Republic of Croatia

Ministry of the Sea, Transport and Infrastructure

National Implementation Plan for Commission Regulation (EU) 2016/919 of 27 May 2016 on the technical specification for interoperability relating to the ‘control-command and signalling’ subsystems of the rail system in the European Union

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1. Introduction

This Plan determines the course of implementation of Commission Regulation (EU) 2016/919 of 27 May 2016 on the technical specification for interoperability relating to the 'control-command and signalling' subsystems of the rail system in the European Union in Croatia for the 2018-2032 period.

The technical specification for interoperability (TSI) is the specification covering all structural or functional subsystems or parts thereof with the aim of fulfilling the basic requirements and achieving interoperability of the rail system.

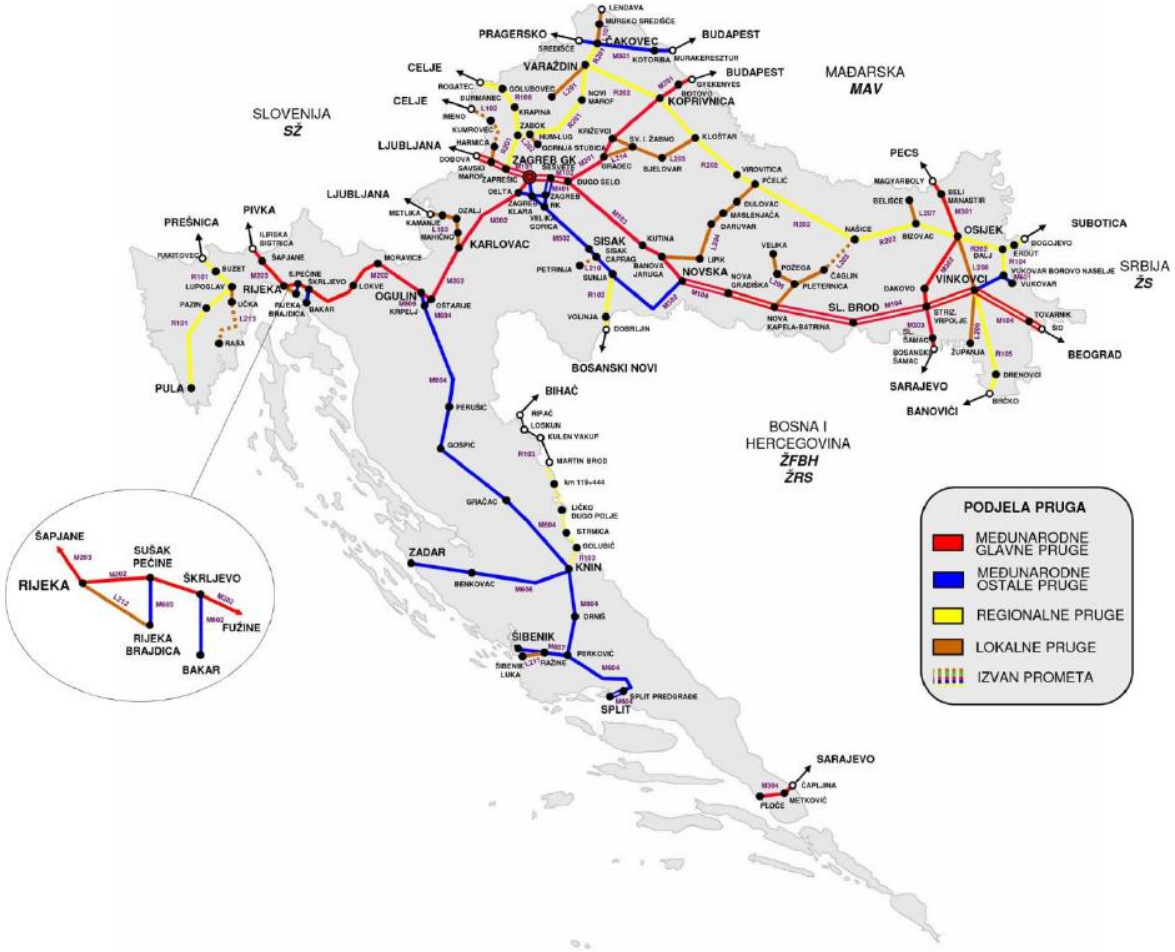

Figure 1 Classification of railway lines in Croatia

SLOVENIA	
HUNGARY	
SERBIA	
BELGRADE	
BOSNIA AND HERZEGOVINA	
CLASSIFICATION OF LINES	
INTERNATIONAL MAINLINE	

OTHER INTERNATIONAL LINES	
REGIONAL LINES	
LOCAL LINES	
DISUSED LINES	

In October 2013 the European Commission and the transport ministers of the EU Member States adopted a final decision on guidelines for the EU's new transport policy. This led to the adoption of Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010, which connected the existing European road and rail network to the trans-European transport network (Trans-European Network - Transport, TEN-T). The objective of creating a single transport network is to remove bottlenecks on European transport routes, to improve infrastructure and to connect different types of traffic to multimodal transport throughout the EU. The Regulation defines nine core EU transport network corridors. Croatia is crossed by two core network corridors: the Mediterranean Corridor and the Rhine-Danube Corridor.

