Circle
Group

"Digitalisation, Automation and Integration along supply chain: benefits of a Smart Terminal Operating System and Rail last Mile optimisation"

Klaipeda

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Circle Group,

providing innovative technological solutions for the automation and digitalisation
of the entiresupply chain

delivering high value consultancy services supporting maritime, port and logistics actors
to gather EU funding and promoting their strategic visibility at international level

*is the right international partner
for your smart, sustainable and
effective business growth*

Digitalisation, Automation and Integration along supply chain: benefits of a Smart Terminal Operating System and Rail last Mile optimization

1. <u>Rail Last Mile Management model</u>
   - ➤ Operating needs and solutions
   - ➤ Digitalization of Rail Last Mile
     - ▪ Federative Digital Platform
     - ▪ Optimization & Digital Twin

2. <u>Smart Terminal Operating System</u>
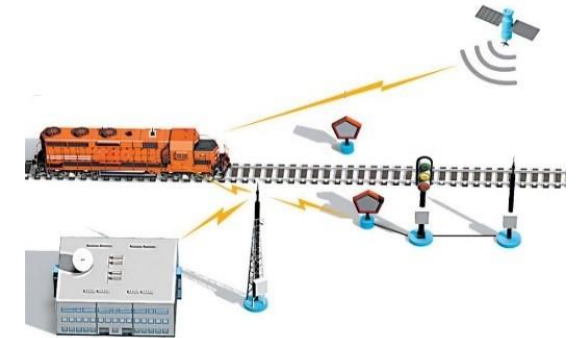   - ➤ Value Added Modules

Rail Last Mile Management model

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Railway transport is the less impactful transport mode for **medium-to-long haul distances**.

Especially, intermodal transport reduces on average CO_2 emissions by 55% compared to road transport.

Benefits of railway transport:

✓ Faster transit times

✓ **Reliability** and **efficiency** with GPS tracking and IoT

✓ Convenience and **cost-effectiveness**
  ➤ Shippers can save 10-40% for long-haul freight from road to rail (also due to lower fuel costs)

✓ Higher level of **transport safety & reliability**
  ➤ Standardized transit schedules

✓ Reduced **road congestion**

✓ **Ecofriendly** due to a lower level of CO_2 emissions
  ➤ Example: with a load of 100 tons on a journey from Modena (Italy) to Moscow (Russia) (about 2,500 km) the train emits up to 75% less CO_2 than the truck

✓ Allows to move **large quantities** of goods over medium-long distances
  ➤ One double-stacked train can hold approximately the same amount as 280 trucks

What is Rail Last Mile?
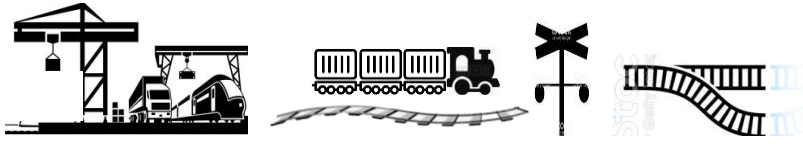
"it is the railway section between the last railway station and the Port or Inland Terminal of destination / departure of the goods"

