1 Welcome & Introduction

2 Panel 1
Boosting rail development in South-East Europe

3 Panel 2
High Speed and cross border passenger mobility

4 Panel 3
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Infrastructure of Serbian Railways

RAILWAY INFRASTRUCTURE PROJECTS

SEESARI WORKSHOP "RAILWAY DEVELOPMENT POTENTIALS IN SOUTH EAST EUROPE"

December 2024, Paris

Current condition of railway network in the Republic of Serbia

- **The total length of the railway network in the Republic of Serbia** is 3,348.1 km, of which single-track lines account for 3,059.4 km, and double track lines for 288.7 km.

- **The total length of electrified railway lines in the Republic of Serbia is** 1,301.9 km, of which single-track lines account for 1,013.2 km, and double-track lines for 288.1 km.

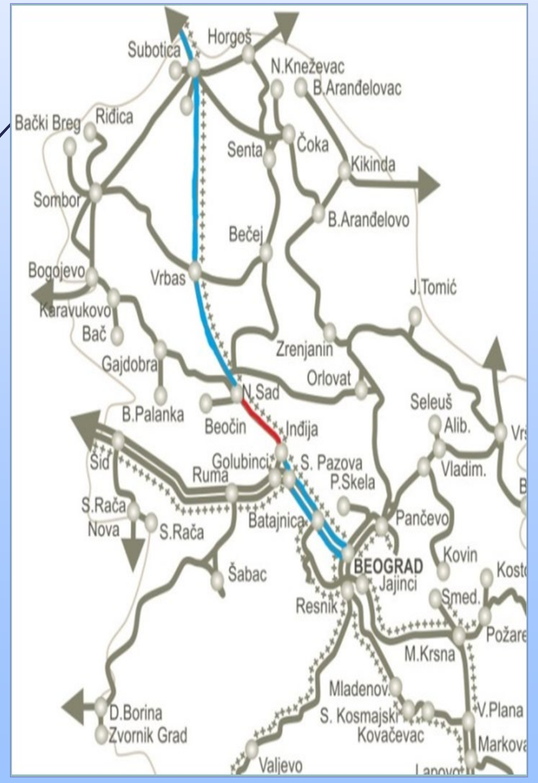
Main objectives for public rail infrastructure in Republic of Serbia

In the previous period the Republic of Serbia has invested, and continues to do so, significant efforts and funds in the railway infrastructure projects aimed at:

- Increased safety, security and reliability of the railway system
- Modernized double-track electrified line along the entire length of Corridor X through Serbia in accordance with the European standards of safety and interoperability (ETCS)
- Modernization of regional and local railway lines
- Design speed of 160 km/h, respectively 200 km/h, on the sections where it is economically justified
- Improved efficiency of main railway nodes (Belgrade, Niš, Novi Sad, Subotica), in order to increase their capacity
- Developed intermodal transport with intermodal terminals in key locations
- Implementation of European interoperability standards

Current projects of importance for international railway traffic

Reconstruction and modernization of railway line Beograd-Subotica-State Border (Kelebia)- (Budapest)



Project details:

Reconstruction, modernization and construction of double-track railway line for passenger and freight service and the speed of up to 200 km/h

Railway line length is 184 km, with three line sections:

- **Section I** Belgrade Center - Stara Pazova (34.5 km) - completed
- **Section II** Stara Pazova – Novi Sad (40.4 km) - completed
- **Section III** Novi Sad - Subotica – State Border (Kelebia) (108.1 km) – line commissioning for commercial traffic is in final stage

Current projects of importance for international railway traffic

RECONSTRUCTION AND MODERNISATION OF BELGRADE - NIŠ RAILWAY LINE (243.5 km)

The project envisages the reconstruction and construction of a double-track railway line, modernization of civil engineering and electrical infrastructure, with increasing the speed up to 200 km/h

- Building and reconstruction of the line is planned in phases, by execution of civil works in the first phase and electrical works in the second phase, on 3 sections (Belgrade - Velika Plana, Velika Plana – Paraćin and Paraćin – Niš)
- The European Commission will provide the EUR 600 million grant to support the modernization of Belgrade-Niš railway line, as a part of the EUR 2.2 billion financial package for the upgrade of Corridor X in Serbia.
- Out of the scope of the grant, EUR 265 million has been already approved for the construction of Stalać-Đunis section, which will be the first to be built.
- The rest of the package consists of EUR 1.1 billion loan (EIB and EBRD). EUR 525 million will be covered by Serbia’s state budget.

Current projects of importance for international railway traffic

RECONSTRUCTION AND MODERNISATION OF NIŠ – BRESTOVAC SECTION (23.4 km, 120 km/h)

- Investment value: EUR 59.9 million
- Contractors: Joint Venture Trace – Balkantel
- The works started in September 2021 and deadline for completion is February 2025
- The project includes works on the reconstruction of civil and electrical infrastructure in the part from Niš to Brestovac for speed up to 120 km/h.

Current projects of importance for international railway traffic

RECONSTRUCTION AND MODERNISATION OF NIŠ - DIMITROVGRAD RAILWAY LINE

Project encompasses reconstruction, modernisation and electrification of the existing line Niš - Dimitrovgrad, as well as the construction of a new single-track electrified bypass line around Niš in length of 22 km.

The total value of the project is app. EUR 268.3 million. Funds are provided from the following sources of funding:

=

- **European Investment Bank loan – EUR 134 million**
- **Grant of the Western Balkans Investment Framework – EUR 73 million euros**
- **National co-financing - EUR 61.3 million euros**

Current projects of importance for international railway traffic

RECONSTRUCTION AND MODERNISATION OF NIŠ - DIMITROVGRAD RAILWAY LINE (86 km, 120 km/h)

- Investment value: EUR 169.7 million
- Contractor: Joint Venture Trace – Balkantel
- The works began in November 2023,

  and the deadline for completion is July 2027
- The Project includes the execution of works on the superstructure and substructure and line electrific
  the section from Sićevo to Dimitrovgrad

Current projects of importance for international railway traffic

RECONSTRUCTION AND MODERNISATION OF NIŠ - DIMITROVGRAD RAILWAY LINE

Project components:

I) Reconstruction of the track and construction of OCL for Prosek - Staničenje – Dimitrovgrad section (80 km)

II) Construction of the railway line and OCL for Niš Bypass (22 km)

III) Signaling and Telecomunication of Niš – Dimitrovgrad railway line (86 km) and Niš Bypass

Current projects of importance for international railway traffic

Railway station Belgrade Center – Phase 2

The new railway station in Belgrade Center covers the area of about 5,600 square meters and is designed according to the highest standards for passenger transport. It is located above ten tracks and six platforms, and provides for the necessary commercial capacities and facilities. The platform part is connected to the station building by elevators, escalators and conveyors, enabliing the passengers to access waiting rooms, ticket offices and other facilities necessary for the functioning of passenger traffic.

Current projects of importance for international railway traffic

Construction of Master Dispatcher Centre in the Republic of Serbia

- Investment value: EUR 114.78 million
- Contractor: RŽD International
- The works started in February 2024, and the deadline for completon is December 2026
- The Master Dispatcher Center will be the central place for monitoring, controlling and regulating of railway traffic on the entire public railway network of the Republic of Serbia, based on the state-of-the-art technological as well as hardware and software solutions aimed at rationalizing and optimizing the railway traffic control and regulation.

Planned projects (total length 806.7 km, estim. value EUR 4,367 mil)

- Reconstruction and modernization of railway line Stara Pazova – Šid – State Border with Croatia (Tovarnik)
- Reconstruction and modernization of railway line Brestovac – Preševo – State Border with North Macedonia (Tabanovce)
- Reconstruction and modernization of railway line Pančevo – Vršac – State Border with Romania
- Reconstruction and modernization of railway line Stalać – Kraljevo
- Reconstruction and modernization of railway line Kraljevo – Rudnica
- Reconstruction and modernization of railway line Ruma – Šabac – Loznica – Zvornik – State Border with Bosnia and Herzegovina
- Construction of railway line Valjevo - Loznica
- Reconstruction and modernization of railway line Batajnica – Ostružnica
- Reconstruction and modernization of railway line Lapovo – Kraljevo and Kraljevo - Požega

Thank you for your attention

ALBANIAN RAILWAYS

ACTUAL RAILWAY PRIORITIES

Seesari Workshop 12 December 2024

ACTUAL RAILWAY PRIORITIES

- Albanian railways priorities are defined in the NSDIE 2022-2030
- National strategic development and European integration NSDIE
- Railway challenges are defined and the GoA's Goals for railways
- The green Infrastructure and sustainable transport Cluster no.4
- Railway in Albania is currently working in accomplishing the Goals
- Establishing fully functional new railway bodies, RLA, RRA, NSA, NIB
- The deployment of the ITS intelligent transport systems in railways
- Licensing of the IM from the RUs, and the ECM and their certification
- Transitional period (36 months) for safety authorizations/certifications

ACTUAL RAILWAY PRIORITIES

- Smart and sustainable mobility strategy flagships for rail & intermodal
- Greening of railway operations and full electrification of infrastructure
- Full implementing of the PIP project implementing plans and the ESIA
- Environmental, social, health and safety plans and relevant measures
- Transport demand analysis as in the Economic reform program (ERP)
- The competitiveness, social and gender balance, employment impacts
- Project management plan/Integrate management information system
- Better coordination and regional coherence to new growth plan (EIP)

ACTUAL RAILWAY PRIORITIES

- Alternative fuel infrastructure and electrification of railways
- AFIR and the e-charging stations in the AL railways terminals
- Deployment of the ITS/ERTMS/VTMIS for railway and maritime
- Adoption of the National multimodal ITS strategy and Action plan
- Transport of dangerous goods – Inland transport by rail (RID)
- TPED and customs administration and railway among the CBPs
- Implementing the SERA through the Recast directive (RAIL CODE)
- Approval of the track access charges (TAC) reviewed methodology

ACTUAL RAILWAY PRIORITIES

- Licensing of the train drivers (TDD), the drivers certification from Rus
- Training of train drivers under the new Ministerial Guidelines (TDD)
- Training of all participants in the transport of dangerous goods (TDG)
- Establishing the training courses for DGSA safety advisors in the HSH
- The Railway safety implementation of the common safety methods
- Railway in Albania, applies the CMS, safety management systems SMS
- Findings of rail safety in the Ims, RUs, ECM are to be published (NSA)
- Register of infrastructure is to be published from the safety authority
- Vehicles registers are to be published from the safety authority (NSA)

ACTUAL RAILWAY PRIORITIES

- The accelerated integration o the EU agency for railways (ERA)
- The ERA regulation is partially aligned in the Railway CODE / LAW
- Approval of the type of the ERTMS trackside is applied in the OSS
- The application for the ERTMS trackside approval is carried out
- Albanian railways has applied for the ERTMS in Durres-PTT-TIA
- Railway and Combined transport (intermodal transport) priorities
- Albanian railway law has defined the intermodal transport (CODE)
- Numerous projects are carried out on Inter-modality by rail and ports
- A final survey on digitalization for Multimodal transport is done (TCT)

ACTUAL RAILWAY PRIORITIES

- Public services obligations by rail Reg 1370/2007 is fully aligned in AL
- The railway code stipulates inter alia on the exclusive right / tendering
- Rights of the passengers by railway under the social issues and rights
- Actual findings from the TCT study on passengers rights is published
- The recast of the regulation 1371/2007 is fully aligned/implementing
- The Multiannual contract with the State of the IM is still missing in AL
- The MAIC should comprise Land strategy and strategy of Competence
- The PSO public service contract is still missing, a request is delivered

ACTUAL RAILWAY PRIORITIES

- The regulation 2015/1315 TEN-T guidelines of the EU is fully aligned
- Albania planned to align the Streaming directive and a new Reg (EU)
- The CEF regulation is also planned to be aligned in Albania for funds
- Albania is involved in the B2B acquis screening with the Commission
- Albania has fully aligned the EU directive recast establishing the SERA
- Albania fully aligned the TEN-T on trans-European transport networks
- Albania is authorized member of the R & I program on rail innovation
- Railway joint undertaking is extremely important to the HSH railways

ACTUAL RAILWAY PRIORITIES

- Albanian railways is involved in the technical committees of the TCT
- Treaty establishing the transport community is extremely important
- The APs, action plan for railways, social rights and the TEN-T reports
- Transport facilitation action plan of the TCT is very important in CBPs
- Albania is in the general procurement notice of the rehabilitation of railways line Vora- Hani Hoti
- The railway priority project promotes the border to Montenegro & rail terminals
- The new growth plan applies for the Western Balkans and the EIP update
- Albania is member in the ECE Economic & social committee in Geneva
- Recently Albanian railway shall moderate in the Danube strategy WB6

ACTUAL RAILWAY PRIORITIES

- Albanian railway implements strategic, special and thematic priorities
- Research and innovation and development is under the implementing
- The Albanian government is fully committed to railway M&R program
- Partnership with the CSOs is also very crucial for smart mobility SSMS
- The urban and railway transport services are developing in the ANPT3
- Albanian national transport plan, the 2nd review, ANTP3, 2020 / 2024
- Order of the Minister of Infrastructure and Energy is annually updated
- An Albanian transport overview is positively evaluated from the OECD

