

# C-ITS

# Railway Level Crossing - RLX



## C-ROADS

CZECH REPUBLIC

MEMBER OF  C-ROADS PLATFORM



**intens**  
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PRAHA



Správa železniční dopravní cesty

23.10.2017



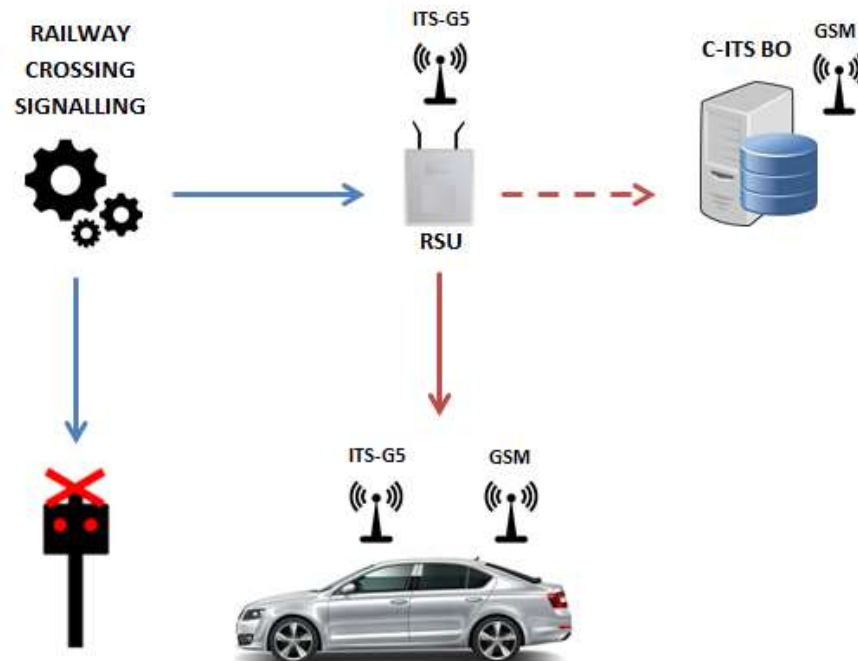
# Background

Year	2010	2011	2012	2013	2014	2015	2016	Total
Number of accidents	275	190	188	180	180	165	175	<b>1353</b>
Number of Fatalities	<b>49</b>	<b>34</b>	<b>27</b>	<b>23</b>	<b>43</b>	<b>32</b>	<b>45</b>	<b>253</b>
Number of Injured	126	107	110	83	77	130	70	<b>703</b>



# Railway Level Crossing

- RLX Use case - Information about the presence/status of Railway Level Crossing (RLX) to the driver
- RSU installed on crossings with signalling systems to warn distractive or undisciplined drivers
- Based on information from the RLX signalling system:
  - Basic warning about the presence of RLX on the way
  - RLX in the warning state (barriers closing/closed) – Train is approaching



# Field tests (2018 - 2019)

Responsible Partners:



- Selected 2 level crossings equipped with signalling systems (with/without barriers)
- Railway line Heřmanův Městec – Moravany
- Tram crossing Ostrava and Plzeň

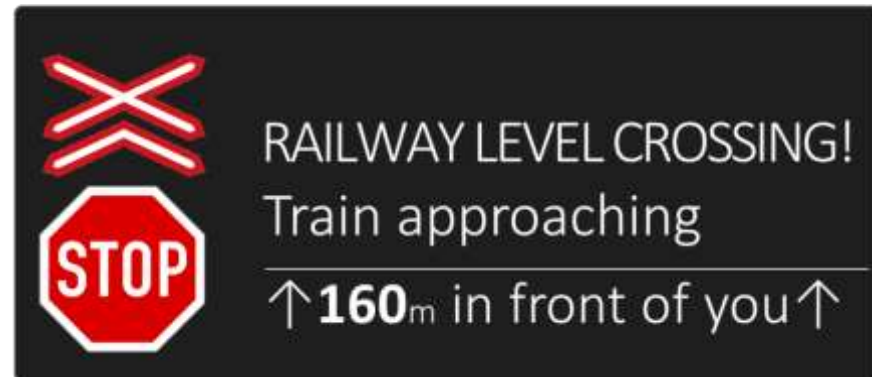
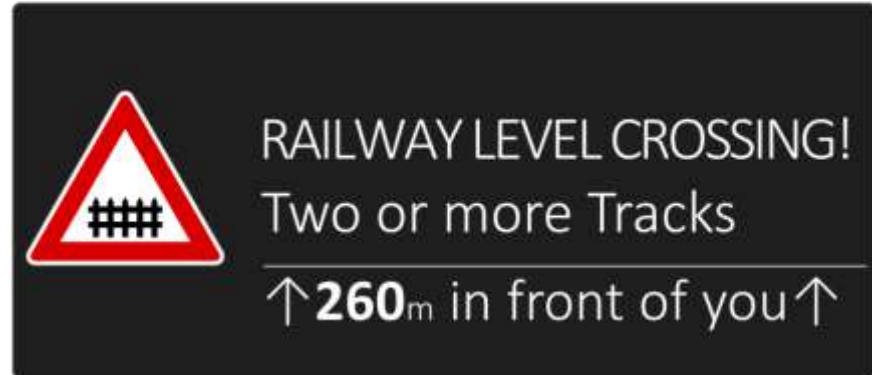