- Digitalization of information flows between the actors of the Last Mile
- Optimization & digital twin
- Upgrading of network infrastructures
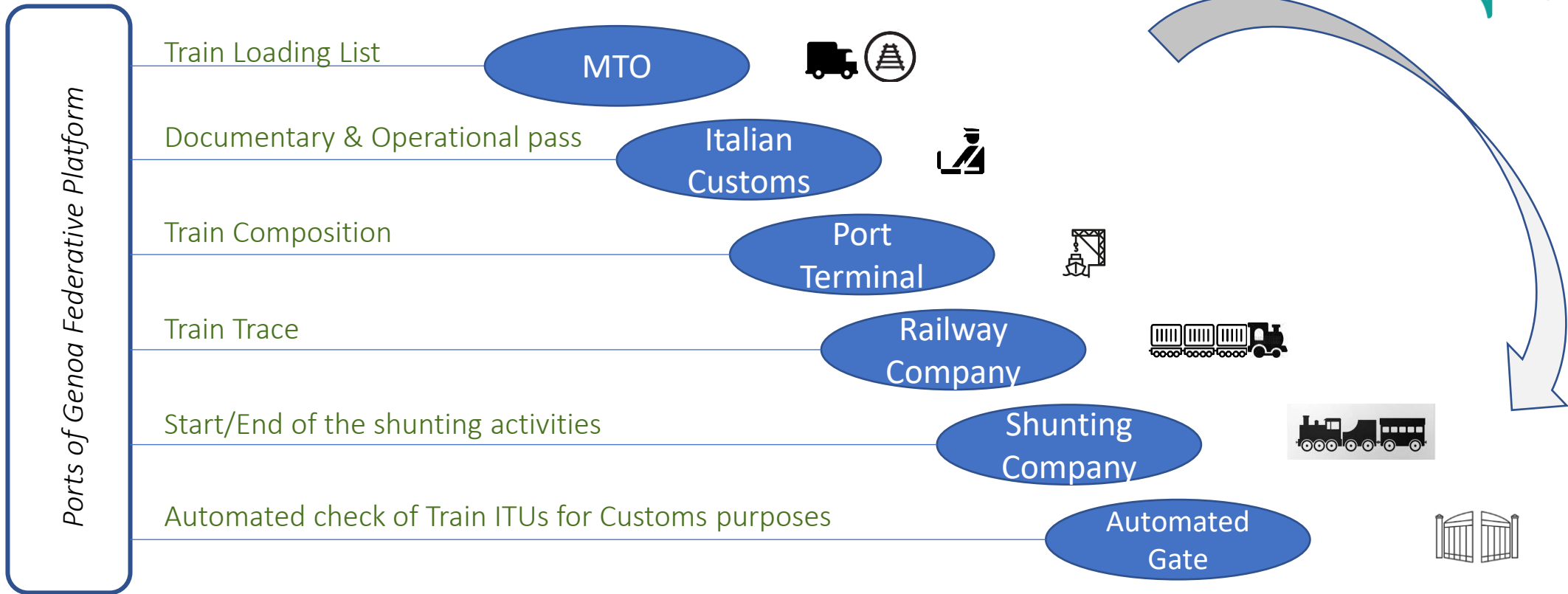- Operational Processes

Increase the connections of the railway network with ports, Inland Ports, terminals and logistics platforms and develop functional and reliable intermodal services, in order to generate a structural benefit for the logistics system

Federative digital platform able to interconnect all the actors involved
in the processes of the Rail first and last mile

Ports of Genoa Federative Platform

Ports of Genoa Federative Platform

- Train Loading List — **MTO**
- Documentary & Operational pass — **Italian Customs**
- Train Composition — **Port Terminal**
- Train Trace — **Railway Company**
- Start/End of the shunting activities — **Shunting Company**
- Automated check of Train ITUs for Customs purposes — **Automated Gate**