ACTUAL RAILWAY PRIORITIES

- Albanian Railway is closely cooperating, in digital/critical infrastructure
- Preventing, prediction, regular, and corrective maintenance in the IM
- The Green Agenda, Connectivity agenda and Digital agenda is applying
- Transport community, energy community and innovation community
- The dual approach and green transition is a top priority of the Albania
- Albanian railways is implementing and toward successful finalization
- Almost 80% is finalized and shall be tested with the main contractor
- The supervision of the civil works, goods and services is implementing

ACTUAL RAILWAY PRIORITIES

- The Intermodal transport network chaired from the MIE is progressing
- The Albania railways, Albanian ports, academia, and inspections in AL
- The ITN intermodal transport network consists of the 60 institutions
- Albania holds the Presidency of Task force of Intermodal in the BSEC
- Albanian railways participated in Workshop in the UNECE, 23.09.2024
- Albanian railways is involved, UNECE Informal Task Force on E-mobility
- Convention on the Contract of International Carriage of Goods by Rail
- The OTIF's WG Tech or CTE meeting included the Albanian railways

ACTUAL RAILWAY PRIORITIES

- Albanian railways is involved in the ECE Working Party on Rail Transport
- Albanian railways in Group of Experts on Assessment of Climate Change Impacts and Adaptation for Inland Transport with the UNECE Committee
- Albanian railway/Working Party on Transport Trends & Economics (WP.5)
- Albanian railways is in the permanent group of experts of HUBS & PIRRS
- Albanian railways is in the ECE customs questioning the transport issues
- Albanian railways is in the UNECE working group of costs' infrastructure
- Albanian railways has signed the NSA of the HARMOTRACK project (UIC)
- The HARMOTRACK project was very useful in the track measurements
- Albanian railways was in Project meetings in Paris, and visit Birmingham

ACTUAL RAILWAY PRIORITIES

- Albanian railways aims to benefit any knowledge and know-how in UIC
- The technical specifications for interoperability is implementing in HSH
- Durres-Tirana-Rinas projects is complemented with the additionalities
- The social, economic, health and safety/technical security under the RPs
- 28 measures adopted from the contracting authority Albanian Railways
- The EBRD and IFIs, International financial institutions are fully supportive
- Internal economic rate of return of the investment is fully assessed (ERR)
- SPP single project pipeline is extremely important with the EU acquis, ISO

ACTUAL RAILWAY PRIORITIES

- Albanian railway is involved in the internal consultation on Ministry MIE these draft acts:
- REGULATION “On the technical specification for interoperability relating to the subsystem ‘telematics applications for passenger services’ of the trans-European rail system “ (finalized)
- Regulation “Establishing common safety methods for supervision by national safety authorities after the issue of a single safety certificate or a safety authorization and for requirement of establishing the common safety methods on safety management system”- YES
- REGULATION "on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service and noise-off costs effects“- Ongoing, internal consultation
- DRAFT- REGULATION “On criteria for applicants for rail infrastructure capacity “, OF THE DEPUTY PRIME MINISTER AND MINISTER OF INFRASTRUCTURE AND ENERGY – In consultation
- ORDER FOR THE APPROVAL OF THE REGULATION “On procedures and criteria concerning framework agreements for the allocation of rail infrastructure capacity“- Internal consultation
- Draft regulation on the Level-Crossings (we welcome *the UIC can provide any ISO standards*)
- The draft regulation is finalized already, but still missing the adoption, a reference to standards

Thank you!

Eneida Elezi

Foreign Affairs

Albanian railways

Technical director of HARMOTRACT PROJECT with the UIC for Rail

Authorized member in the UNECE Economic and social committee

Member in Technical committee in TC transport of dangerous goods

Authorized member in the Rail Europe Joint undertaking RE JU (EU)

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SEESARI

South East Europe
Strategic Alliance for Rail Innovation

Connecting regions - high-speed challenges

Workshop, Paris, 12.12.2025

INTERNATIONAL UNION
OF RAILWAYS

SEESARI - South-East Europe Strategic Alliance for Rail Innovation

SEESARI is the initiative for **supporting rail and transport development in South East Europe with focusing on railway research, development and innovation**

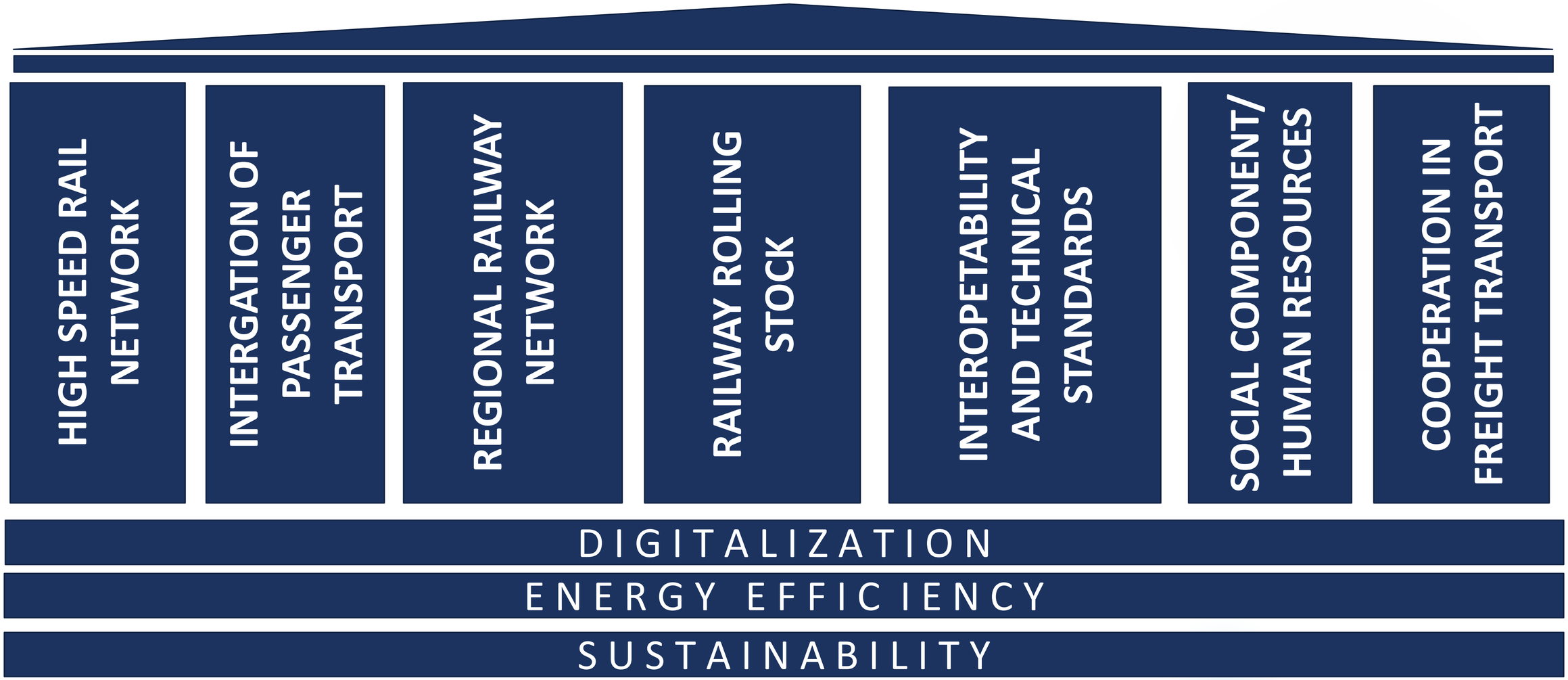
Partnership:

=> currently **more than 70 members from 18 countries** (railway transport operators and infrastructure managers, manufacturers and suppliers of technical equipment, financial institutions, research institutions, associations and interest groups connected with (rail) transport, national and regional authorities,..)

SEESARI
South East Europe
Strategic Alliance for Rail Innovation

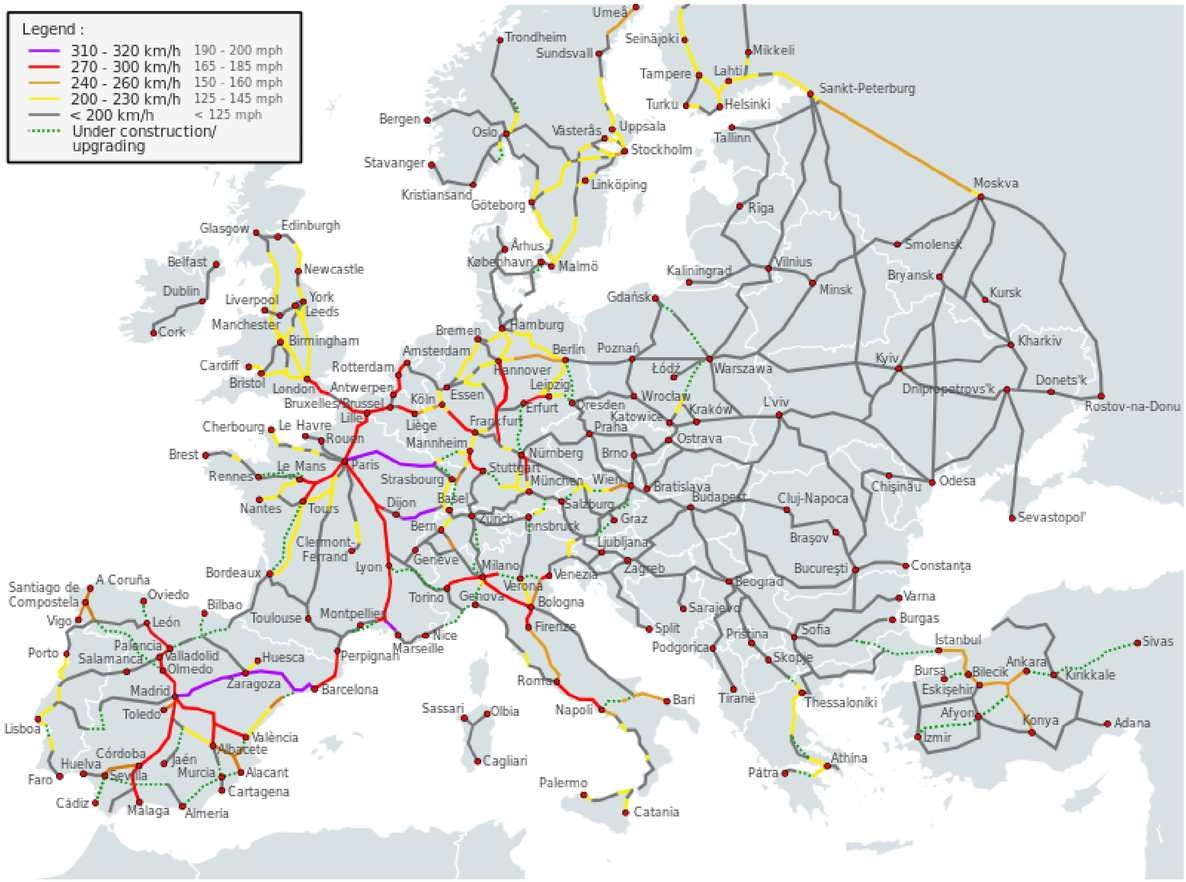
INTERNATIONAL UNION
OF RAILWAYS

SEESARI – MAIN PRIORITIES



DEVELOPMENT OF THE HIGH SPEED RAIL NETWORK IN SEE

UIC proposal 1974



Today

DEVELOPMENT OF THE HIGH SPEED RAIL NETWORK IN SEE

EU TRANSPORT WHITE PAPER - SUMMARY OF RAIL-RELATED GOALS

=> **By 2050, complete a European high-speed rail network.**

=> By 2030, triple the length of the existing high-speed rail network and maintain a dense railway network in all Member States. **By 2050 the majority of medium-distance passenger transport should go by rail**.

=> By 2050, **connect all core network airports to the rail network, preferably high-speed**.

