

eCall and ERA-GLONASS interoperability test: the first findings

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Photo: VTT



Photo: www.112.fi

eCall and ERA-GLONASS



Source:

https://commons.wikimedia.org/wiki/File:EU_Member_states_and_Candidate_countries_map.svg



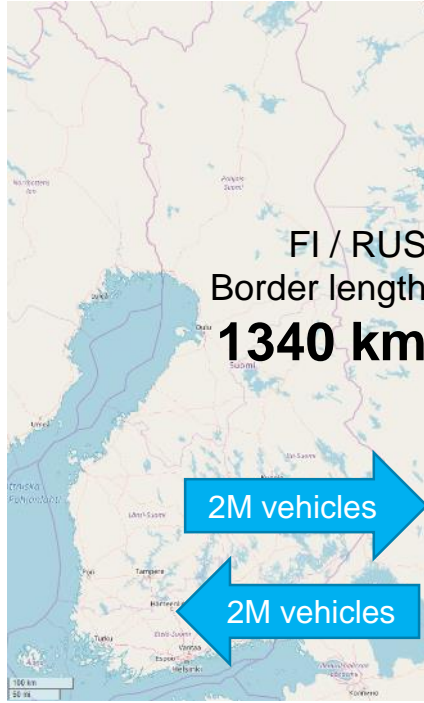
	eCall	ERA-GLONASS
Region	EU + EFTA	Russia + Belarus + Kazakhstan
Vehicle categories	M1 and N1	All categories (M1...M3, N1...N3)

Vehicles registered in
ERA-GLONASS system:

2 336 538

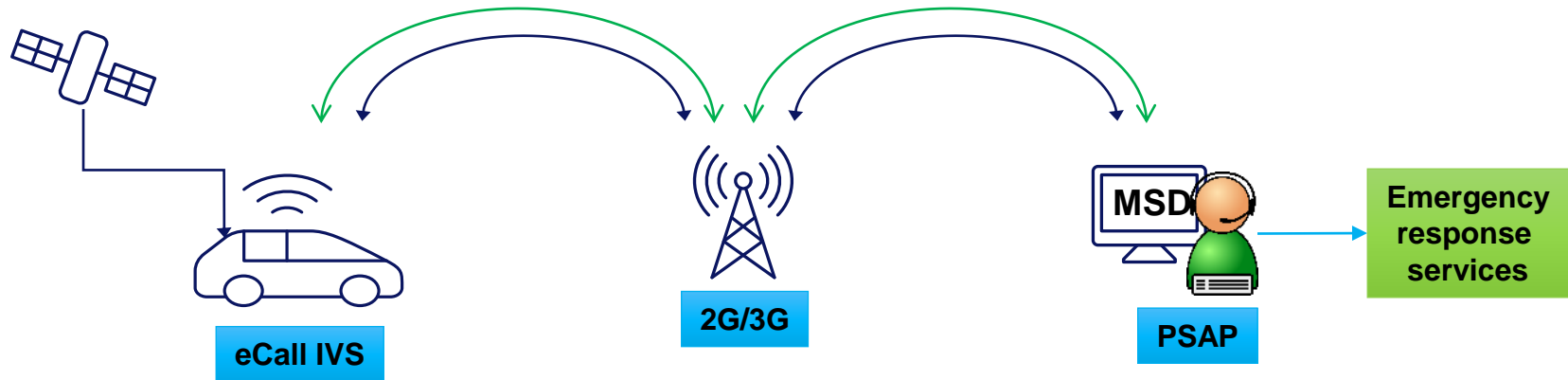
<https://aoglonass.ru/en/gais-ehra-glonass/>
(cited 15.8.2018)