- Digitalization of information flows between the actors of the Last Mile
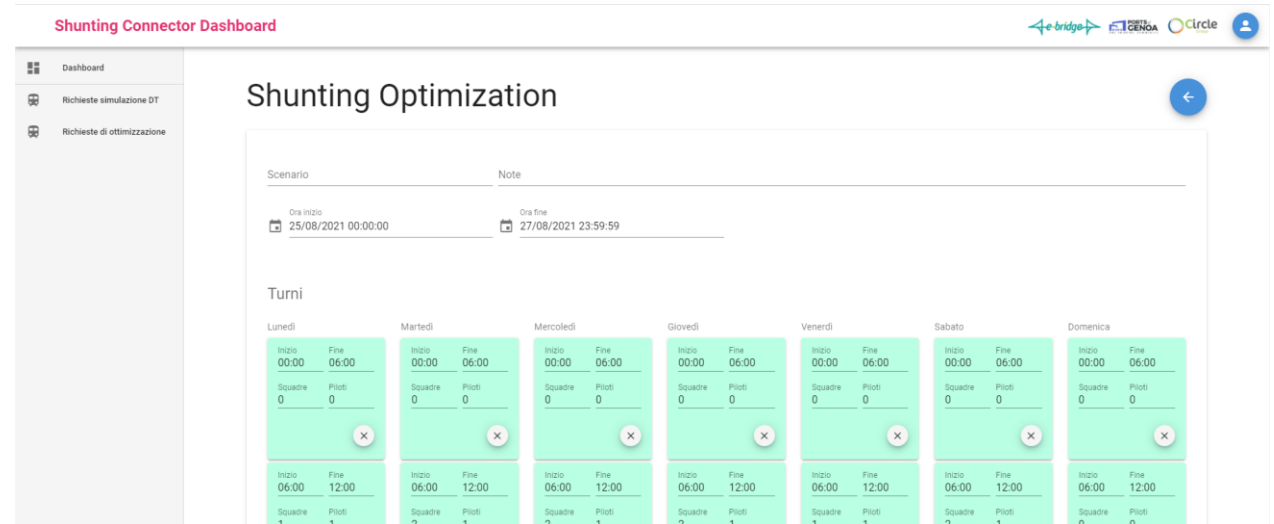- Value Added Services related to operational processes
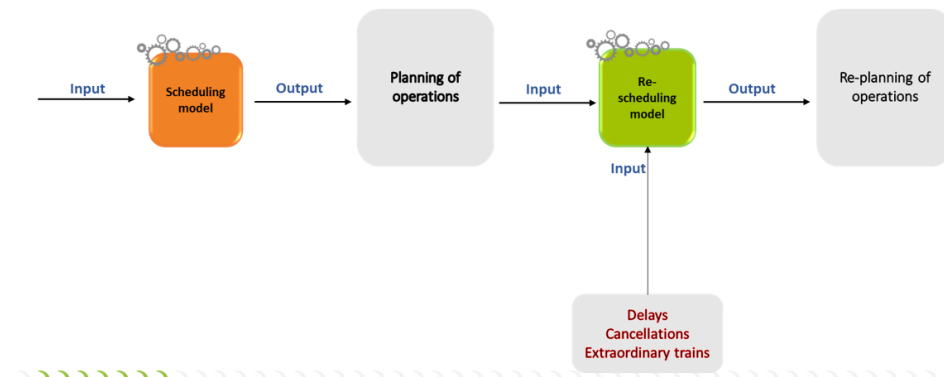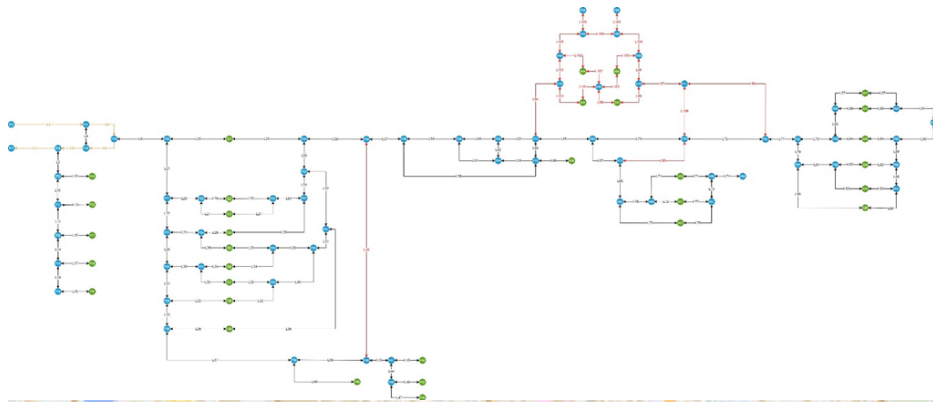
Port Rail Shunting Optimization

Tool for supporting planning of railway shunting operations inside port areas

- **Scheduling** the shunting operations with respect to the constraints arising from resources, trains' paths and terminal availability

- **Re-scheduling** the shunting operations due to unpredictable events with respect to the constraints

PORT RAIL SHUNTING OPTIMIZATION PROCESS

Port Rail Shunting Process Digital Twin

Digital Twin for both the visualization and the simulation of railroad maneuvers using simulation through AnyLogic software