CONNECTING REGIONS - HIGH-SPEED CHALLENGES

The high speed lines in South East Europe:

Characteristics: double-truck rail for speeds of 200 km/h and higher speed (depends on studies), ETCS L2, GSM-R, mixed hilly-mountain-flatland railway, railway for mixed traffic

Step-by-step process:

- Studies
- Low cost investment measures (border procedures, timetables, digital cross-border ticketing and reservation system)
- Big investments (design, construction)

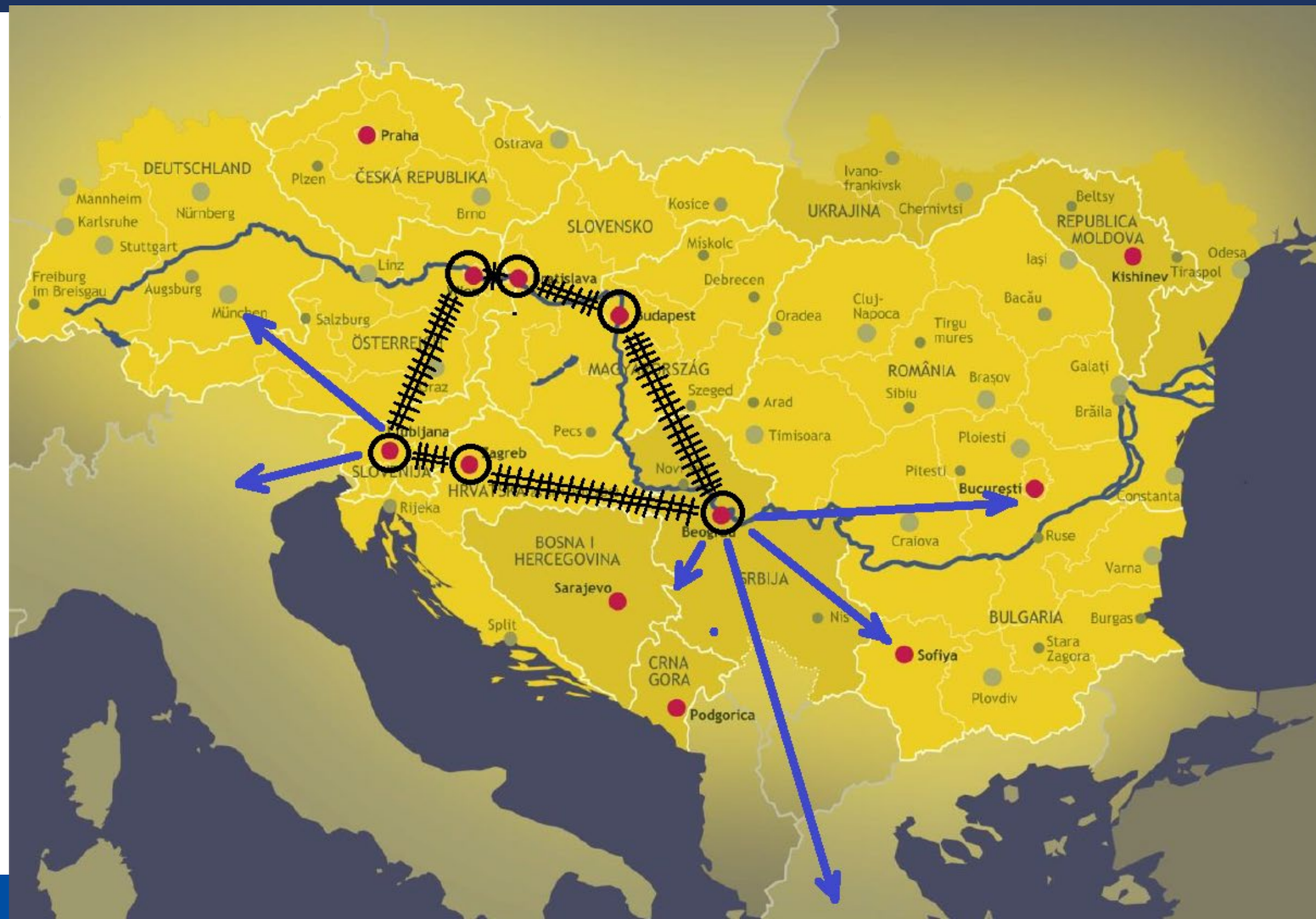
SEESARI
South East Europe
Strategic Alliance for Rail Innovation

INTERNATIONAL UNION
OF RAILWAYS

CONNECTING REGIONS - HIGH-SPEED CHALLENGES

High speed line/belt Vienna-Ljubljana-Zagreb-Belgrade-Budapest-Bratislava-Vienna - idea

- 6 capital cities, total 9 million people
- 6 countries, 28 million people
- 1500 km of length
- Connections to North-West and South East



Thank you for your attention.

Dr. Peter Verlič,

Chairman

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Any questions?

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Salzburg

Ljubljana

Planning

Belgrade

Transport

Strategy

Thessaloniki

Pireus

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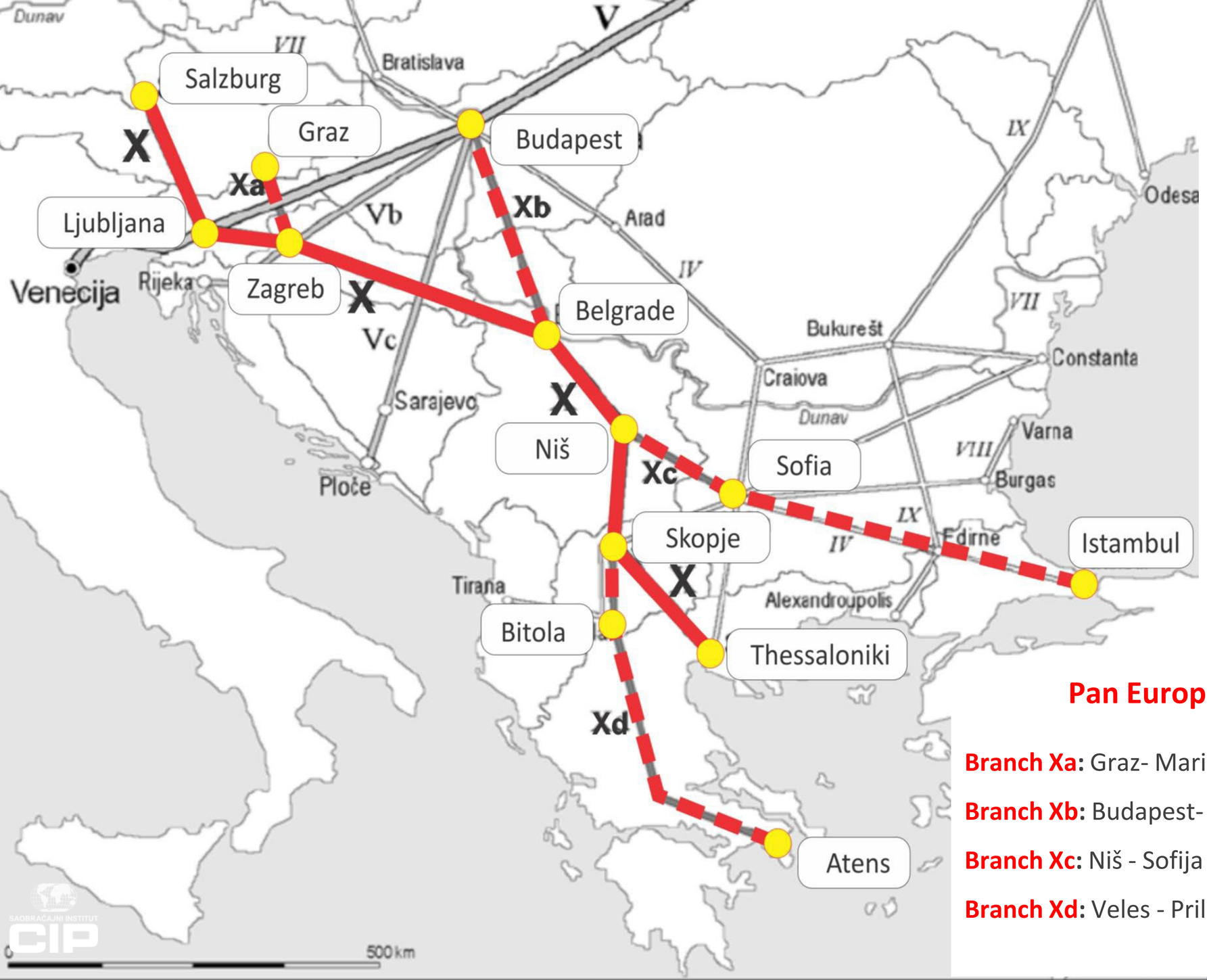
Corridor?

The line that connects .....
people and the economy .....

The **Orient/East-Med Corridor** is the fourth of the ten priority axes of the Trans-European Transport Network

(Germany – Czechia – Austria / Slovakia – Hungary – Romania – Bulgaria – Greece – Cyprus);


European Commission
TRANS-EUROPEAN TRANSPORT NETWORK
TEN-T CORE NETWORK CORRIDORS
BALTIC - ADRIATIC
ORIENT / EAST-MED
ATLANTIC
NORTH SEA - BALTIC
SCANDINAVIAN - MEDITERRANEAN
NORTH SEA - MEDITERRANEAN
MEDITERRANEAN
RHINE - ALPINE
RHINE - DANUBE
Oulu
Helsinki
Turku/Naantali
Hamina/Kotka
Tallinn
Oslo
Orebro
Stockholm
Ventspils
Riga
Gothenburg
Klaipeda
Malmo
Copenhagen
Trelleborg
Vilnius
Kaunas
Gdynia/Gdansk
Dublin
Shannon-Foynes
Cork
Rostock
Kiel
Bremerhaven
Bremen
Hamburg
Szczecin/Swinoujscie
Amsterdam
Utrecht
Osnabrück
Rotterdam
Magdeburg
Berlin
Poznan
Warsaw
Hannover
Frankfurt/Oder
Lodz
Zeebrugge
Antwerp
Dusseldorf
Cologne
Dresden
Wroclaw
Calais
Gent
Lille
Brussels
Liege
Prague
Krakow
Frankfurt
Würzburg
Ostrava
Katowice
Le Havre
Luxembourg
Mannheim
Nuremberg
Zilina
Metz
Stuttgart
Regensburg
Paris
Strasbourg
Munich
Bratislava
Nantes/Saint-Nazaire
Tours
Dijon
Basel
Innsbruck
Graz
Budapest
Arad
Brasov
Sulina
Udine
Timisoara
Bucharest
Constanta
Lyon
Novara
Verona
Ljubljana
Craiova
A Coruña
Gijón
Bordeaux
Turin
Milan
Venice
Rijeka
Bilbao
Toulouse
Bologna
Ravenna
Sofia
Burgas
Vitoria
Montpellier
Genova
La Spezia
Nice
Ancona
Valladolid
Marseille
Livorno
Porto
Aveiro
Zaragoza
Perpignan
Rome
Barcelona
Bari
Madrid
Tarragona
Naples
Taranto
Lisbon
Sines
Valencia
Igoumenitsa
Palma de Mallorca
Cagliari
Seville
Cordoba
Huelva
Antequera/Bobadilla
Murcia
Cartagena
Gioia Tauro
Palermo
Athens/Piraeus
Patras
Lefkosia
Limassol
Larnaka
Tenerife
Algeciras
Augusta



Pan European Corridor koridor X

(Synonym: the Corinthian or Helsinki Corridor)

Salzburg - Ljubljana - Zagreb - Belgrade - Niš - Skopje – Veles - Thessaloniki

(Length: Rail: **2,528 km** / Road: **2,300 km**)

The Corridor X is one of the pan-European corridors. It runs between Salzburg in Austria and Thessaloniki in Greece.

The corridor passes through Austria, Slovenia, Croatia, Serbia, North Macedonia, and Greece. It has four branches: Xa, Xb, Xc, and Xd.

Pan European Corridor koridor X - Branch

Branch Xa: Graz- Maribor - Zagreb

Branch Xb: Budapest- Novi Sad - Belgrade

Branch Xc: Niš - Sofija - Dimitrovgrad (BG) – Istanbul via Corridor IV

Branch Xd: Veles - Prilep - Bitolj - Florina – Igoumenitsa (Via Egnatia)


High-speed railways in Europe
310 – 320 km/h
270 – 300 km/h
240 – 260 km/h
200 – 230 km/h
Under construction
< 200 km/h (non high-speed)
Salzburg
Budapest
Ljubljana
Novi Sad
Zagreb
Belgrade
Niš
Skopje
Thessaloniki
Patra
Pireus
Austria section: (197 km)
Slovenia section: (176 km)
Croatia section: (303 km)
Hungary section: (166 km)
Serbia section: (687 km)
North Macedonia section: (213 km)
Greece section: (732 km)