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# Railway Level Crossing

## Basic information about the railway level crossing:

- Crossing type:
  - Unavailable
  - With warning lights
  - With Barriers or Gate
  - Unprotected Level Crossing
- Signalling Control State:
  - Unavailable
  - Warning/Closed
  - Long-term Warning/Closure
  - Failure
- Number of Tracks
  - Unavailable
  - One Track
  - Two or More Tracks
- Optional Info
  - Unavailable
  - Or:
    - Time to Open
    - Direction of Train Movement
    - Maximum Speed to Pass the RLX



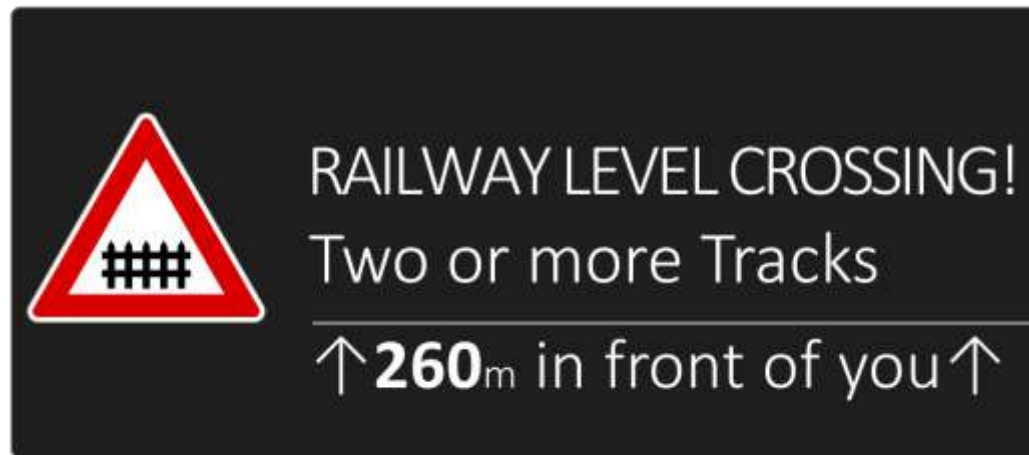
It is not allowed to introduce and broadcast explicit information that the level crossing is clear/open due to potentially false and highly dangerous broadcasting of such info in case of RSU (or also OBU) malfunction.

## Which C-ITS message? DENM? IVI?

# TEMPORARY SOLUTION of missing attributes

## 🚗 Used message: IVIM

- **RoadSignCode (ISO TS 14823):**
  - Nature: **11**
  - Code: **236**
- **ExtraText: Railway Level Crossing!  
Two or more Tracks**



# PROPOSED SOLUTION of missing attributes

## Extend the list of attributes of DENM

- **CauseCodeType:**
  - RailwayLevelCrossing
- **RailwayLevelCrossingSubCauseCode**
  - Unavailable
  - With warning lights
  - With Barriers or Gate
  - Unprotected Level Crossing
- **SignallingControlState**
  - Unavailable
  - Warning/Closed
  - Long-term Warning/Closure
  - Failure
- **NumberOfTrack**
  - Unavailable
  - OneTrack
  - TwoOrMoreTracks
- **Optional Info**
  - Unavailable
  - Or:
    - TimeToOpen
    - DirectionOfTrainMovement
    - MaximumSpeedToPassTheRLX
- ...





# Thank you for your attention

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