



July 2022

# MANIFESTO

*for the*  
UIC centenary

**RAIL SOLUTIONS  
FOR A BETTER FUTURE**



INTERNATIONAL UNION  
OF RAILWAYS

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# FOREWORD BY FRANÇOIS DAVENNE, UIC DIRECTOR GENERAL



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**Globally, transport accounts for approximately 1/4 of all greenhouse gas emissions, currently the second largest emitting sector. Since the last Intergovernmental Panel on Climate Change report in April 2022, we know that, in order to reach the objective of limiting global warming to 2°C, it will be necessary to achieve a 27% reduction in emissions by 2030.**

In Europe, rail accounts for about 8% of passenger traffic, but only creates 0.5% of its GHG emissions. That means that if 10% of the European traffic was shifted to rail, the corresponding emission would drop by between 8% and 9%. This would make a significant contribution to the EU's target of reducing net greenhouse gas emissions by at least 55% by 2030. And this result would be achieved with the existing technologies. Besides, on average, rail requires 12 times less energy and emits 7-11 times less GHGs per passenger-km travelled than private vehicles, making it the most efficient mode of land transport.<sup>1</sup>

As the most electrified mode of transport, rail has the capability to be the essential ingredient for a net-zero-carbon transport system<sup>2</sup>. On top of that, society is benefitting from every increase in a modal share to railways, through fewer road fatalities and injuries, more inclusive access to mobility, reduced congestion, improved air quality, valuable travel time and freeing up space in our cities.

We only have this decade to get on track and keep global warming well below 2°C. All levers must be pulled to change the way we move using steps to “Avoid, Shift, Improve”<sup>3</sup>.

The priority for our rail sector is to implement innovative and disruptive projects at regional, national and global level to bring the UIC 2030 vision, approved by UIC members, to life and design a better future:

- ▶ To transform cities and connect communities
- ▶ To use clean energy, technology and innovations
- ▶ To promote intermodality and seamless connections
- ▶ To transform customer experience

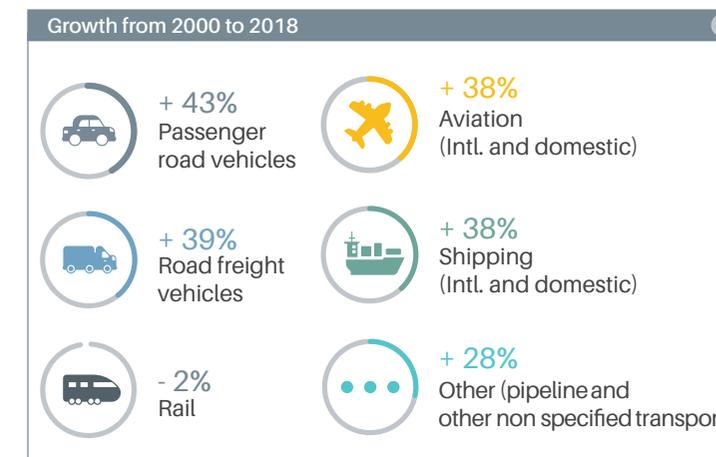
It is worth remembering that conventional means can also help, such as selling more empty seats in existing trains.

To date, 38 UIC members have committed, through the UIC Railway Climate Pledge<sup>4</sup>, to achieving net-zero emissions by 2050 as well as contributing to the United Nations Sustainable Development Goals.

3. Avoid-Shift-Improve (A-S-I) is an approach to environmental sustainability that seeks to increase efficiency by modifying consumer behaviour. Though it originated in transportation studies, it has since been applied to other ways that consumers use natural resources.

4. [uic.org/sustainability/energy-efficiency-and-co2-emissions/railway-climate-responsibility-pledge](https://uic.org/sustainability/energy-efficiency-and-co2-emissions/railway-climate-responsibility-pledge)

Railways are the only mode which has reduced emissions<sup>5</sup>, and European railways have set themselves a 2030 goal of reducing the total CO<sub>2</sub>eq emissions from train operation by 30% in absolute terms compared to 2005. 2020 data shows that they have already reduced emissions by more than 50%. Decarbonising rail by 2030 is possible and rail is on track to be the first mode to reach net-zero emissions.