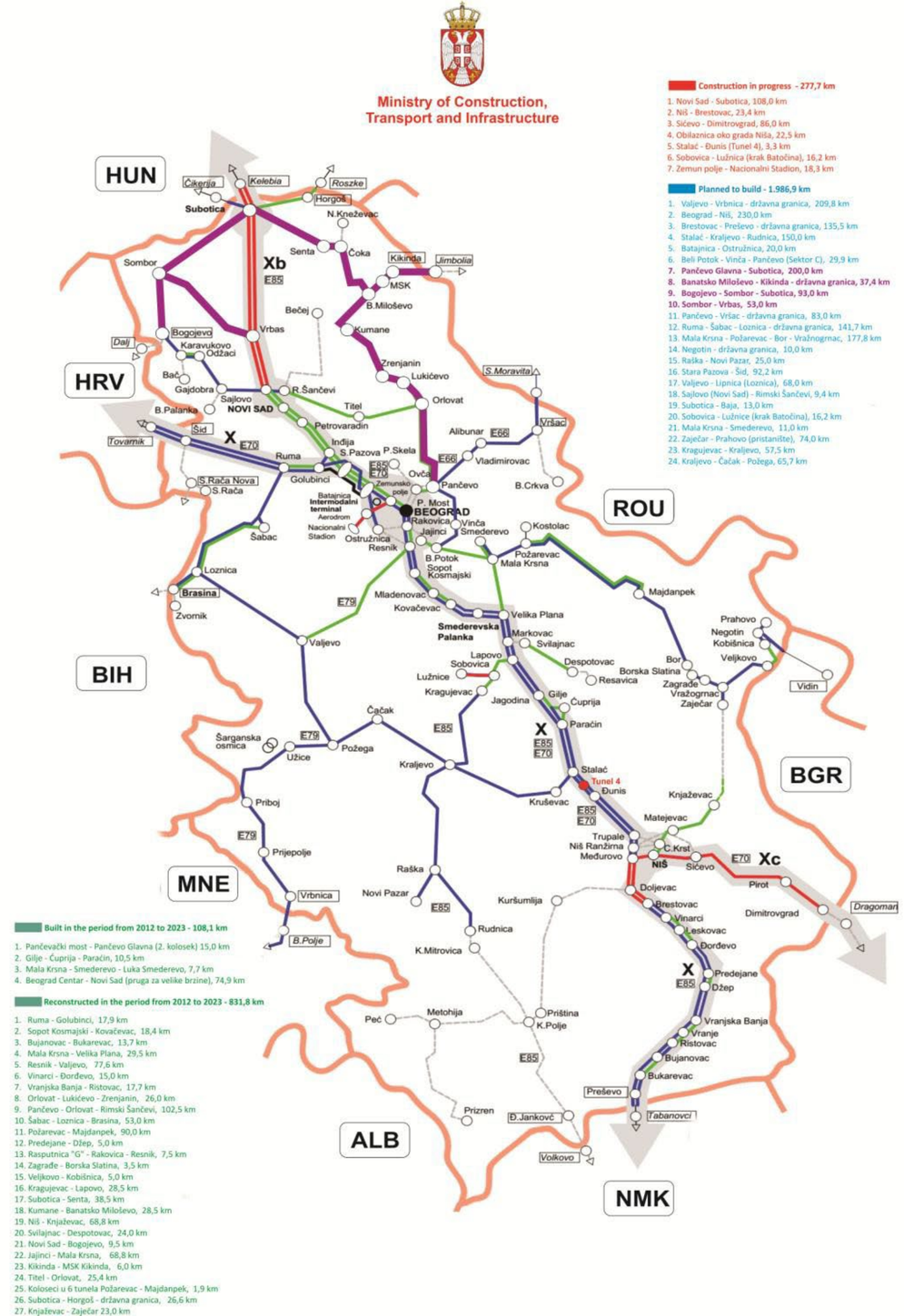
2012. – 2023.

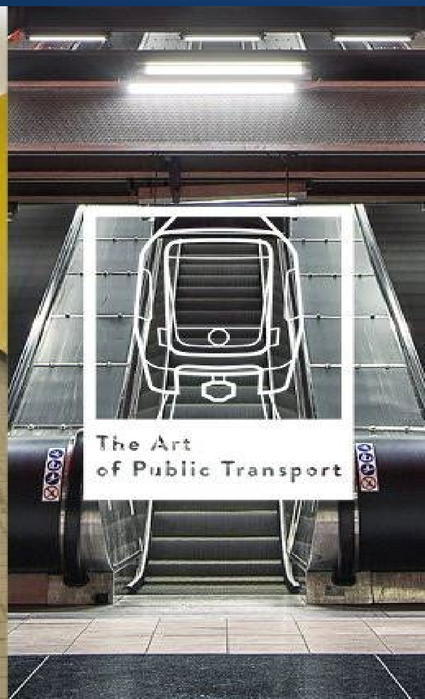
Built : 108,1 km

Construction in progress : 277,7 km

Reconstructed : 831,8 km

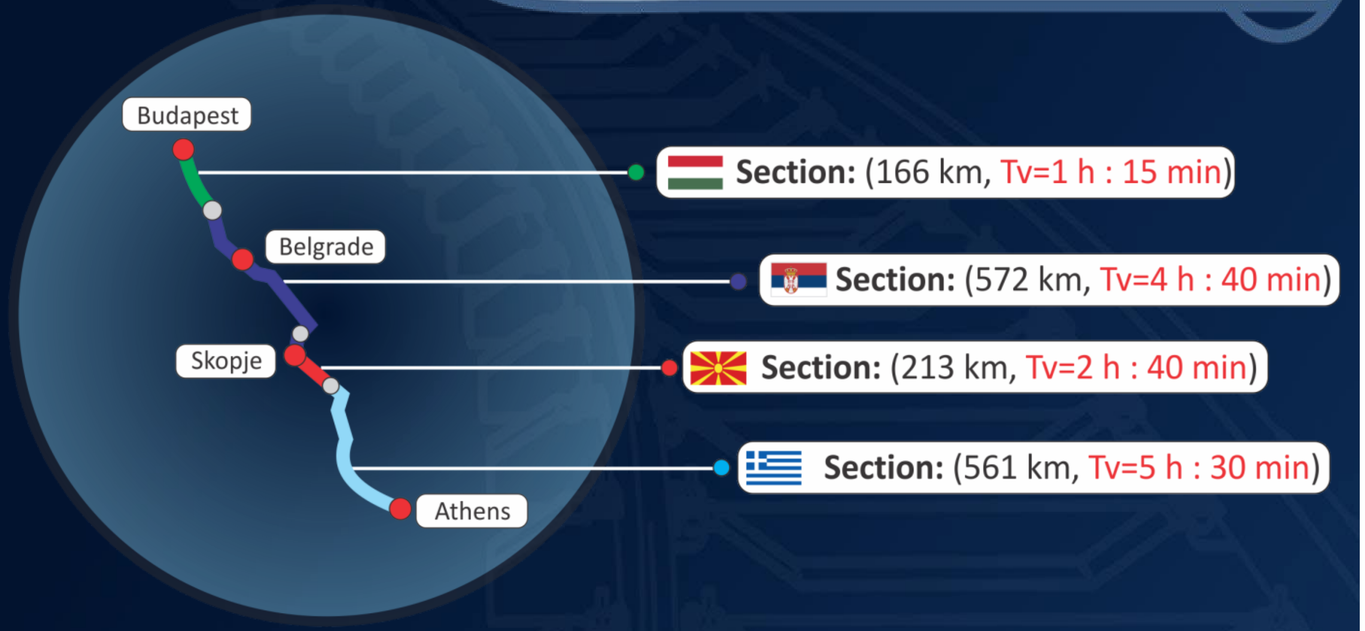
Planned to build : 1.986,9 km





Around 6 million passengers annually

Source: Statistical Yearbook of the Republic of Serbia, 2023



Section: (166 km, Tv=1 h : 15 min)

Section: (572 km, Tv=4 h : 40 min)

Section: (213 km, Tv=2 h : 40 min)

Section: (561 km, Tv=5 h : 30 min)

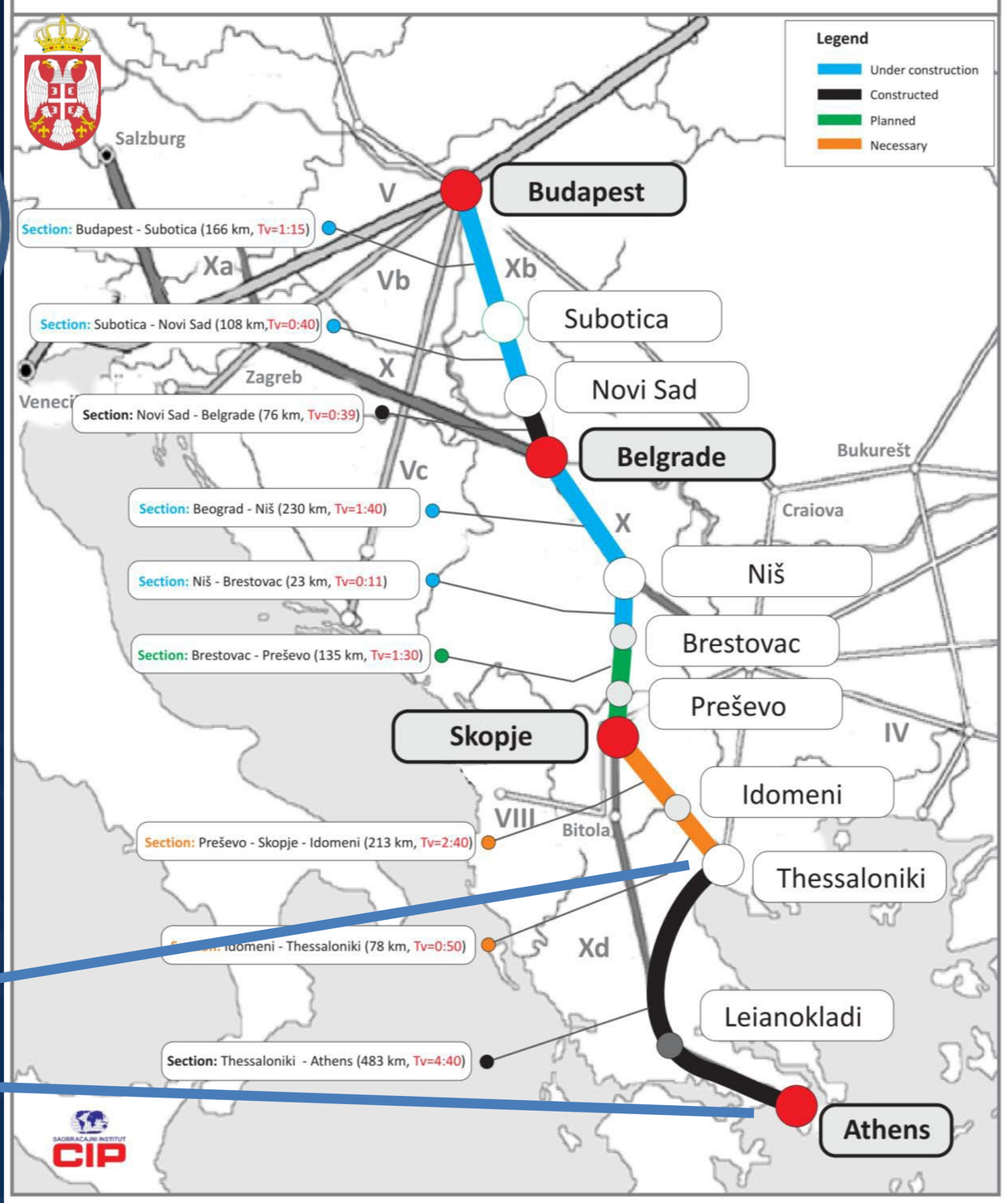
Total section: Budapest - Athens (1.512 km, Tv=14 h : 5 min)

Around 11 millon t·km / annually

Around 3 millon t / annually

Source: Statistical Yearbook of the Republic of Serbia, 2023

7,6%



economy

- ✓ Transport is a central part of the economy of every country and is crucial for the way and quality of life
- ✓ The transport industry in the EU directly employs around **10 million** people and accounts for about **5%** of GDP (Serbia: 125,726 employees and around **3.9%** of GDP).
- ✓ On average, **13.2%** of the budget of every household is spent on the transport of goods and services.
- ✓ Transport and logistics make up **10-15%** of the final product price for European companies.

efficiency

- ✓ Efficient transport systems are **fundamental** to the ability of national companies to compete in the global economy.
- ✓ Railways are the most energy-efficient mode of transport (energy consumption accounts for only **2.5%** of total energy use in the transport sector, while road transport consumes **84%**).

ecology

- ✓ **Decarbonisation and "greening"** the transport system is one of the main goals of EU transport policy.
- ✓ The rail subsystem has the lowest CO_2 emissions—around **3%.**
- ✓ The rail subsystem generates **50%** less noise compared to other modes of transport, measured per unit of transport work.

Benefits

Integration and increasing the attractiveness of the system
(integration with the EU TEN-T network, expansion of the transport services market, with a potential market of approximately 25 million inhabitants).

Improving the sustainability of the railway system
(increasing competitiveness, system revenue, reducing subsidies, etc.).

Improving reliability, stability, and efficiency
(reliable and modern technical and technological infrastructure)

Improving the system's share in modal distribution
(increasing the number of trips, number of users, transport work, etc.)

Reduced travel and journey times
(increasing operational speed by at least 100%)

Improving the flow of people, goods, and services
(efficient support for the implementation of the Open Balkans Declaration)

Enhancing safety and security
(application of the most stringent interoperability standards)

Improving the spatial and temporal accessibility of the region
(reducing time losses in transport).

Improving energy efficiency
(e.g., energy consumption in freight transport is four times lower compared to road transport)

Achieving the goals of the European Green Deal
(reduction of emissions by 55% by 2030)

Enhancing the environmental sustainability of the system
(decarbonisation – implementation of modern electric-powered trains)

Improving citizen mobility and reducing migration to major cities
(efficient travel implementation and integration with other subsystems)

SAOBRAĆAJNI INSTITUT CIP

SAOBRAĆAJNI INSTITUT CIP

Balkan Mobility Manifest

Interoperability

Ensure the conditions for the development of interoperability and the role of the public transport system as a key service and the backbone of all mobility services.

Regulation

Ensure the change and adaptation of the national legal framework to maintain mobility at the forefront.