Motivation

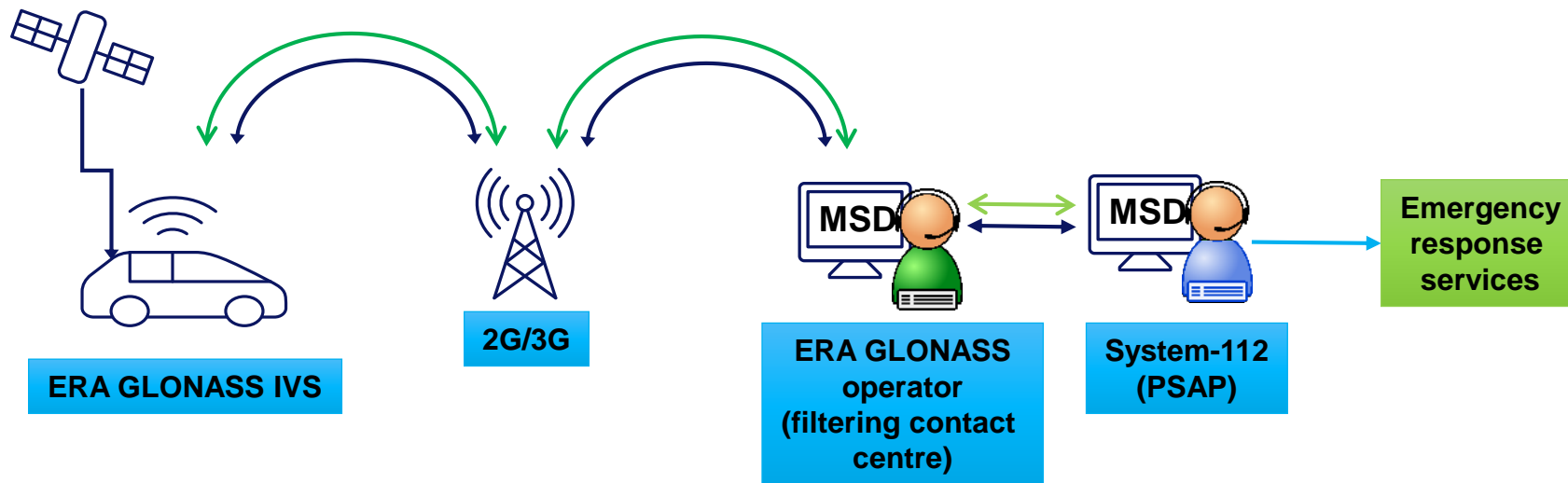


- Russian ERA GLONASS system and pan-European eCall system are harmonized but not identical
- It is important to ensure and test systems compatibility
- Target is to provide service coverage for European vehicles in Russia and Russian vehicles in the EU
- At the moment, there is no agreement between EU countries and Russia on handling of emergency calls from vehicles

eCall system



ERA-GLONASS system



eCall and ERA-GLONASS Comparison (related to interoperability)

	eCall	ERA GLONASS
GNSS	GPS + (GALILEO)	GLONASS +(GPS or GALILEO)
Emergency number	112	112
MSD data transfer	In-band modem	In-band modem + SMS backup
MSD	EN15722 (ver 2)	EN15722 (ver1 & ver 2)
SIM card	SIM card from ?	ERA GLONASS full MVNO SIM card
Emergency call features	Voice call, MSD (re)transmission, call back, ...	Voice call, MSD (re)transmission, call back, ...
Additional features	MNO calculated location in PSAP (EN16072)	Base for public Services and variety of consumer Value Added Services

MSD versions

- **Interoperability issue with MSD versions?**



- eCall supports MSD version 2 (EN15722:2015)
- Specifications of ERA-GLONASS allow use of MSD version 1 (EN15722:2011) until January 2018
- ERA GLONASS (PSAP) supports both versions and OEMs in Russia today use MSD version 1 and only gradually may start moving to version 2

I_HeERO MS have implemented the eCall in PSAPs which support both MSD ver 1 & 2, including Finland => **No problem with this issue!**



Photo: www.112.fi

Roaming issue

- ERA GLONASS IVS uses JSC GLONASS SIM-cards, which does not have roaming agreements in European Member States



- What about eCall SIM-cards used in eCall IVS, do they have roaming in Russia?
Roaming with ERA GLONASS & major MNOs?



Interoperability tests of eCall and ERA-GLONASS

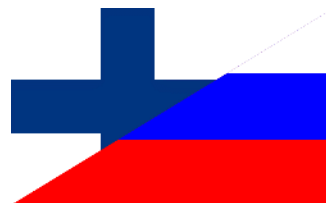
▪ **TEST OBJECTIVES:** interoperability tests focused on the core features of both systems:

- Voice connection between user of the IVS and PSAP
- Transmission, decoding and presenting of minimum set of data (MSD)
- MSD retransmission
- Call back from PSAP to IVS

▪ **Tests in Finland and Russia has been planned and implemented in cooperation with**

- Ministry of Transport of Russian Federation
- JSC GLONASS, which operates the GAIS ERA-GLONASS system
- Ministry of Transport and Communications (Finland)
- Finnish Transport Safety Agency (Trafi)
- VTT Technical Research Centre of Finland Ltd
- Emergency Response Centre Agency (Finland)