Source: [Global Transport and Climate Change - SLOCAT Transport and Climate Change Global Status Report \(tcc-gsr.com\)](https://tcc-gsr.com)

In order for the railway sector to have the concrete means to overcome this necessary paradigm shift, financing can be envisaged in many ways. It is important to underline that financial engineering allows for innovative schemes and many solutions. In this framework, public authorities and financial institutions must be well-informed about possible technical solutions in order to play their role with full knowledge and conviction.

5. [Global Transport and Climate Change - SLOCAT Transport and Climate Change Global Status Report \(tcc-gsr.com\)](https://tcc-gsr.com), page 3

Over the past two years, governments have launched various plans to revive the economies and, in this context, transport has been given top priority. Most of these plans include funding for transport in general and aim to invest massively in infrastructure, its maintenance and upgrading and the development of new lines for direct needs. Several countries are therefore focusing on upgrading rail infrastructure and decarbonising transport.

For example, Europe's New Green Deal, a major stimulus package focused on sustainability, is estimated to include €87.5 billion of investment related to rail infrastructure issues. Similarly, in the United States, the Infrastructure Investment and Jobs Act provides \$66 billion in funding and grants for corridor development, track upgrades and safety improvements. Improving rail connectivity and convenience is a goal of other continents, such as Asia, where high-speed rail is growing daily, and Africa, where an integrated African high-speed rail network is at the heart of “Agenda 2063”.

This manifesto sets the scene for the main deliveries that the global railway community, supported where applicable by UIC as a development and implementation platform, can bring over the next decade. It describes how the global railway community will help bring to life the 2030 Vision “[Design a better future](#)”.

The development of these solutions will be integrated in the upcoming 2023-25 UIC work programme.

The clock is ticking.

“Solutions exist; others have to be enhanced – their implementation relies on strengthened collaboration between the railway sector, public authorities and financial institutions.”

## TRANSFORMING CITIES AND CONNECTING COMMUNITIES

A net-zero emission scenario will be possible only with a change of paradigm based on a new vision of cities and town planning. Mobility should be designed as a system, with the objective to use public transport and rail in conjunction with cycling, walking and individual electromobility. And by avoiding travel in some cases by having services such as schools, work and shops close to home. Optimizing the transport network while bearing in mind a frugal approach can help us to reach the emission targets while giving back high-quality public space to the citizens within our cities.

Reality will help us: urban travel is responsible for 40% of all greenhouse gas emissions from passenger transport<sup>6</sup>, and three-quarters of all emissions from urban passenger transport come from private vehicles. Besides, the average travel length is less than 25 km<sup>7</sup>. In this case, the train can be an alternative for short distances as well. It should also be remembered that the highest emissions occur on long journeys and that the train can be a perfect alternative for such journeys. From a climate change perspective, walking and cycling should be the primary modes of transport. UIC offers key forums (such as the Global Passenger Forum) where this new concept of urban experience and intercity links can be designed.



### Transit-Oriented Development, the railway network at the centre of daily mobility

TOD (Transit-Oriented Development) is a way of conceiving shared space, public space and intermodal spaces and, as such, it is opposed to car-oriented development. However, the place of the car is not excluded. This includes the concept of the “15-minute city”, where all essential services are within reach in 15 minutes by sustainable and active mobility. Though this target is not the responsibility of the railway companies, they can support such a policy through:

- ▶ More punctual and efficient public transport
- ▶ Intermodality
- ▶ Utilities and shops in railway stations
- ▶ Advising municipalities on how to design their districts so that the combination of walking, cycling and public transport is the preferred mode for most inhabitants

The challenge of this concept is to integrate rail and public transport as the main mode of medium- and long-distance mobility, while integrating a share of personal mobility into the first ring of mobility hubs that forms the network.

TOD, already well-known for decades, is gaining momentum in Europe and North America.

The major environmental challenges are pushing even more mobility players to rethink their mobility and transit methods:



**UIC's Station Managers Global Group (SMGG)** aims to work with city leaders and stakeholders in projects that create more liveable cities.



**UIC Commuter and Regional Train Sector** aims to better adapt commuter and regional rail services to new customers' behaviour and daily needs, for example by identifying how flexible tariffs could respond to the increase of new trends like remote working.