Transport policy

Ensure the conditions for continuous infrastructure investment and that mobility implementation technology exceeds all relevant policies.

Financing

Prioritise transport changes in the national budget, particularly for investments in infrastructure and mobility implementation technology.

émissions de CO2 * Choose public transport and help reduce carbon emissions * Utiliza el transporte público y ayuda a reducir emisiones de carbono

Choisissez les transports en commun et aidez à réduire les

Bitte nutzen Sie Öffentliche Verkehrsmittel, um den CO2-Ausstoß zu verringern *

Slovenske železnice

SEESARI
South East Europe
Strategic Alliance for Rail Innovation

INTERNATIONAL UNION
OF RAILWAYS

HOW SEESARI SOLUTIONS HELPED SZ TO KEEP PACE WITH CURRENT DEVELOPMENT IN TICKET, RESERVATION SALES AND VALIDATION IN EUROPE

RECENT TICKETING ECOSYSTEM IN EUROPE

UNTIL RECENTLY THE DEVELOPMENT OF MAIN SERVICES IN TICKET AND RESERVATION SALES IN EUROPE **WAS VERY SLOW**.

IN THE TICKETING FIELD, SOME RUs **USED THEIR OWN SYSTEMS** TO CONNECT TO NEIGHBOURING RUs TO BE ABLE TO ISSUE CROSS-BORDER TICKETS. RESERVATION SYSTEMS STARTED TO USE XML BASED MESSAGES INSTEAD OF BINARY MESSAGES.

PCS, A SIMPLE, BUT LIMITED SYSTEM FOR DAILY EXCHANGE OF TICKET DATA VIA SFTP, MANAGED BY NS, WAS USED FOR TICKET VALIDATION.

RECENT TICKETING ECOSYSTEM IN SLOVENIAN RAILWAYS

SLOVENIAN RAILWAYS USED EPA (LIKE MANY OTHER COUNTRIES)
AS THEIR RESERVATION SYSTEM AND
RELIED ON SECURITY IN PAPER AS A SAFETY PRECAUTION.

INTERNATIONAL PRICES **WERE EXCHANGED ONCE A YEAR** USING PRIFIS DATABASE.

DISCONTINUATION OF EPA SERVICES CREATED NEW OPPORTUNITIES FOR SZ AND SEESARI

WHEN DB DECIDED TO STOP OFFERING EPA SERVICES TO OTHER RUs, **SZ DECIDED** TO BUILD THEIR OWN RESERVATION SYSTEM, BECAUSE TO LOSE THE POSSIBILITY TO ISSUE RESERVATIONS AND IRT TICKETS WAS NOT AN OPTION.

SEESARI OFFERED TO SZ TO BUILD A NEW RESERVATION SYSTEM NOT ONLY FOR SZ, BUT ALSO FOR OTHER RUs WITH THE IDEA TO SHARE EXPENSES.

UNFORTUNATELY, DIRECT TRAFFIC TO MOST BALKAN COUNTRIES WAS DISCONTINUED DURING THE COVID PANDEMIC AND WAS NOT RESTORED. SO, MOST OF THESE COUNTRIES WERE NOT INTERESTED TO USE THE RESERVATION SYSTEM ANY MORE.

SEPA PLATFORM TO HOST NEW UIC SERVICES

BUT SEESARI LOOKED FORWARD AND DECIDED
TO CREATE SEPA SYSTEM AS A PLATFORM TO SERVE NOT ONLY RESERVATION SYSTEMS, BUT OTHER EMERGING SERVICES, TOO.

ALSO, IT WAS CLEAR THAT EU IS GOING TO GIVE WAY TO RAIL TRAFFIC AND THAT ONE OF THE MAIN OBSTACLES IN PASSENGER TRANSPORT WOULD BE INTERNATIONAL TICKETING.

SO, **SEESARI** AND **SZ** TOOK PART IN A LOT OF ACTIVITIES AIMED TO MAKE INTERNATIONAL TICKETING AND TICKET VALIDATION EASIER FOR PASSENGERS AND MORE SECURE FOR THE RAILWAYS.

CONNECTIONS TO EXISTING SERVICES

WHILE THE OSDM ONLINE WAS STILL SLOWLY COMING,
THE **NEXT STEP FOR SZ WAS TO CONNECT** TO OTHER TICKETING SYSTEMS, PRIMARILY DB AND OEBB TO BE ABLE TO OFFER PASSENGERS LOW-COST TICKETS FROM THESE TWO RAILWAYS WHICH ARE MOST IMPORTANT FOR THE SLOVENIAN MARKET.

DB CONNECTION WAS ESTABLISHED SEVERAL YEARS AGO, BUT WITH OEBB THE NEGOTIATIONS ARE STILL GOING ON.

CONNECTIONS TO EXISTING SERVICES

DESPITE PROGRESS MADE WITH OSDM, THERE WILL BE AT LEAST A YEAR AND A HALF WHEN IT WILL BE FULLY IMPLEMENTED IN BOTH COUNTRIES.

IN THE MEANTIME, SEESARI ESTABLISHED A CONNECTION WITH DISTRIBUSION, A TICKET DISTRIBUTION COMPANY.

THIS CONNECTION RESULTED IN A POSSIBILITY TO SELL TICKETS FOR OVER 700 BUS, TRAIN AND FERRY CARRIERS WORLDWIDE.

ALSO, SZ TICKETS ARE GOING TO BE SOLD THROUGH THE DISTRIBUSION'S NETWORK.

USING ELECTRONIC TICKETS FOR MORE SECURE VALIDATION

IN PARALLEL, **AS ETCD WAS TAKING ITS FIRM PLACE** AMONG MOST INFLUENTIAL EUROPEAN RUs, SEESARI WAS WORKING HARD TO KEEP PACE AND TO CONNECT AS SOON AS POSSIBLE TO THIS SYSTEM.

TEST PHASE WAS SUCCESSFUL AND PREPARATIONS FOR PRODUCTION ARE CURRENTLY TAKING PLACE IN SZ.

SO, BEGINNING OF 2025 SZ CONDUCTORS WILL BE ABLE TO VALIDATE TICKETS THROUGH THIS MODERN SYSTEM AND **THE PLAN IS TO START USING ETCD FOR ITS OWN TICKETS** TO BE VALIDATED ABROAD BY MID-2025.

USING ELECTRONIC TICKETS FOR MORE SECURE VALIDATION

RUNNING ETCD AS A TCO WILL ENABLE BETTER CONTROL OVER INTERNATIONAL TICKETS, ACCEPTANCE OF HOME PRINTED TICKETS AND EASIER HANDLING OF INTERRAIL TICKETS VALIDATION.

THIS IS VERY IMPORTANT HAVING IN MIND THE IMPORTANCE OF RAILWAY PASSENGER TRANSPORT IN SLOVENIA WHICH IS BOTH A TOURIST COUNTRY AND A TRANSIT COUNTRY.

THE ERA OF OSDM IS BEGINNING

OSDM ONLINE IS BY NO MEANS THE BIGGEST SOFTWARE PROJECT THAT SEESARI STARTED FOR SZ. CURRENTLY OSDM FARE PROVIDER SERVICE IS BEING DEVELOPED AND WHEN FINISHED BY THE MID-2025 IT WILL ENABLE SZ TO ISSUE THEIR OWN OFFERS TO OTHER RAILWAYS UTILIZING OSDM.

IN PARALLEL OSDM RETAILER SERVICE WAS DEVELOPED WHICH IS NOW USED ONLY FOR TESTING PURPOSES, BUT BY THE BEGINNING OF 2026 IT IS EXPECTED TO BE USED IN CONNECTION WITH OTHER RAILWAYS.

OSDM WILL THEN GRADUALLY REPLACE DB AND OEBB PROPRIETY CONNECTIONS MAKING SLOVENIAN RAILWAYS **FULLY INTEGRATED** INTO THE EUROPEAN OSDM COMMUNITY THUS ENABLING EASY TICKETING FROM AND TO SLOVENIAN TERRITORY.

OTHER PROJECTS ARE ALSO BEING DEVELOPED

THERE ARE ALSO SOME OTHER PROJECTS WHICH SEESARI IS WORKING ON FOR SZ, ONE OF THE MOST IMPORTANT IS

-WEB SALES (WIN, ANDROID, IOS)

THIS SALES CHANNEL IS ALSO VERY MUCH DEPENDENT ON WORKS DONE WITHIN UIC, ESPECIALLY TO USE CONTEMPORARY SOLUTIONS FOR TICKET SAFETY LIKE FCB AZTEC CODE, UNIVERSAL RAIL TICKET FORMAT AND DOSIPAS.

1 Welcome & Introduction

2 Panel 1
Boosting rail development in South-East Europe

3 Panel 2
High Speed and cross border passenger mobility

4 **Panel 3**
DAC to boost freight operation

5 Closing remarks

European Freight DAC Delivery Programme

enabled by Europe's Rail

Moving European Rail Freight Forward

SEESARI – WORKSHOP
"Railway Development Potentials In South East Europe"

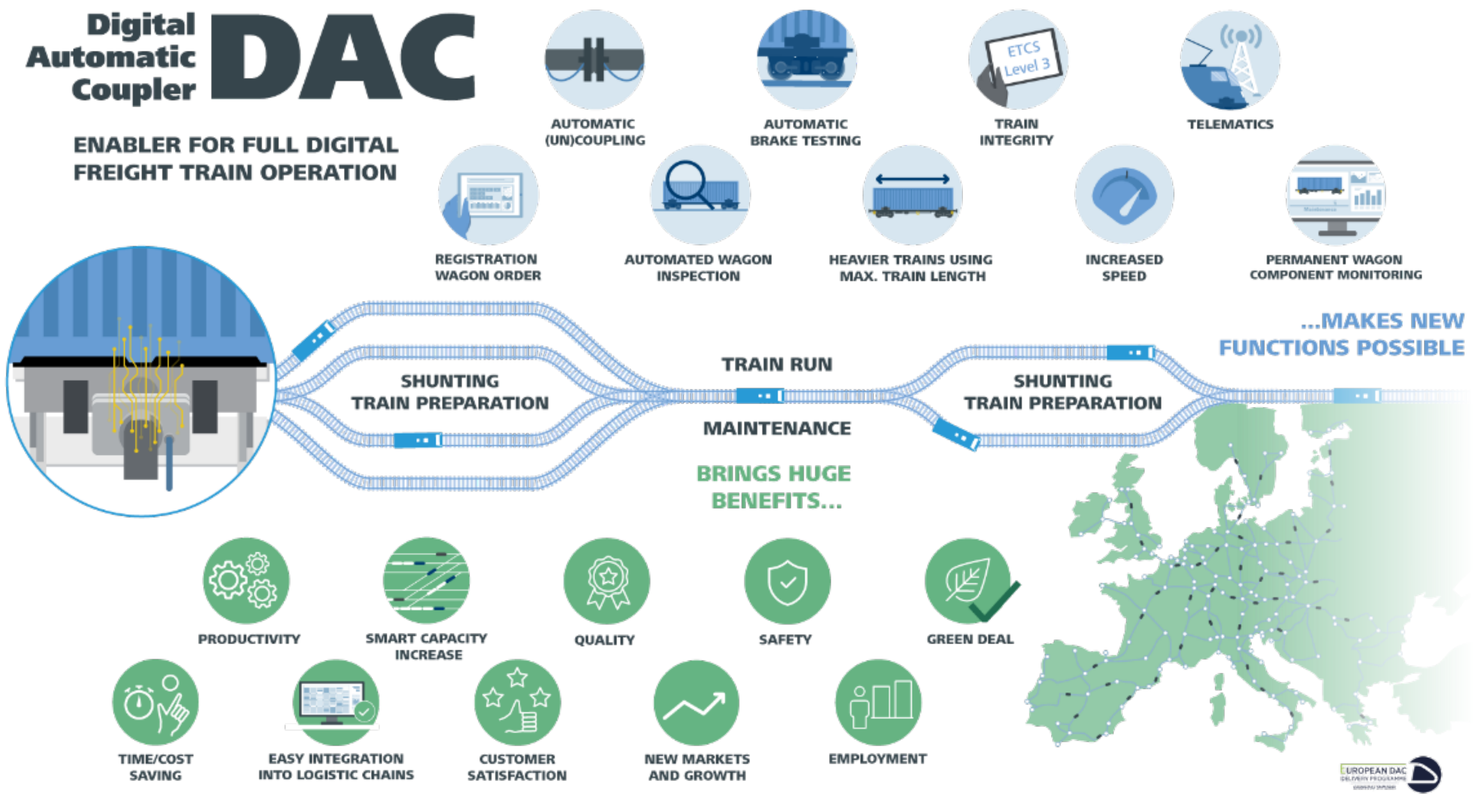
Block 3: DAC TO BOOST FREIGHT OPERATION – DAC Status and Priorities

Jens Engelmann, EDDP Programme Manager

12th of December 2024

17:15 – 18:00

DAC for Full Digital Freight Train Operations



- **more than just a coupler**
- key and unique **enabler for numerous applications**
- allowing more **use cases** to **generate** a max. possible **benefit**
- the backbone for **“full digital freight train operations”** in order to transform European rail freight

EDDP in 2024

Shifting from…

…R&D* to *Implementation
…Concept* to *Reality
…Talking* to *Doing

Our main focus:
fulfilling the preconditions for DAC deployment

All DAC-related work areas and activities

Europe's Rail Flagship Project 5	EDDP	EC/ERA	Europe's Rail System Pillar	ESOs
	Stakeholder Management			

FP5TRANS4M-R

Europe's Rail

DAC/"Full Digital Freight Train Operations"

Prio

target operat. proc.

functional reqs.

system architecture
tech. development
testing & demos
tech. specification
authoris. dossiers

FP 5 FDFTO sounding boards

Technology (mirroring & sector feedback)

Operational Procedures (mirroring & sector feedback)

Fleet Analyses & rtf Engineering (rtf readiness)

Prio

Retrofit capacity (workshops, work-force, components)

Infrastructural & IT adaptations

Migration strategies & retrofitting plan

(traffic & customer sidings analysis, operational plan)

Placing into service plan (safety, workforce training, rulebooks etc.)