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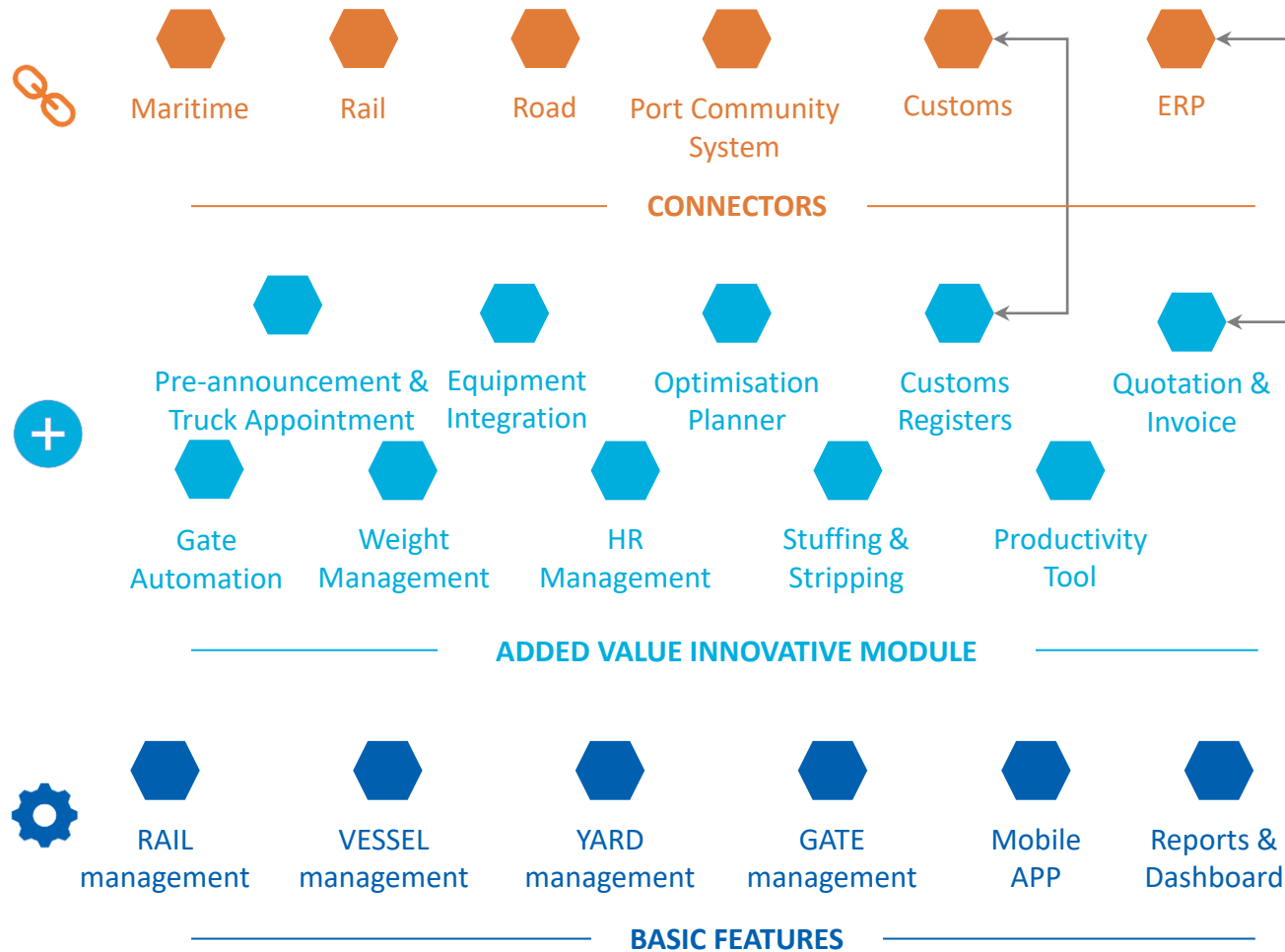
Smart Terminal Operating System

In this digital age, ports face stiff competition in global supply chain. Smart ports, as high performing ports, utilize information and communications technology (ICT) to provide a wide range of smart applications, resulting in vastly improved vessels and container management among others, which subsequently improve the competitiveness and sustainability of the national economy.

Smart Terminal Operating System are one of the main platforms that contribute to the *fifth generation of ports* (customer- and community-centric smart port).

With the introduction of digitalization and automation in ports, **Smart TOS** must:

a. allow **optimal decisions** to be made either by operators or by artificial intelligence-enhanced system in an autonomous manner;

b. operate with a **diverse range of devices and equipment**;

c. collect and share **real-time information** with public and private shareholders;

d. **integrate with other smart initiatives**, such as *smart city and intelligent transportation system*, to improve a nation's economic, social, and environmental aspects

Milos TOS - Solution and interconnected systems

CONNECTORS

Maritime · Rail · Road · Port Community System · Customs · ERP

ADDED VALUE INNOVATIVE MODULE

Pre-announcement & Truck Appointment · Equipment Integration · Optimisation Planner · Customs Registers · Quotation & Invoice · Gate Automation · Weight Management · HR Management · Stuffing & Stripping · Productivity Tool

BASIC FEATURES

RAIL management · VESSEL management · YARD management · GATE management · Mobile APP · Reports & Dashboard

Milos® TOS is the innovative suite developed to achieve an effective global management of the terminal activities throughout simplified processes and reliable interoperability with all the relevant stakeholders' information systems.

Milos TOS Suite allows to digitalize and automate the **main operations** (Rail, Vessel, Yard and Gate) of a multipurpose logistic terminal. The solution enables to manage different type of cargo handled (forest products, new cars, vehicles, trailers, project cargo and containers)

In addition to TOS basic features, Milos offers a series of high added value modules that allow to **manage customs, administrative and commercial activities**, to automate and optimize gate and yard operations (**equipment and HR**) and to monitor terminal performance through productivity tools, in a **totally «SMART» perspective**.