6. International Transport Forum – Transport Outlook 2021: [doi.org/10.1787/16826a30-en](https://doi.org/10.1787/16826a30-en)

7. [report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_FinalDraft\\_FullReport.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf), page 67

## The railway station, an infrastructure at the service of the city

The railway station is above all a multimodal mobility infrastructure, which serves the interests of individuals, operators and cities, but can also play a booster role as a tool for socio-economic, cultural integration and inclusion for travellers and citizens – but also a tool in terms of climate adaptation and biodiversity. Train stations across the world are unfortunately not the green oases that they could be. Given climate change and the urban heat island, stations should be regreened all over the world.

The stations are a gateway to the rest of the railway network and to the other modes of transport, and therefore to the cities and countryside and, in some cases, to an entire region.

Keeping a station open and contributing to the mobility and accessibility scheme is therefore an asset for the city and this importance does not decline when the size of the station and the city is small.



**The UIC’s “Small stations” working group** is working on guidelines, whose objective is to offer the infrastructure managers (top managers, project managers, site managers, designers) a set of tools, arguments and examples to help them make decisions and propose projects to revitalise rural areas.

## High-speed rail

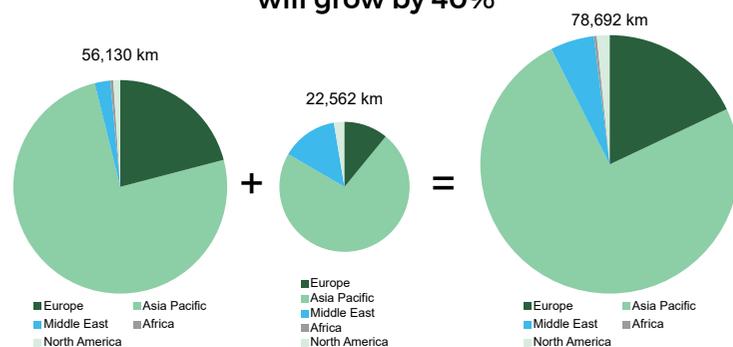
Compared to other modes of transport, which are undergoing profound changes, rail has an unprecedented ten-year window of opportunity to enhance its competitiveness and increase its modal share.

The development of high-speed infrastructure will benefit from a change in the perceptions of travellers, who may be less attracted to air travel (for a variety of reasons, including the environmental one).

On the other hand, the Covid-19 crisis has fostered interest in the expansion and modernisation of high-speed infrastructure.

The greater attractiveness of the rail mode, compared with the air mode, is leading travellers to accept longer journeys and, ultimately, to make new long-distance lines profitable on a continental scale. We can think of Central Europe, Asia, or the North American or African continents. This profitability of lines will increase with the advent of intramodal competition, which will have the effect of increasing the density of traffic on high-speed rail lines. With a growth of the high-speed rail network in commercial operation averaging from 8% over 30 years to 14% during the past decade, the length of high-speed lines on all continents is expected to continue to grow by 40% in the next 5 years and to help to respond to the growing demand for mobility, as the addition of lines to national or local transport systems will increase the number of travel options offered to citizens.<sup>8</sup>

**In the next five years the network length will grow by 40%**



Source UIC Atlas, edition December 2020

8. UIC Atlas - High-Speed Rail 2021: [uic.org/IMG/pdf/uic-atlas-high-speed-2021.pdf](https://uic.org/IMG/pdf/uic-atlas-high-speed-2021.pdf)

## EXAMPLES OF ACHIEVEMENTS IN AFRICA, IN THE MIDDLE EAST AND IN ASIA-PACIFIC

### Morocco’s high-speed train turns to green energy

As part of the development of the Moroccan rail network, a HS Line master plan was drawn up in 2007 to build a network of 1,500 km. The “Morocco Rail Plan” consists of two main railway axes: the “Atlantic” axis, from Tangier through Rabat, Casablanca, and Marrakech to serve Agadir, and the “Maghreb” axis linking Casablanca, Rabat, Fez and Oujda.

This aims to respond to the evolution of mobility within the country with significant repercussions on the community in terms of safety, job creation and preservation of the environment. Upon its completion, the national rail network will serve 43 major cities of the Kingdom, i.e. 87% of the population, connecting 15 international airports and 12 ports. The modal share of rail will increase from 8% to 13%, transporting 150 million passengers, while generating significant socio-economic benefits for the community. The first stage of this master plan, HS Train Al Boraq, serving Tangier and Kenitra (about 200 km), was inaugurated in 2018, to be followed by the construction of HS lines to Agadir serving Rabat, Casablanca and Marrakech.