The **Mediterranean Corridor** connects the Iberian ports of Algeciras, Cartagena, Valencia, Tarragona and Barcelona via southern France, with a link to Marseille, and Lyon to northern Italy and Slovenia, with a branch via Croatia and Hungary to the Ukrainian border. It covers rail and road, airports, ports, rail-road terminals (RRTs) and, in northern Italy, the River Po inland waterway. Key projects are a railway line in Spain built to UIC standards, a rail tunnel linking Lyon and Turin, and a crossing through a karst region linking Trieste/Koper and Ljubljana.

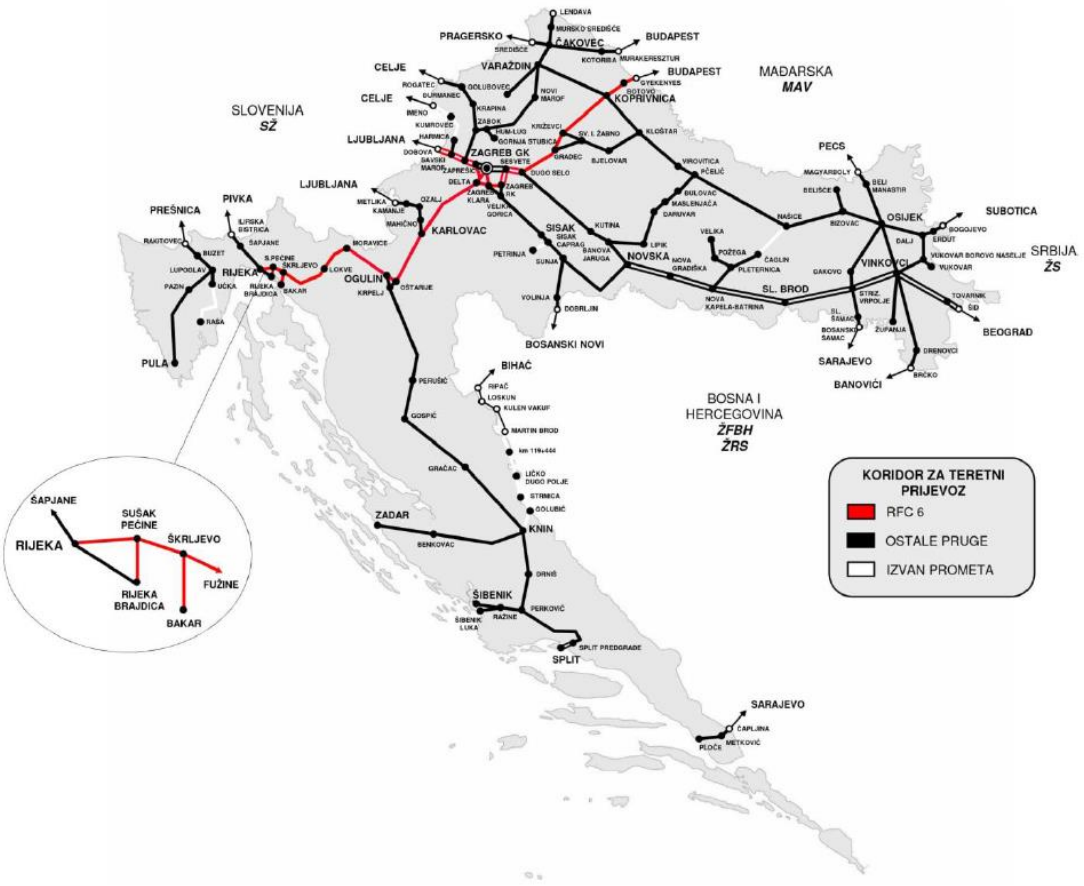

Figure 2 Freight transport corridors in Croatia

SLOVENIA	
HUNGARY	
SERBIA	
BELGRADE	
BOSNIA AND HERZEGOVINA	
FREIGHT TRANSPORT CORRIDOR	
RFC 6	
OTHER LINES	
DISUSED LINES	

The **Rhine-Danube Corridor** connects Strasbourg and Mannheim via two parallel axes in southern Germany, one along the Main and Danube Rivers, the other via Stuttgart and Munich, with a branch to Prague and Žilina to the Slovak-Ukrainian border, through Austria, Slovakia and Hungary to the Romanian ports of Constanța and Galați. It covers rail, road, airports, ports, RRTs and the inland waterway system of the River Main, the Main-Danube Canal, the entire Danube downstream of Kelheim and the River Sava. The key projects are removing the bottlenecks along the inland waterways and the Stuttgart-Ulm and Munich-Freilassing railway line sections.