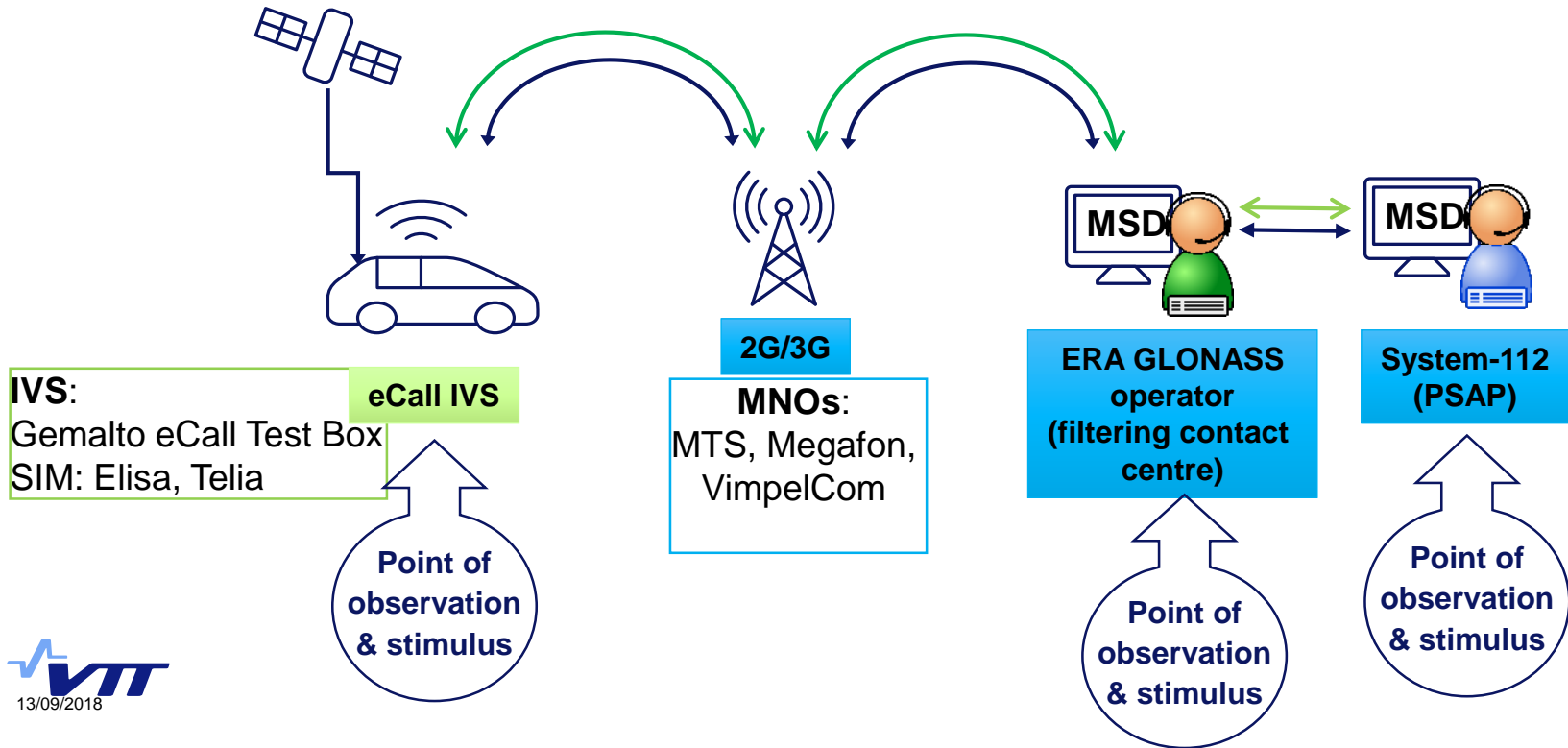
(Supported by *I_HeERO project)