Funding & Financing plan

Prio

CBA (updates)

Investment plan & procurement framework plan

Other regulatory & legal framework plans

EUROPEAN UNION AGENCY FOR RAILWAYS

development of efficient & suitable authorisation provisions & requirements

preparing TSI drafts for the EC

TSI revision

Europe's Rail

Operational procedures standardization (plan & execution)

Technical harmonisation: preparing inputs for ERA TSI drafting process & driving EU standardisation

Alignment of rail & DAC system architecture

CEN

CENELEC

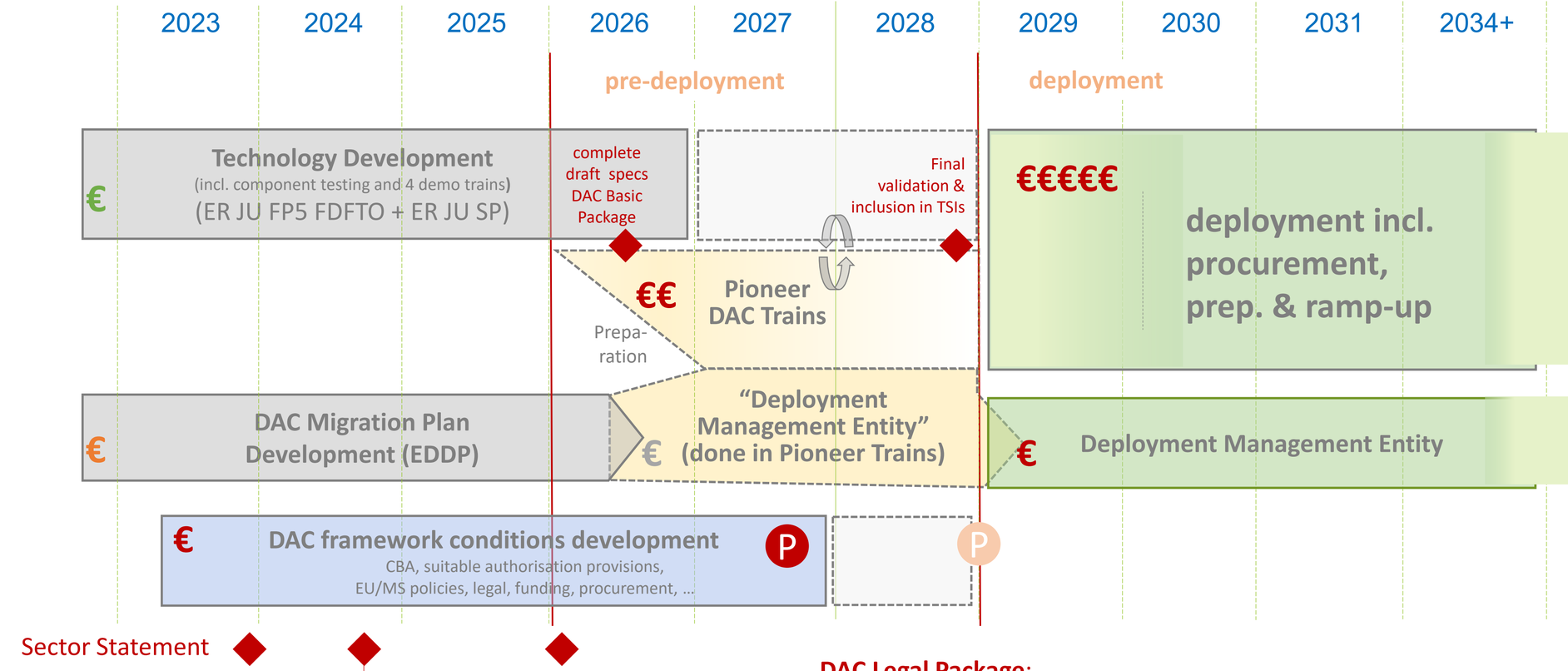
ETSI

Executing European standardisation

Prio

Operating Pioneer DAC Trains

The DAC General Master Plan 02 [December 2024]



DAC Legal Package:
TSIs final (technical + migration + operations)
Deployment Management Entity Deployment
Funding Instrument
Suitable authorisation provisions

Major amendments/reasons:

- Extension of FP5-TRANS4M-R to end-2026 (Dec. 2026)
- Updated planning and focus on DAC Basic Package
- DAC technology for Pioneer Trains operation available as of end-2026

€ Budget and resource need (already funded)

€ Budget and resource need (currently mainly unfunded)

P Determining milestone:
DAC Legal **P**ackage to be implemented before this deadline

existing

to be prepared

Together, we can make DAC happen!

100+ organisations and 300+ participants in EDDP
only EDDP PB and SB members are listed here

EU-Rail FP5 partners
only the beneficiaries are mentioned here

SEESARI – WORKSHOP, “Opportunities and challenges in the region“

Paris, France, 12th December 2024, UIC

DACCord : Aims

The project DACcord provides with management competencies the support to the EU-Rail for the continuation of the professional management of the activities of the European DAC Delivery Programme (EDDP). The EDDP, enabled by the EU-Rail gathers European Rail Freight Sector and manufacturers for the Europe-wide introduction of a Digital Automatic Coupler.

- **Coordinated DAC Rollout:**
  - Enable an efficient Europe-wide rollout of DAC technology.
  - Manage risks and define mitigation measures.
  - Monitor progress on technological readiness for DAC components
- **Migration and Implementation Planning:**
  - Develop an actionable roadmap for DAC migration, identifying tasks, resource needs, and milestones.
  - Align efforts among stakeholders to ensure smooth adoption of DAC systems
- **Stakeholder Engagement:**
  - Build strong support among political and industrial stakeholders.

Stakeholder country grouping

Group	
EU	*EU Institutions/bodies*
FR	*FR (4F)*
DACH	*DE, AT, CH*
Benelux	*BE, NE, LU*
Central	*CZ, PL, SK, Rail Baltica*
Southern	*HU, SI, HR*
Eastern	*BG, RO, EL, (TR)*
W Balkan	*TCT-countries*
Baltic	*FI, Baltic, Rail Baltica*
Nordic	*SE, DK, NO*
IT	*IT*
Iberian	*ES, PT*
-	*EI*
-	*UK*

Funded by the
European Union

DAC Ambassadors for SEESARI countries

Boglarka MONDVAY-NEMETH
boglarka.mondvay-nemeth@oebb.at

Libor LOCHMAN
ll.pohurka@gmail.com

Danijela DORIC (support)
danijela.doric@railenium.eu

Funded by the
European Union

Stakeholder management: Actions to be taken

Upon the recent nomination of the DAC National contact points (NCP) by the Transport Ministries:

1. **A coordination meeting between the NCPs and DAC Ambassadors in the region**
   - The NCP as the principal DAC contact in the country
   - Agreement on the mode of cooperation between EDDP and NCPs in the region
   - Establishing the principal position of the States in the region
2. **Collation & listing of the relevant stakholders**
   - Infrastructure Managers, Railway Undertakings, Wagon Keepers, Intermodal Operators, Rail Freight Customers and relevant associations to be contacted & connected
3. **Organisation of the DAC Forum**
   - The aim: 1-2 DAC Forums yearly per country/region.
   - The objectives: **inform on the state of the play of the different EDDP actions and gather information from the country/region & recruit relevant contributors to EDDP**

Opportunities for SEESARI Countries

Operational Efficiency and Increased Capacity

- **Faster Operations:** Automated coupling cuts labor needs and reduces errors.
- **Boosted Network Capacity:** Streamlines train turnarounds, improving throughput.
- **Freight Optimization:** Enables longer, heavier trains—ideal for key corridors.

Enhanced Safety

- **Safer Workflows:** Automation limits manual risks
- **Smarter Management:** Real-time data reduces faults and enhances safety.

Funded by the
European Union

Opportunities

Cross-Border Interoperability

- **Standardization:** DAC aligns rail systems with EU standards, ensuring seamless cross-border operations and integration into the European network.
- **TEN-T Alignment:** Supports Western Balkans' role in TEN-T corridors, boosting connectivity and competitiveness.

Digital Integration and Smart Logistics

- **Data-Driven Operations:** Real-time monitoring improves maintenance and planning
- **Smart Supply Chains:** Enables efficient freight systems with intelligent rail car communication.

Funded by the
European Union

Opportunities

Economic Benefits

- **Cost Savings:** Reduced labor and downtime make rail freight more competitive than road transport.
- **Investment Magnet:** DAC adoption attracts EU and private-sector investments in railway modernization..

Environmental Sustainability

- **Greener Freight:** Boosts rail freight efficiency, supporting the shift from road to rail and cutting emissions.
- **Energy Optimization:** Improves train management, reducing energy consumption**.**

Facilitating Regional Cooperation

- **Shared Standards:** Promotes collaboration through unified technological frameworks.
- **Strategic Hub:** Enhances the region's role as a key transit point for Europe, Asia, and the Middle East.

Funded by the
European Union

INTERNATIONAL UNION
OF RAILWAYS

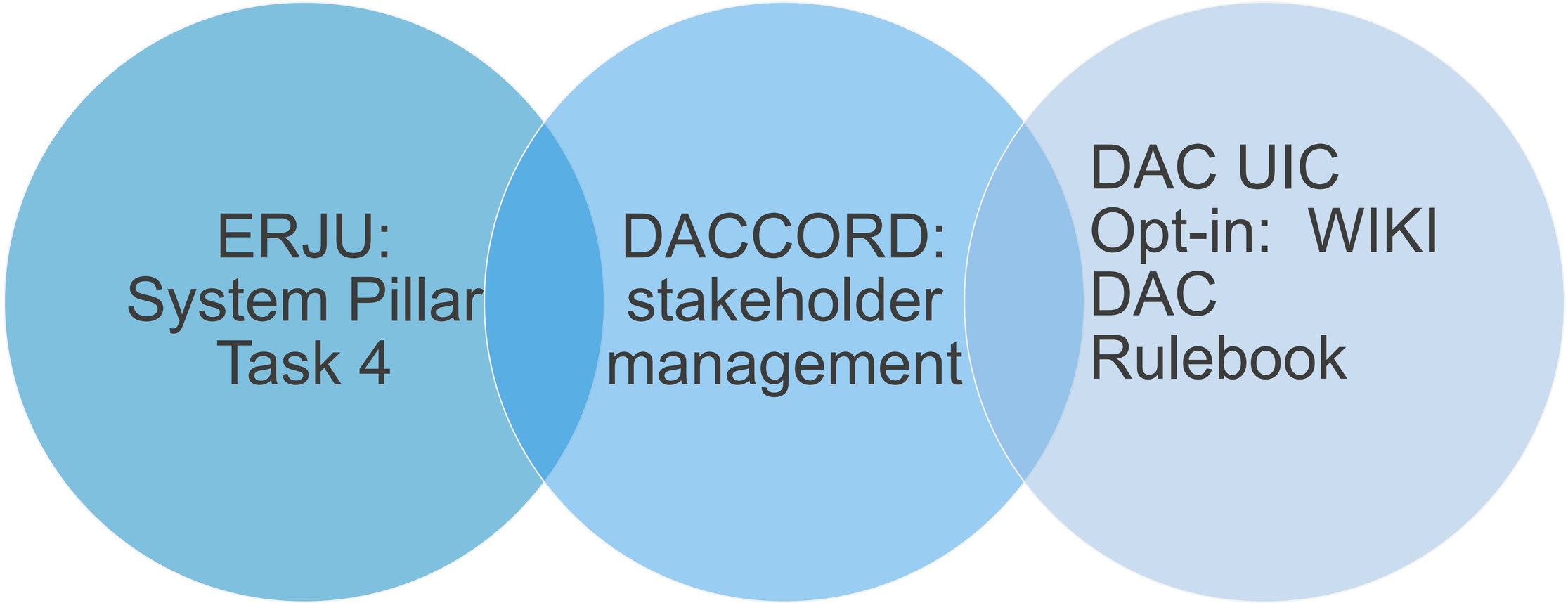
UIC supporting DAC operational implementation