‘Core network corridors’ were introduced to facilitate the harmonised implementation of core networks. They bring together public and private resources and concentrate EU and CEF (Connecting European Facility) funds, particularly in order to remove bottlenecks, to build missing cross-border links and to promote modal integration and interoperability.

The purpose of these corridors is also: to integrate rail corridors for freight transport as a permanent modal means, which will be incorporated into a multimodal TEN-T network; to promote clean fuel and other innovative transport solutions; to develop telematic applications for the efficient use of infrastructure; to incorporate urban areas into the TEN-T network, and to improve safety.

2. The current situation of railway lines in Croatia

There is currently no automatic transport management system on the network of railway lines in Croatia.

The current train protection system on railway lines in Croatia is the autostop (AS) device INDUSI (I 60). An autostop device is an automatic train protection device that transmits information from a railway line to a traction unit in motion, forcing the train to brake if the driver fails to react properly to the approaching signals or if the speed of the train is greater than that permitted at those times when the speed of the train is controlled by autostop. There are currently 1 676 balises installed (1 465 balises with a frequency of 1 000/2 000 Hz and 211 balises with a frequency of 500 Hz). A balise with a frequency of 2 000 Hz forces the train to brake sharply and is activated when the main signal forbids onward passage of the train, fails to light up, or signals ‘Drive with caution up to 20 km/h’. A balise with a frequency of 1 000 Hz requires specific action by the driver: confirm that he/she is awake and reduce the speed of the train within a specific period of time to the default value according to the category of train. It is activated when the main signals or presignals signal that the train may continue at a reduced speed or presignal a ‘stop’ sign at the next main signal or that the train may continue at a reduced speed. It is also activated when the control signal signals ‘equipment defective at level crossing’. A balise with a 500 Hz frequency is designed to check the speed of the train at a certain distance before a main signal where a 2 000-Hz balise is active. It is activated when the speed indicator on the main signal signals a reduced limit of 10, 20 or 30 km/h. A balise has an average lifespan of around 15 years.

According to how it operates, the autostop device INDUSI (I 60) belongs to the group of devices for controlling the movement of trains at a single point, known as a point system.

Figure 3 shows the situation of traffic-management and signal-safety subsystems in Croatia