See summary of the test plan: I_HeERO M21

Qn	Interoperable features statement questions	Interop. exp.	Notes
Q1	eCall flag, emergency call routing to PSAP	☑	
Q2	MSD transmission to PSAP	☑	(see MSD versions 1 & 2)
Q3	MSD decoding & visualisation	☑	(see MSD versions 1 & 2)
Q4	Establish voice connection	☑	
Q5	Call hang-up by PSAP	☑	
Q6	End call by in-band-modem by PSAP	☑	
Q7	Request retransmission of MSD by SMS	-	Not supported in eCall
Q8	Request retransmission of MSD by in-band-modem	☑	(SMS is used in ERA GLONASS)
Q9	Call back to IVS from PSAP	☑	Not possible if no roaming SIM
Q10	Request retransmission of MSD (in-band-modem) during call back	☑	(SMS used) No if not roaming SIM
Q11	Request retransmission of MSD by SMS during call back	-	Not supported in eCall
Q12	Mobile network based location of the caller	-	Not in ERA GLONASS
Q13	Mobile network provides IVS CLI to PSAP	☑	Not possible if no roaming SIM

Test case 1: eCall IVS in Russia contacting ERA-GLONASS-system

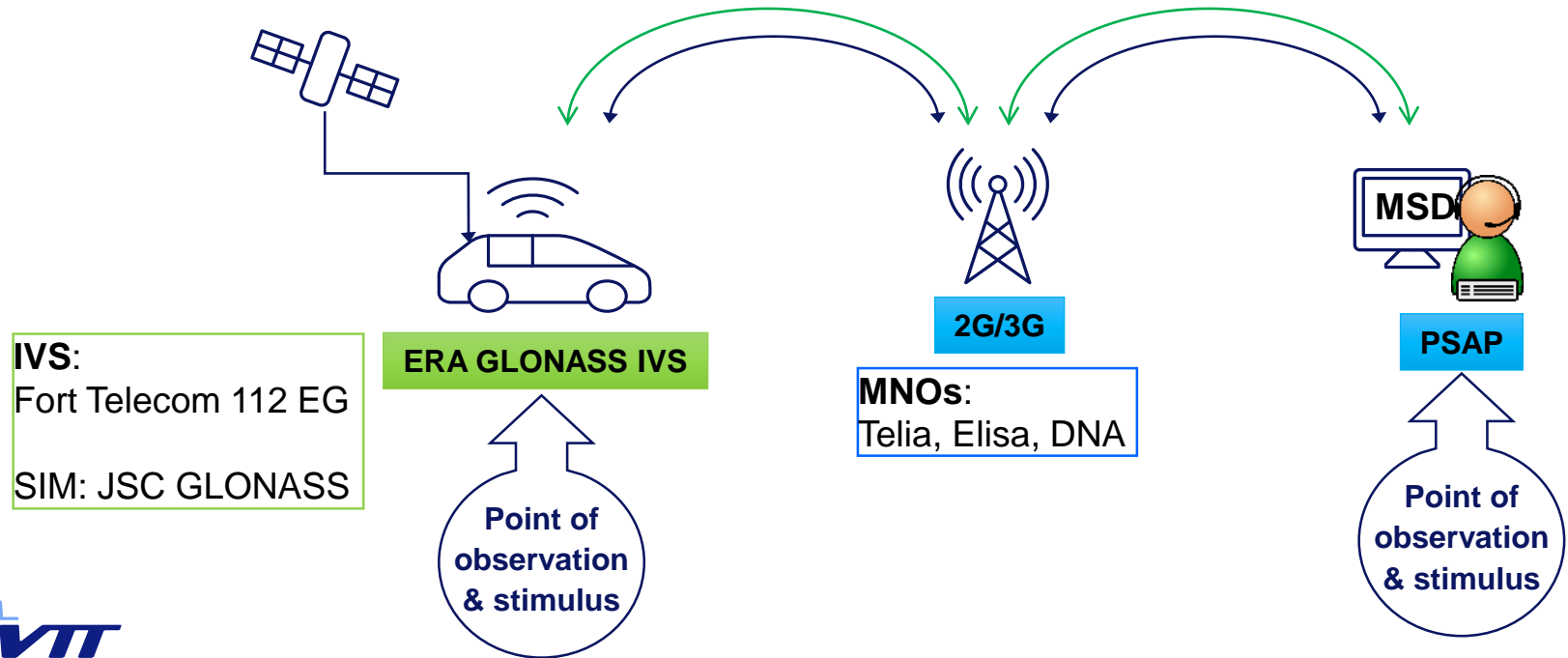


Test case 1 results: eCall IVS inside Russia



Qn	Test point	Interoperable features	PASS	FAIL	Inconclusive / notes
Q1	IVS & PSAP	eCall flag, emergency call routing to PSAP	✓		X / Not working with one MNO (foreign SIM)
Q2	IVS	MSD transmission to PSAP	✓		
Q3	PSAP	MSD decoding & visualisation	✓		
Q4	IVS & PSAP	Establish voice connection	✓		
Q5	IVS & PSAP	Call hang-up by PSAP	✓		
Q8	IVS & PSAP	Request retransmission of MSD by in-band-modem			X / will be retested
Q9	IVS & PSAP	Call back to IVS from PSAP	✓		Only normal voice call used & not possible if not roaming SIM
Q10	IVS & PSAP	Request retransmission of MSD (in-band-modem) during call back		X	Not possible during normal voice call & not roaming SIM
Q13	PSAP	Mobile network provides IVS CLI to PSAP	✓		Not possible if not roaming SIM