Terminal Operating System: MILOS TOS *Rail functionalities*

Rail Management planning

- Planning of **rail park occupation**

Terminal Operating System (TOS)

Rail Execution

- The rail loading and discharging **execution** can be easily performed also thanks to **mobile App.**
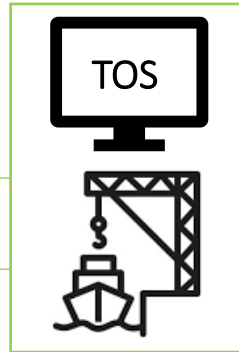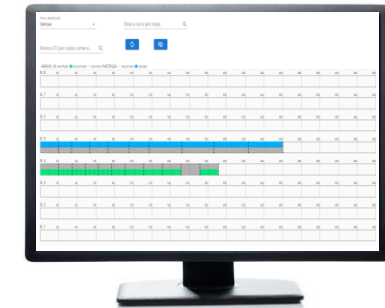
Railway operators Connectors

- Railway Companies, MTOs, Shunting Operators, Railway Infrastructure Manager..

- EDIGES Connectors

- **TAF-TSI standards**

Rail Park - Real Time View

Control operations in **real time**, see **graphical views** below of rail parks

Rail Train Planning

- **Planning** of train discharging and loading operation with **automatic controls** on weight and dimension rules for rail wagons.

The integration of the ***Equipment module*** with the *control unit placed on the Yard and Quay vehicles* (Reach Stackers, Quay Cranes..), allows the Terminal Operator to use the data received from the vehicles themselves detected by the sensors, integrating them with the data managed by the TOS, in order to automate the operation of the Equipment.

The Equipment Integration Module is specifically designed for the processing of data concerning the equipment vehicles for monitoring and reporting purposes, as well as the development of Key Performance Indicators (KPIs) related to the operation of the vehicles.
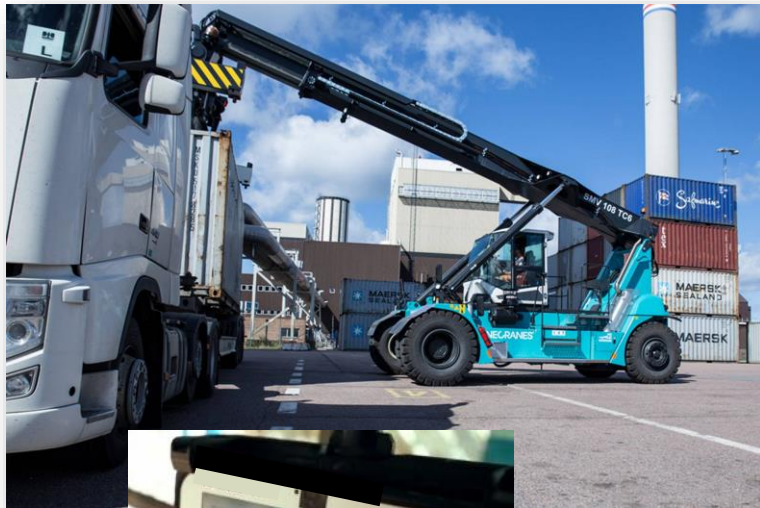
- ***Identification (login) of the operator*** (i-button or NFC badge) and verification of enabling;

- ***Equipment operation status check-list***;

- ***Speed reduction*** according to the weight / position of the load, the operating area of the machine or dangerous conditions (high speed and obstacles);

- ***Automatic alerts*** in case of need for Equipment maintenance;

- Etc.

The **Truck Appointment System** is developed specifically for logistics terminals in order to integrate them in the port transportation context, to optimize the management of the intermodal appointment with truck drivers, which are about to reach the terminal for loading/unloafing of Intermodal Transport Units (ITUs).

Road Haulers can enter or send M2M *pre-notices of arrival* and check in advance the terminal's availability for pickup/delivery of goods. Drivers can access a **Mobile App to check the status of goos pickup/delivery** in real time and manage the certified signature of the Interchange.

The module features a **dashboard** providing an intuitive view of what is expected to arrive at the terminal, with evidence of any critical issues (possible congestion, etc.)
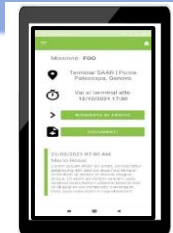
Possibility to integrate the system with a **Buffer Area**, where trucks can wait for the Terminal's availability.

Road Haulier

Shipper's Warehouse

Buffer Area

Terminal Gate

Within the next few months the ***digitalisation and optimisation of rail last mile transport operations and documents*** are further used and tested in ongoing **EU projects** and also in new **CEF2 proposals**

More than 28 international actors of the Rail Transport industry have already signed an Expression of Interest

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ARABIAN REGION

Thank you

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