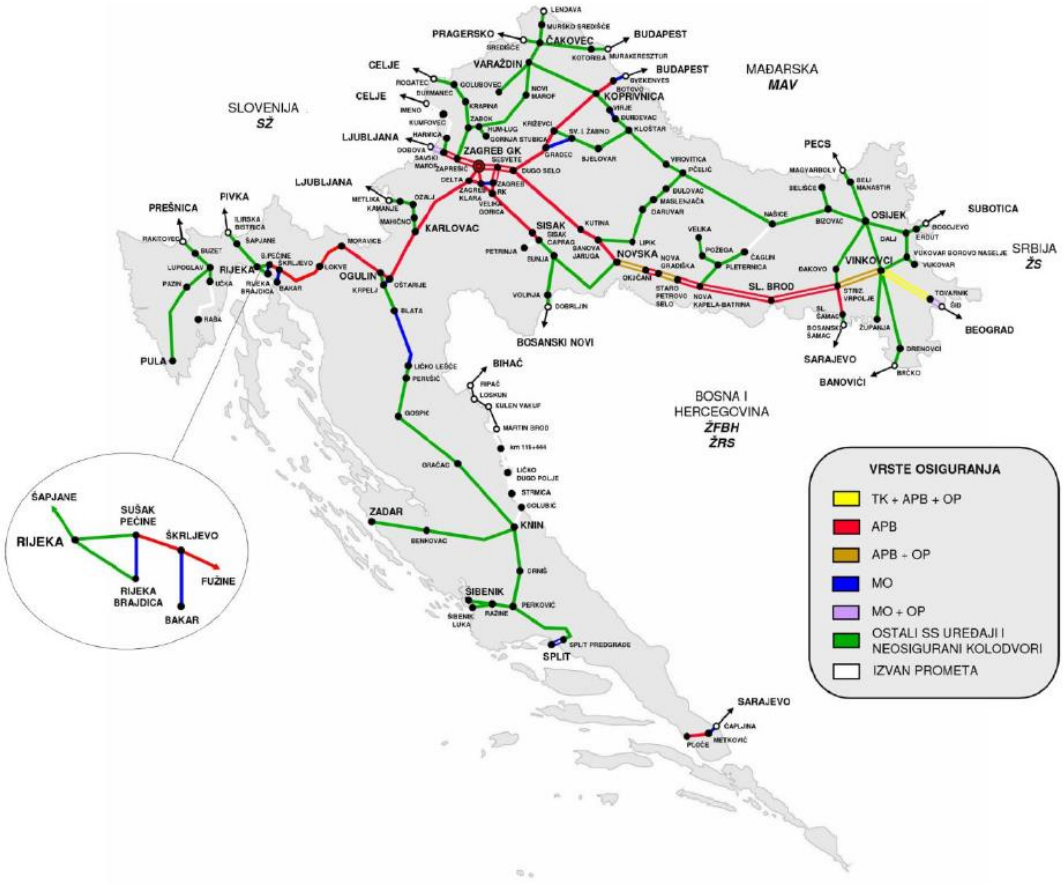

Figure 3 Safety systems on railway lines in Croatia

SLOVENIA	
HUNGARY	
SERBIA	
BELGRADE	
BOSNIA AND HERZEGOVINA	
TYPE OF SAFETY SYSTEM	
TK + APB + OP	
APB	
APB + OP	
MO	
MO + OP	
OTHER SAFETY SIGNAL DEVICES AND STATIONS WITH NO SAFETY SYSTEM	
DISUSED LINES	

With EU cofinancing from the European Regional Development Fund, under the Transport 2007-2013 Operational Programme, the railway infrastructure manager in Croatia, the company HZ Infrastruktura d.o.o., has produced a study into the introduction of a

European Rail Traffic Management System (ERTMS), which reveals where the system should be introduced, at what ETCS Level (1 or 2) and the justification for introducing it.

The study recommends implementing ETCS Level 2 on the railway infrastructure in Croatia managed by HZ Infrastruktura d.o.o.

3. ERTMS - European Rail Traffic Management System

Commission Implementing Regulation (EU) 2017/6 of 5 January 2017 on the European Rail Traffic Management System European deployment plan requires railway infrastructure managers to equip the core network corridors with ERTMS and put ERTMS into operation in those corridors at the latest by the dates specified in Annex I to the Regulation, including in railway stations and junctions. The railway infrastructure on the Mediterranean Corridor in Croatia is scheduled to be equipped with ERTMS and put into ERTMS operation after 2023.

In line with the latest agreements on common technical standards for all Member States along the Mediterranean Corridor, ETCS Level 2 will have to be built on all railway lines, and the GSM-R system installed will have to be compatible with it.

4. Transition strategy

There are two possible strategies for implementing ERTMS. Trains and/or infrastructure may be 'dually' equipped with both ERTMS and the class B national system. The two strategies are known as the railway vehicle strategy and the infrastructure strategy. The railway vehicle strategy has been selected for the implementation of ERTMS in Croatia.

Where vehicles equipped with ETCS/ERTMS run on lines equipped with the autostop device currently in operation in Croatia, the train system will require a specific transmission module (STM). The STM is currently being developed by industry and will be available on the open market.

5. Financing

The Croatian Implementation Plan for Commission Regulation (EU) No 2016/919 of 27 May 2016 on the technical specification for interoperability relating to the 'control-command and signalling' subsystems of the rail system in the European Union is financed using EU subsidies.

6. Conditions for completion of the Plan

The schedule for implementing the Plan depends on whether the financial resources are secured on time.

7. A more detailed schedule for the installation of ETCS is given in the table below[1]:

Railway line	Section	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
M101 DG - S. Marof - Zagreb Gk	DG - S. Marof - Zagreb Gk						X	X	X							
M102 Zagreb Gk - Dugo Selo	Zagreb Gk - Sesvete (incl.)						X	X	X	X						
	Sesvete - Dugo Selo	X	X	X												
M103 Dugo Selo - Novska	Dugo Selo - Novska			X	X	X	X	X								
M104 Novska - Tovarnik - DG	Okučani - Vinkovci					X	X	X	X	X						
M201 DG - Botovo - Dugo Selo	DG - Križevci		X	X	X	X	X									
	Križevci (incl.) - Dugo Selo	X	X	X												
M202 Zagreb Gk - Rijeka	Hrvatski L. - Karlovac			X	X	X	X									
	Goljak -Skradnik							X	X	X	X					
	Škrljevo (incl.) - Rijeka (incl.)			X	X	X	X	X								
	Oštarije - Škrljevo							X	X	X	X	X				
M203 Rijeka - Šapjane - DG	Rijeka - Šapjane - DG			X	X	X	X	X								
M601 Vinkovci - Vukovar	Vinkovci - Vukovar	X	X	X												