Test case 2: ERA-GLONASS IVS in Finland contacting eCall PSAP

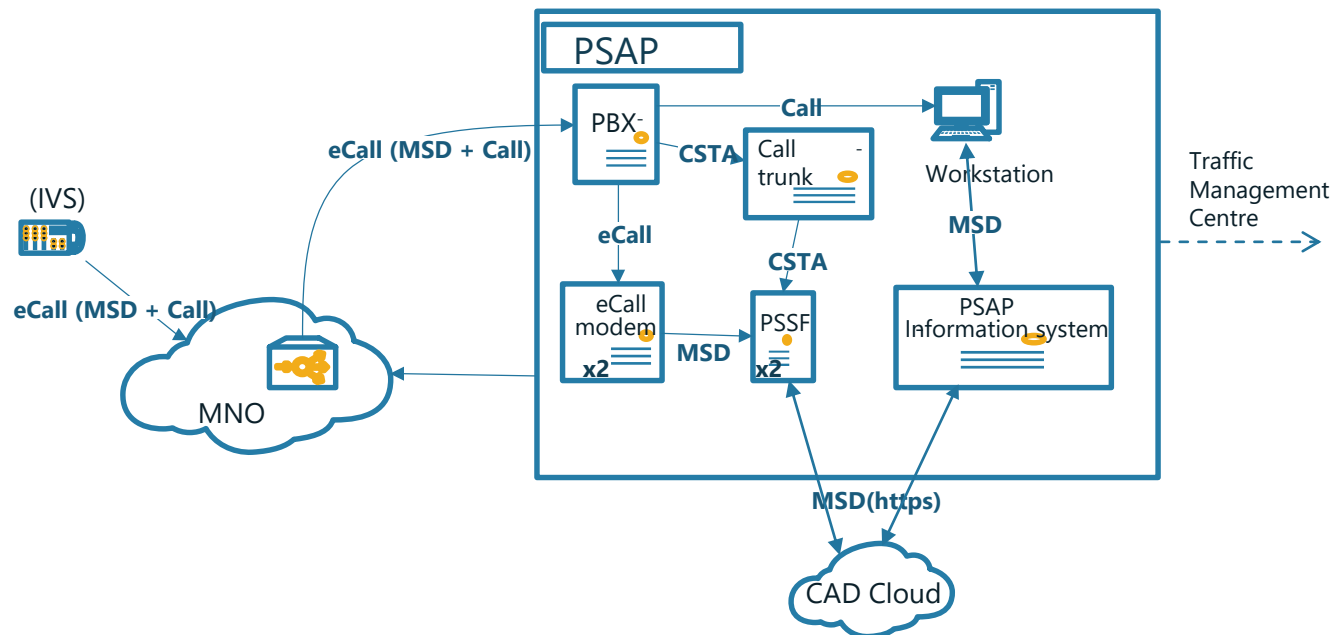


Test case 2 results: ERA GLONASS IVS in Finland



Qn	Test point	Interoperable features	PASS	FAIL	Inconclusive / notes
Q1	IVS & PSAP	eCall flag, emergency call routing to PSAP	☑		
Q2	IVS & PSAP	MSD transmission to PSAP	☑		
Q3a	PSAP	MSD decoding	☑		
Q3b	PSAP	MSD visualisation		X	1. Foreign and not roaming SIMs problem
Q4	IVS & PSAP	Establish voice connection	☑		
Q5	IVS & PSAP	Call hang-up by PSAP	☑		
Q6	IVS & PSAP	End call by in-band-modem by PSAP	☑		
Q8	IVS & PSAP	Request retransmission of MSD by in-band-modem		X	1. Foreign and not roaming SIMs problem
Q9	IVS & PSAP	Call back to IVS from PSAP		X	2. Not possible with not roaming SIM
Q10	IVS & PSAP	Request retransmission of MSD (in-band-modem) during call back		X	2. Not possible with not roaming SIM
Q12	PSAP	Mobile network based location of the caller			X / 3. Works with one MNO
Q13	PSAP	Mobile network provides IVS CLI to PSAP		X	2. Not possible with not roaming SIM