Giancarlo DE MARCO TELESE

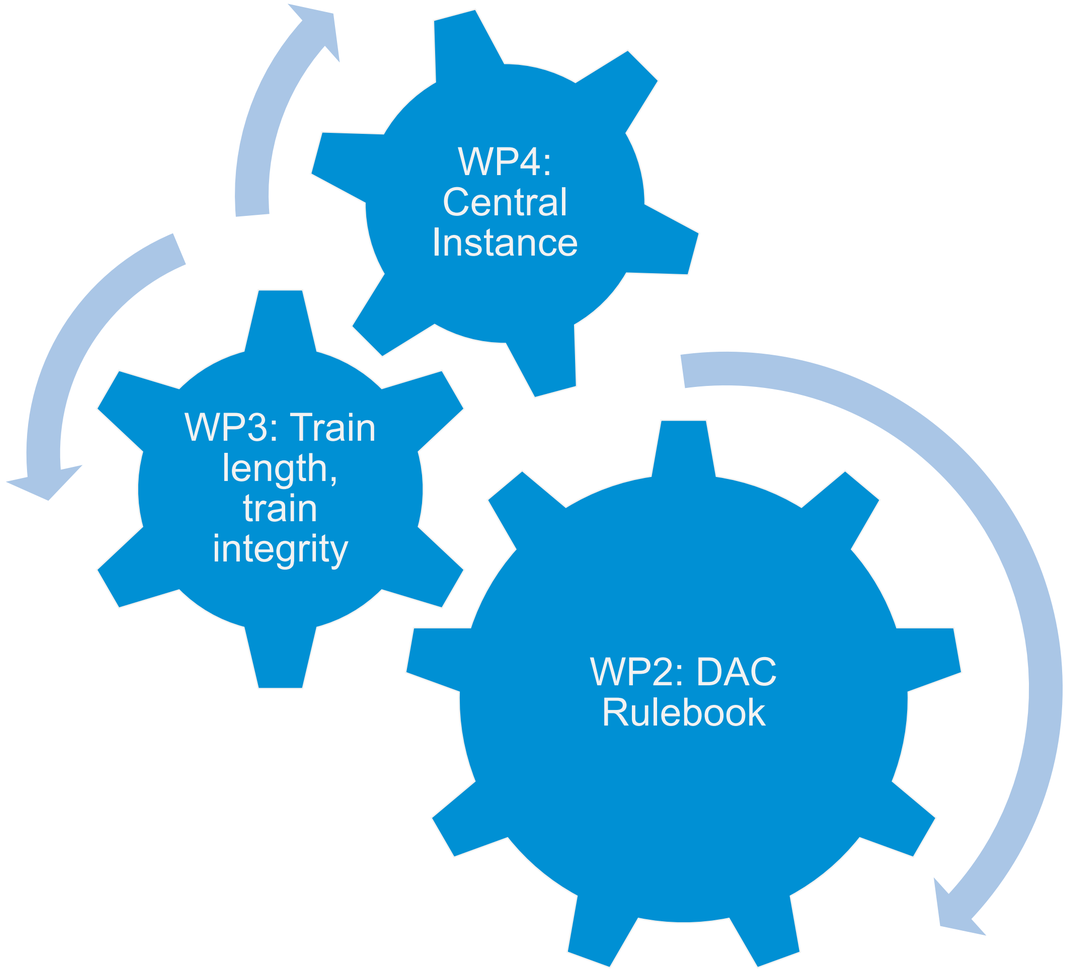
Deputy Head of Operations & Safety

SEESARI workshop, 12/12/2024

UIC contribution to DAC



ERJU: System Pillar Task 4



Task 4 - WP2: DAC Rulebook

It describes all DAC operational processes, derived from Flagship Project 5 Deliverable 2.1

It ensures safe harmonized procedures, to ensure interoperability

It is as short as possible to be easily used by Operational Staff, but as long as necessary to prevent the implementation of National Rules

Yard Manager

D1 – is the TU planned for shunting already coupled to wagon set?

Input:

- Yard Manager receives the shunting plan from the RU

Throughput:

- Yard Manager decides (based on the shunting plan from the RU) if the traction unit shall be used for shunting preparation; if not, a traction unit shall be assigned by the RU to the wagon set
- Yard Manager prepares a work order for the traction unit movement that is assigned for the shunting activity

Output:

- Decision is taken and work order is given to the operator TU

Operator TU

T1 – initiates movement of TU to WS; 2 – movement of TU: 3 – Couple TU

Input:

- Operator TU receives the work order from the YM

Throughput:

- Operator TU initiates movement of traction unit to the wagon set after having been authorized by the Yard Manager
- Operator TU drives towards the wagon set
- Operator TU couples the traction unit to the wagon set (see EP21)

Output:

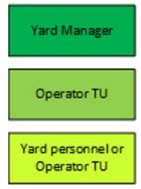
- Traction unit coupled to wagon set

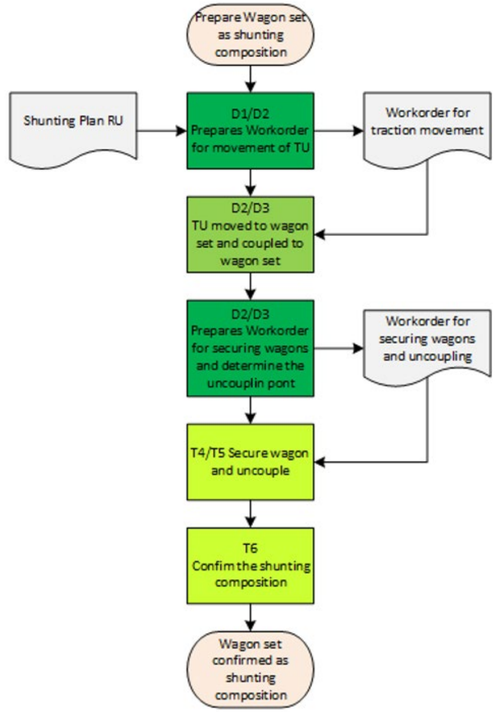
Yard Manager

D2 – is removing of wagon(set) planned?

Input:

- Yard Manager receives the shunting plan from the RU

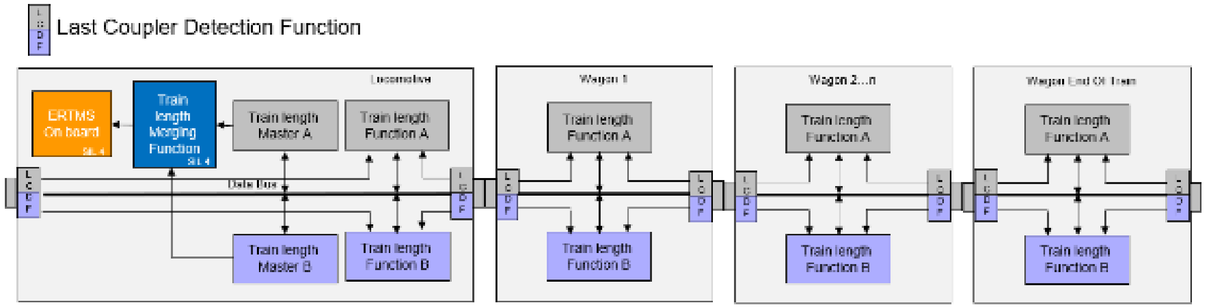




Task 4 - WP3: Train length, train integrity

Identification of technical solutions to obtain safe train length information to enable ETCS moving block (and L2 hybrid).

Common final target is to have a fully automated FDFTO system



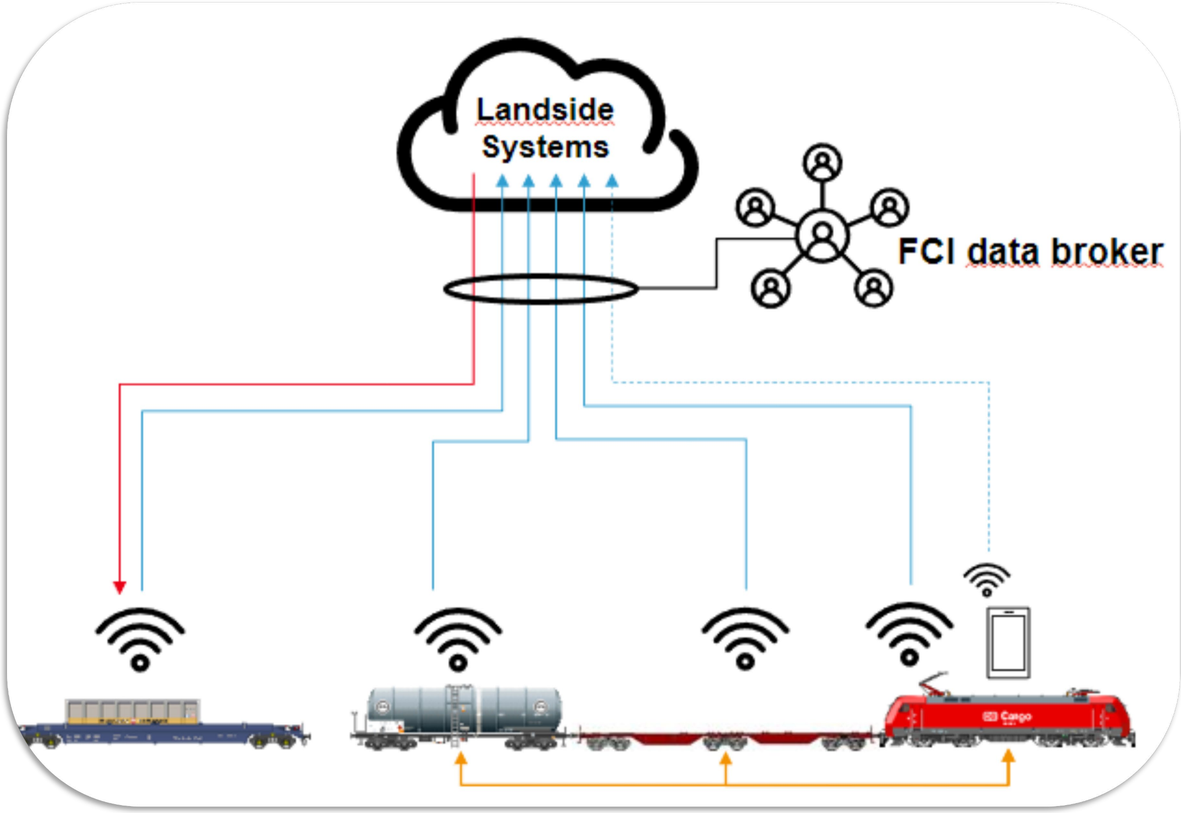
Task 4 - WP4: Central Instance

It is a data broker only dealing with Full Digital Freight Train Operation data (minimum mandatory), which are relevant for interoperability

It enables an efficient sharing of FDFTO information collected from locomotives and wagons to the relevant stakeholders

These information can be used by the FDFT to compose information in form of pre-defined and interoperable message formats (e.g. failure codes)

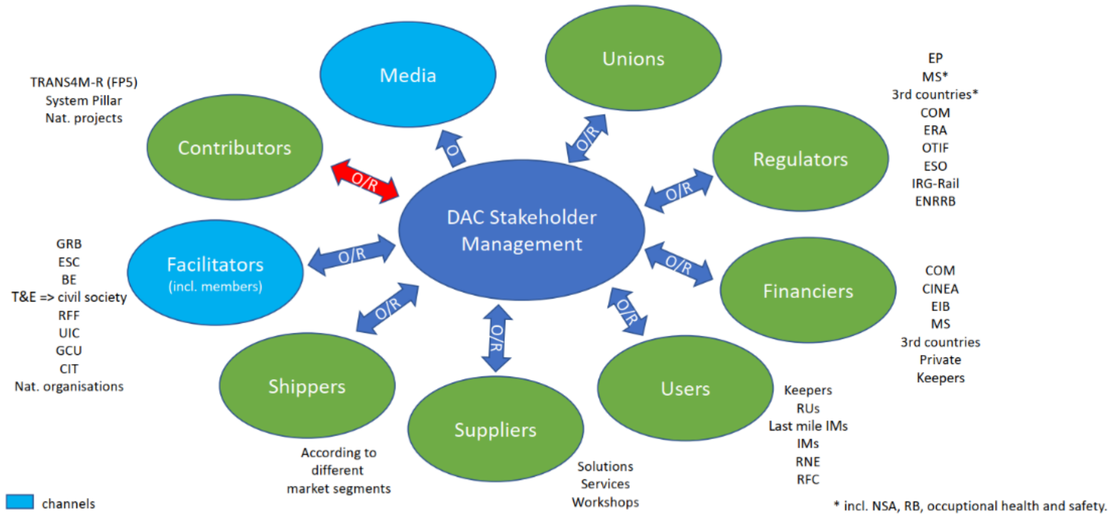
It ensures the possibility to exploit the full potential of the digital innovations established with DAC