Railway line	Section	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
M604 Oštarije - Knin - Split	Oštarije - Knin													X	X	
	Knin - Split															X

M - Railway line of importance for international traffic

[1] *Due to the high level of detail, adjustments to this table can be expected.*

The Croatian railway network still has no GSM-R infrastructure that supports functions, applications and services designed for mobile railway communication, and for that reason ETCS Level 1 will be installed initially. Once GSM-R and ETCS Level 2 have been installed, ETCS Level 1 will remain in use as a backup system.

8. A more detailed schedule for the installation of GSM-R is given in the table below[1]:

Railway line	Section	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
M101 DG - S. Marof - Zagreb Gk	DG - S. Marof - Zagreb Gk			X	X	X	X									
M102 Zagreb Gk - Dugo Selo	Zagreb Gk - Dugo Selo			X	X	X	X									
M103 Dugo Selo - Novska	Dugo Selo - Novska			X	X	X	X									
M104 Novska - Tovarnik - DG	Novska - Tovarnik - DG			X	X	X	X									
M201 DG - Botovo - Dugo Selo	DG - Botovo - Dugo Selo			X	X	X	X									
M202 Zagreb Gk - Rijeka	Zagreb Gk - Rijeka			X	X	X	X									
M203 Rijeka - Šapjane - DG	Rijeka - Šapjane - DG			X	X	X	X									
M301 DG - B. Manastir - Osijek	DG - B. Manastir - Osijek			X	X	X	X									
M302 Osijek - Strizivojna-Vrpolje	Osijek - Strizivojna-Vrpolje			X	X	X	X									
M303 S.-Vrpolje - S. Šamac - DG	S.-Vrpolje - S. Šamac - DG			X	X	X	X									
M304 DG - Metković - Ploče	DG - Metković - Ploče			X	X	X	X									
M401 Sesvete - Sava	Sesvete - Sava			X	X	X	X									
M402 Sava – Zagreb Klara	Sava - Zagreb Klara			X	X	X	X									

Railway line	Section	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
M403 Zagreb RkPs - Z. Klara (K)	Zagreb RkPs - Z. Klara (K)			X	X	X	X									
M404 Zagreb Klara - Delta	Zagreb Klara - Delta			X	X	X	X									
M405 Zagreb Zk - Trešnjevka	Zagreb Zk - Trešnjevka			X	X	X	X									
M406 Čulinec - Zagreb Resnik	Čulinec - Zagreb Resnik			X	X	X	X									
M407 Sava - Velika Gorica	Sava - Velika Gorica			X	X	X	X									
M408 Zagreb RkOs - Mićevac	Zagreb RkOs - Mićevac			X	X	X	X									
M409 Z. Klara - Zagreb RkPs (S)	Z. Klara - Zagreb RkPs (S)			X	X	X	X									
M410 Zagreb RkOs - Zagreb RkPs	Zagreb RkOs - Zagreb RkPs			X	X	X	X									
M501 DG - Čakovec - Kotoriba -DG	DG - Čakovec - Kotoriba -DG			X	X	X	X									
M502 Zagreb Gk - Sisak - Novska	Zagreb Gk - Sisak - Novska			X	X	X	X									
M601 Vinkovci - Vukovar	Vinkovci - Vukovar			X	X	X	X									
M602 Škrljevo - Bakar	Škrljevo - Bakar			X	X	X	X									
M603 Sušak - Rijeka Brajdica	Sušak - Rijeka Brajdica			X	X	X	X									
M604 Oštarije - Knin - Split	Oštarije - Knin - Split			X	X	X	X									
M605 Ogulin - Krpelj	Ogulin - Krpelj			X	X	X	X									

Railway line	Section	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
M606 Knin - Zadar	Knin - Zadar			X	X	X	X									
M607 Perković - Šibenik	Perković - Šibenik			X	X	X	X									
R201 Zaprešić - Čakovec*	Varaždin - Čakovec			X	X	X	X									
R202 Varaždin - Dalj *	Varaždin-Koprivnica			X	X	X	X									

M - Railway line of importance for international traffic
R - Railway line of importance for regional traffic

[1] *Due to the high level of detail, adjustments to this table can be expected.*
** These sections do not currently form part of this Implementation Plan for Commission Regulation (EU) 2016/919.*