today, proprietary Over-The-Air subscription management services exist for remote provisioning and management of M2M connections.

Furthermore, the GSMA is leading and coordinating an industry pre-standard for common global remote provisioning architecture for "[eUICC](#)" (i.e. embedded SIM); this technical specification enables 'over the air' installation and management of operator profiles by a new entity known as a Subscription Manager.

ETSI TC SCP is working on a [formal standard](#) for the eUICC.

Recommendations

A standardised process is required to ensure compatibility across all TCUs, MNOs and Subscription Managers.

For this reason, subscription management should be included as part of the reconfiguration or test call process, given that OTA subscription management is only possible when the TCU is registered on the network.

Recommendations on residual eCall issues



Testing the Inactive TCU State

Problem Statement

In order to ensure that eCall does not result in tracking of individuals (i.e. when no accident is present), eCall has been developed so that the device does not transmit location information at any time unless an emergency call is necessary.

To achieve this, the TCU (and hence SIM) defaults to an inactive state, in which no signalling occurs between the car and the serving MNO. This is a unique connectivity requirement for eCall, requiring that the inactive state has been correctly implemented on the TCU and SIM.

Context

The 'eCall-only' inactive mode is based upon:

- The TCU 'listening' to the network to establish a list of available networks to reduce the time for network selection and registration in the case of a triggered eCall.
- Registering on the network only when needed to initiate an actual eCall, using the highest priority allowed based upon the most recent background scan.
- Maintaining registration on the network for a defined period after the eCall is ended to allow for the PSAP to call-back to the vehicle.

Recommendations

Testing is required to confirm that the TCU does connect to a mobile network when an eCall is triggered.



Recommendations on residual eCall issues



Operating Costs

Problem Statement

Pan-European eCall is a public service and is therefore mandated to be accessible free of charge to all consumers.

The deployment of eCall requires all the mandated parties to incur costs for implementation. Some details regarding the allocation of cost, however, have not been addressed to date, specifically the handling/processing of eCalls in some countries, including false calls.



Context

Some Member States do not charge to handle 112 emergency calls as it is considered a public service. In other countries the PSAPs' designated provider of Emergency Call Handling Services (typically the fixed-line incumbent) charges mobile operators for handling emergency calls, as well as including premium charges for telematics calls.

In the UK for example, prices for handling Global Positioning Emergency Service (Telematics Service) have increased from £2.50 per call to £10 per call.

These charges could be accrued for "real" eCalls, as well as for false calls. In this case, these false calls could create real financial burdens to the serving MNO.

Recommendations

National Regulatory Authorities (e.g., OFCOM in the UK) must review the per eCall costs charged to MNOs by the PSAPs' designated provider of Emergency Call Handling Services to ensure appropriate ex-ante regulation is in place prior to the deployment of pan-European 112 eCall.

6. About the authors



David McClure

As head of SBD's research and consulting division, David has been involved in telematics and connected car services since the late 1990s. During that time he has authored numerous reports that are directly focused on eCall and advised multiple OEMs on strategic and tactical issues associated with implementing services. In 2006 SBD was commissioned by the UK DfT to prepare a detailed Cost-Benefit Analysis for eCall in the UK and he has continued to work with OEMs, their suppliers and MNOs on all issues associated with eCall since then.

Francesca Forestieri

As the head of the GSMA mAutomotive activities and its Connected Car Forum (2010-2013), Francesca brought together OEMs and MNOs with the aim to overcome barriers and advance cross-industry opportunities for connected car services. During this timeframe Francesca was the GSMA's lead for eCall, participating in the EeIP, CEN standardisation activities for eCall, as well as leading the GSMA's eCall Task Force. As an expert on M2M communications and the development of new services, she has worked on both eCall and ITS Directive applications.

Andy Rooke

Andy was the UK lead for defining the European eCall based on 112 in both the Emerge and GST Rescue projects. Since 2011 he has been the Project Coordinator for all HeERO projects. Andy is also a member of CEN 278 WG 15 responsible for the formulation of all eCall standards and is the secretary to the European eCall Implementation Platform (EeIP).

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