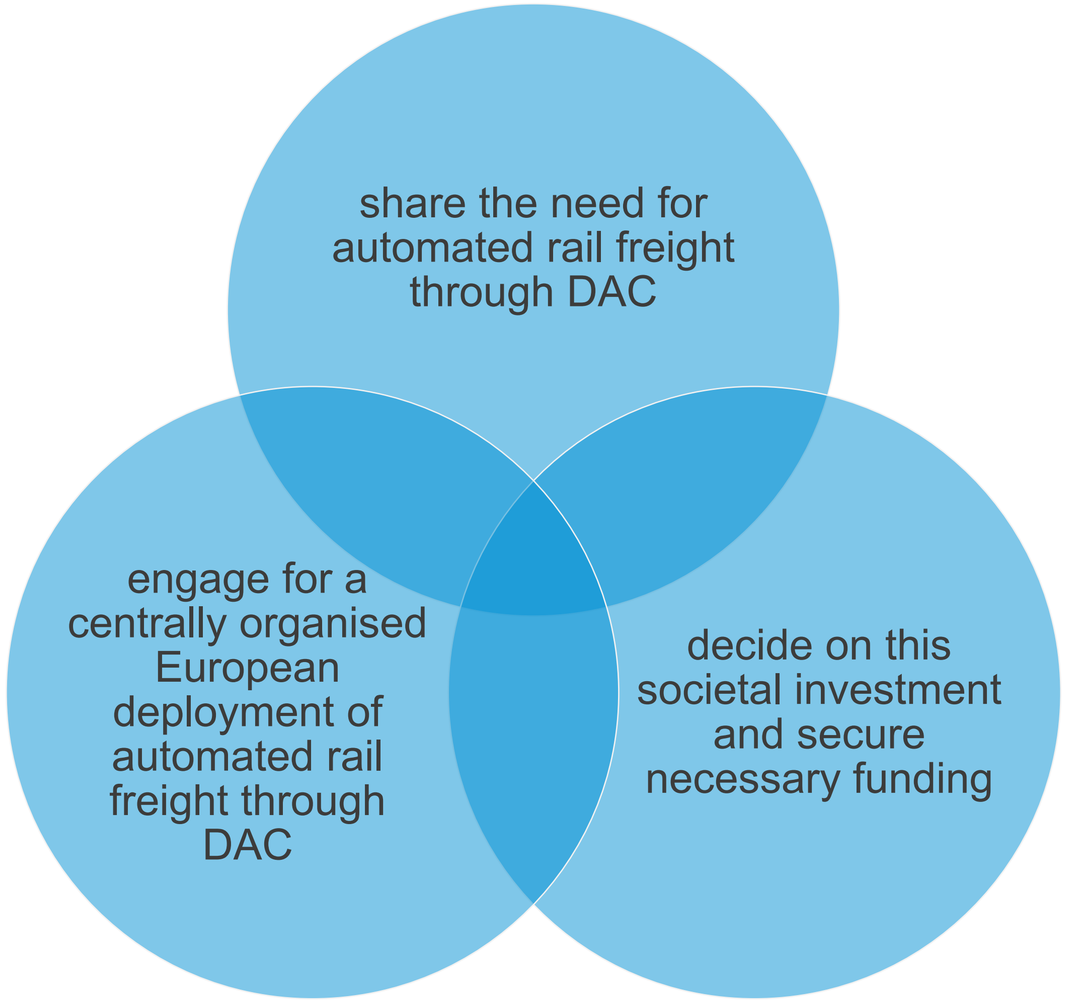


DACCORD: stakeholder management

DACcord

Institutional environment.





DACCORD: the approach

The needs of each country are specific, so a tailor-made approach is defined by each Ambassador, in collaboration with the National Contact Points

Task 4 -

Europe's Rail

EDDP country groups, NCPs & ambassadors

DACcord

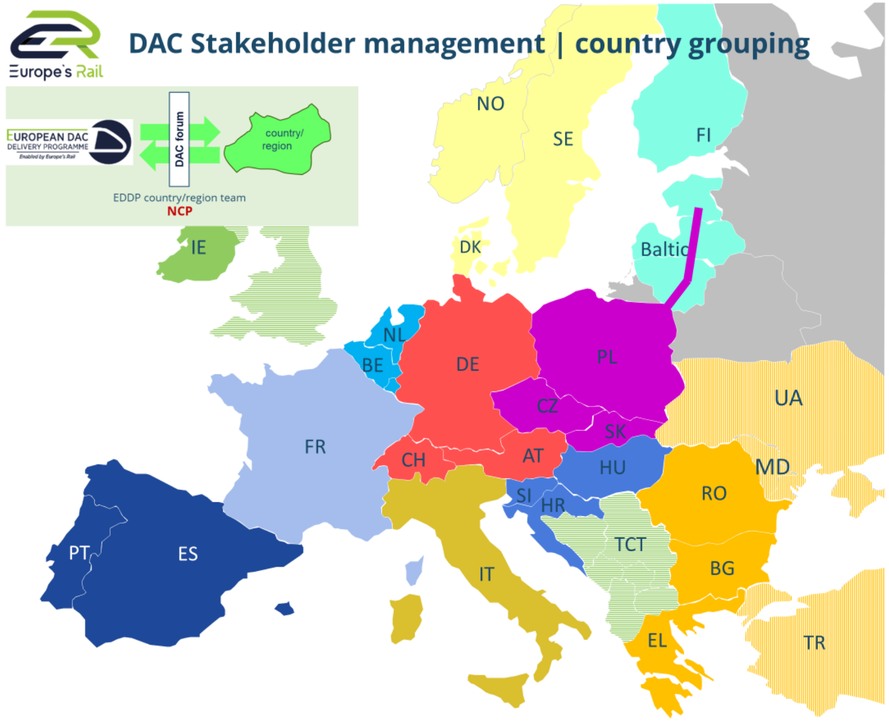
Groups	Sub-Groups	NCPs	EDDP ambassadors (group)
EU	EU Institutions + groups + OTIF	--	EU-Rail & EDDP PM (EU-Rail & Mark Topal/Jens Engelmann)
FR	FR	Henri Vichard	Railenium (Danijela Doric); KB (Victorien Thenault), Wabtec (Laura Ghiringhelli)
DACH	DE, AT, CH	Jan Schöning (DE) Petra Deflorian (AT) René Sigrist (CH)	DB Cargo (Michael Sünder); UIP (Lisa Gruber); ÖBB (Sarah Bimingstorfer, Boglarka Mondvay-Nemeth) **VAP (CH) most likely to be added**
Benelux	BE, NL, LU	Functional contact (BE) Marcel Thijs (NL) Pierre Gierenz (LU)	BRFF (Frederick de Backer) TBC
Central	CZ, PL, SK	Pavlina Tomkova (CZ) Andrea Neuschlová, Peter Klamo (SK) Maciej Sofinski (PL)	DACcord (Libor Lochman) supported by Michael Sünder (DB Cargo)
Southern	HU, SI, HR	György Lengyel (HU) Damir Bukvić (HR); Substitute: Mario Pavić	RCG (Boglarka Mondvay-Nemeth supported by DACcord (Libor Lochman)
Eastern	BG, RO, EL, (TR), (MD), (UA)	Ivan Cholakov (BG) Giorgios Danias (EL)	DACcord (Libor Lochman)
W-Balkan	RS, BA, MK, ME, XK (TCT-countries)	Matej Zakonjšek	DACcord (Libor Lochman) supported by Railenium (Danijela Doric)
Baltics	FI, EE, LT, LV	Ville-Veikko Savolainen (FI) Kristjan Kaunissaare (EE) Tomas Bieksa (LT) Māris Aizstrauts (LV)	DACcord (Libor Lochman)
Nordics	SE, DK, NO (FI)	Christer Löfving, Bo Olsson (SE) Paula Ottenberg (DK) Ole Skovdahl (NO) Ville-Veikko Savolainen (FI)	Trafikverket (Jan Bergstrand)
Iberian	ES, PT	Jesus Coloma Pérez, Roberto Marín Escribano (ES) Amelia Areias (PT)	CER (João Sarmento) + NN Spain
IT	IT	Carlo Prischich	UIC (Giancarlo De Marco Telese); Mercitalia / FERMERCI (NN); ASSOFERR TBC
IE	IE	Donnacha Stackpoole	ERFA (Conor Feighan) TBC
IMs	IMs		EIM (Bardo Schettini) + CER (Marcel dlHaye) + Trafikverket (Jan Bergstrand)

3

Europe's Rail

DAC Stakeholder management | country grouping

DACcord



Group	
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W Balkan	TCT-countries
Baltic	FI, Baltic, Rail Baltica
Nordic	SE, DK, NO
IT	IT
Iberian	ES, PT
IE	IE
-	UK

2

DACCORD ensures that the contents of all dissemination activities are exact, coherent, and harmonized. This is achieved via coordinated preparation meeting, and shared information base fed by all DAC-related workstreams

UIC opt-in DAC

The online preliminary DAC rulebook: a wiki-approach

EP02 Wagon Processing

To ensure the safe, efficient, and controlled movement of wagons and wagon sets through the wagon processing activity. This procedure outlines the steps necessary to verify that all prerequisites are met before commencing wagon processing. By following these steps, we aim to:

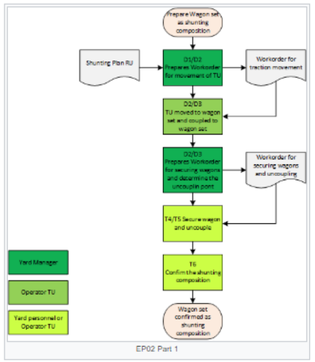
- **Minimize risks** associated with wagon processing activities by guaranteeing a properly prepared environment and equipment.
- **Prevent delays** by ensuring all documentation and clearances are obtained beforehand.
- **Protect personnel and property** by verifying the wagon set's condition and ensuring a safe shunting path.
- **Optimize shunting efficiency** by having all necessary information and resources readily available.

Contents [hide]

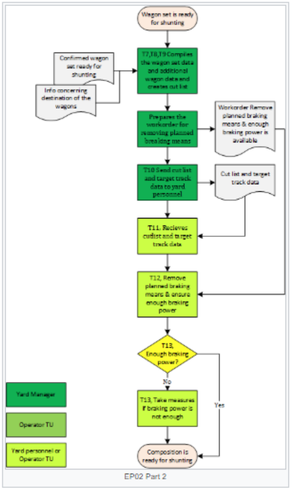
Preconditions [edit | edit source]

- Wagon set is ready for processing, with or without a traction unit
- Yard Manager has received the shunting plan from the RU

Steps [edit | edit source]



EP02 Part 1



EP02 Part 2

D1 – is the TU planned for shunting already coupled to wagon set? [edit | edit source]

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Output:

- Decision is taken and work order is given to the operator TU

T1 – initiates movement of TU to WS; 2 – movement of TU: 3 – Couple TU [edit | edit source]

Input:

- Operator TU receives the work order from the YM

Throughput:

- Operator TU initiates movement of traction unit to the wagon set after having been authorized by the Yard Manager
- Operator TU drives towards the wagon set
- Operator TU couples the traction unit to the wagon set (see EP21)

Output:

- Traction unit coupled to wagon set

D2 – is removing of wagon(set) planned? [edit | edit source]

Input:

- Yard Manager receives the shunting plan from the RU

Throughput:

- Yard Manager decides, based on the shunting plan, if the traction unit shall be used for shunting preparation
- Yard Manager prepares a work order for securing the wagon (set) and for uncoupling the composition

Output:

- Yard Manager gives the work order to the Yard Personnel or Operator TU

T4 – secure wagon(s); T5 – uncouple at uncouple point of shunting composition; T6 – Confirm wagon set [edit | edit source]

Input:

- Traction unit is coupled to the wagon set
- Work order for securing wagons and uncoupling point(s) of the wagon set

Throughput:

- Secure the wagon set against rolling away (see P22)
- Uncouple the wagon set at the ordered uncouple-point (see P20)
- Confirm the wagon set of the shunting composition to the Yard Manager (see P10)

Output:

- Wagon set has been secured against rolling away
- The wagon set has been uncoupled at uncoupling point for the shunting composition
- The wagon set has been confirmed as shunting composition

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T7 compile additional wagon data; T8 Compile wagon set data; T9 Create cut list information; T10 Send cut list information [edit | edit source]

Input:

- A confirmed wagon set is ready for the shunting process.
- Yard Manager receives the shunting plan (information concerning the destination of the individual wagons) from the RU

Throughput:

- The YM compiles Wagon Target Track Data and Additional Wagon Data for each wagon in set; compiles wagon set data (order and orientation),and creates a cut list based on the destination information.
- The YM sends the cut list to the Yard Personnel and Yard Legacy System to sort the wagons and handle the switches.

Output:

- Wagon set has been secured against rolling away
- Cut list including destination data and wagon target track data.
- Order to remove planned braking means to yard personnel or TUO and let them ensure enough braking power is braking power is available.

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T11 Receives cut list information and wagon target track data; T12 remove planned braking means; T13 ensure enough brake power is available [edit | edit source]

Input:

- Cut list from information and wagon target track data.

Throughput:

- Yard personnel or TUO removes the planned breaking means from the wagon set.
- YP or TUO ensure that there is enough braking power available. Take measures in case the braking power is not enough (e.g. speed reduction).

Output:

- Shunting composition is ready for shunting.

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Thank you
for your attention

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