PSAP eCall handling in Finland



Problems and repairs found in Finland

1. MSD visualization problem / MSD retransmission (foreign and not roaming SIM):

- Problem with leading zeroes of the incoming number in the PSAP system
=> **PROBLEM KNOWN AND WILL BE FIXED**

2. Call-back / MSD-retransmission during call-back / CLI number in PSAP (with not roaming SIM):

- No roaming with JSC GLONASS SIM => **cannot be fixed**

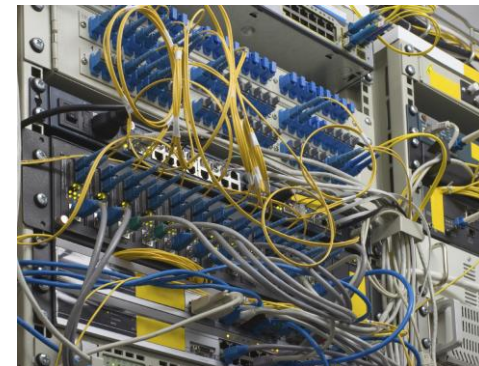


Photo: VTT

3. Mobile network based location of the caller (with not roaming SIM):

- FIX: MNO creates a temporary number (a set prefix + last digits of the IMEI of the calling device) and uses it to query the network for the location

=> THIS FIX WILL BE USED SOON BY MOST MNOS IN FINLAND

Topics for further research

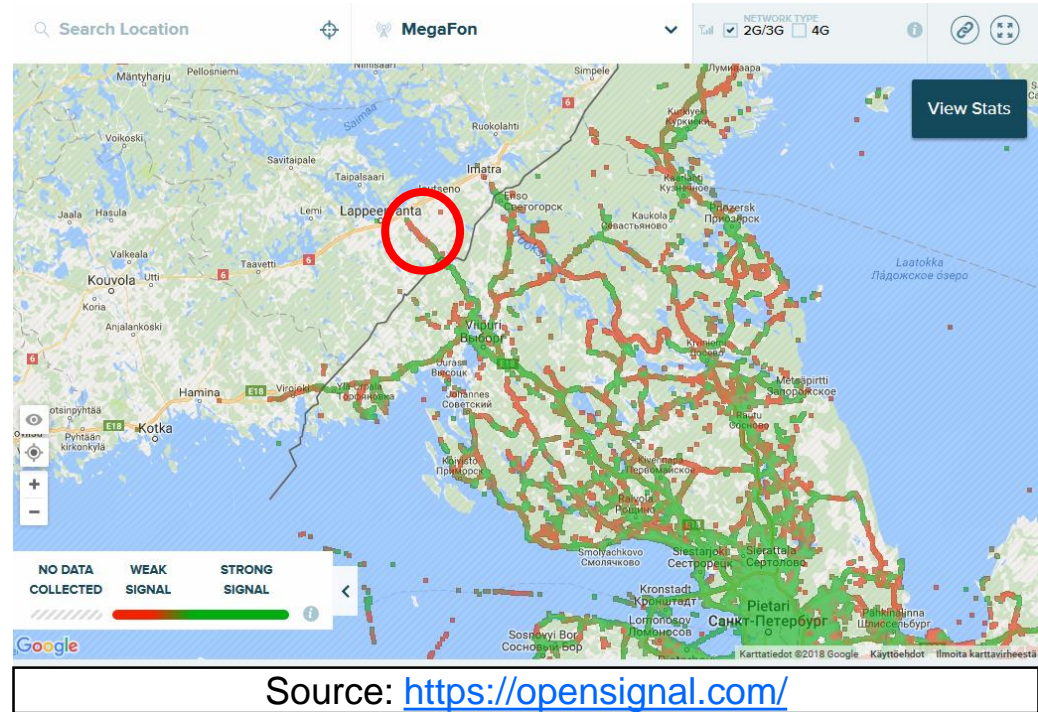
Emergency calls from vehicles in cross-border situations:

e.g. ERA GLONASS emergency call in Finland when still connected to Russian mobile network

= > (MSD) information exchange needed

Compatibility will remain a research topic in the future:

- NG eCall
- eCall for trucks



Thank you!



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