As part of the national energy strategy that places renewable energy at the centre of the energy mix of the country, all “Al Boraq” high-speed trains have been running on clean energy<sup>9</sup>, i.e. entirely on 100% wind power, since January 1, 2022.

9. Source: [uic.org/com/enews/article/oncf-al-boraq-goes-green-for-eco-friendly-mobility](https://uic.org/com/enews/article/oncf-al-boraq-goes-green-for-eco-friendly-mobility)





© Ahmad Faizal Yahya | Dreamstime

### A high-speed line connects the two cities of Makkah and Madinah in Saudi Arabia

The 450-km high-speed line connecting Makkah to Madinah was inaugurated in September, 2018.

Equipped with the ERTMS level 2 signalling system, it is also planned to serve King Abdullah Economic City (KAEC), King Abdulaziz International Airport (KAIA) and Jeddah at appropriate stages.

The 35 planned high-speed trains were built to cope with the extreme climatic and desert conditions in Saudi Arabia and can run at a maximum speed of 330 km/h.



© Ahmad Faizal Yahya | Dreamstime

### China railway strategy for high-speed rail with impacts on sustainable development

China has developed the most important and longest high-speed rail network in the world. After reaching 350 km/h operational speed in 2018, this network reached a total of 38 283 km of operational railways at the end of 2020.

Current travel times between cities in China aim at giving HSR access in travel circles of 500 km radius within 1 to 2 hours, 1,000 km within 4 hours, between 1,000 and 2,000 km in 1-day return, and 2,000 km being reached in 8 hours with a morning departure and evening arrival. In parallel, in order to avoid saturation and transporting significant numbers of travellers, capacity has been improved: in October 2021, 14.8 billion passengers were transported to their destination, 4.7 trillion pkm, and 1.4 billion passengers every 3,360 km.

The impact on the modernization of the industrial chain is huge: every invested RMB 100 M brings RMB 1 billion in return in terms of capacity and service improvement, economic growth along the lines, output in construction, manufacturing, up- and downstream industries and resource aggregation in cities. It has been estimated that HSR access improves the sustainable competitiveness of the served areas by 57% in terms of energy conservation and carbon reduction.

Besides, the entire Chinese railway network is being upgraded with 170,000 km as a total target including 50,000 km of HSR by 2025: all the cities with over 200,000 inhabitants will be accessible by rail and 98% of the cities with over 500,000 inhabitants by high-speed rail. By 2035, a network of 200,000 km, including 70,000 km of HSR, will be operated with the 1-4 hour original travel circles being reached within 0.5 to 2 hours.



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“Strengthened collaboration between the railway sector, public authorities and financial institutions must rely on more effective, innovative processes.”

## ENERGY, TECHNOLOGY AND INNOVATION

We must transform the railways into a **desirable mode of transport**, capable of dramatically **increasing the number of passengers and goods carried**.

To do this, UIC will support **cost leadership strategies** of its members and their efforts for increasing the **capacity** of the railway network and improving the **punctuality, safety, availability** and **reliability** of the railway system. UIC will also support their efforts for railway infrastructure and rolling stock that are resilient to climate change.

Therefore, the Railway System Forum (RSF) will support our members by implementing **concrete actions** through its **multiannual work programme** based on the following objectives:

### Capacity

Capacity is the key resource for operators to run their trains and provide services in line with market needs. This issue is at the heart of all UIC technical departments.

**Railway System Forum (RSF) is working on Traffic Control Centres and crisis management**, which are key enablers for increasing the capacity of the railway system.

Automation is another enabler on which UIC RSF is working, in order to facilitate an increase in the number of trains and to support the cost leadership strategy: autonomous trains (ATO), Digital Automatic Coupling (DAC), robotisation of infrastructure maintenance, automatic inspections of infrastructure through drones and other maintenance devices.

**UIC is working on noise reduction**, facilitating the acceptance of the increasing number of trains by neighbours on the existing and newly built railway lines.

**UIC is providing tools to its members**, like for instance **TrainDy**, for increasing the length and towed mass of freight trains.

The capacity increase can be reached through digitisation. In Europe, UIC is active in the deployment of some key technologies which will allow a strong capacity increase by approximately 54% of current track superstructures without the construction of entire new lines.

The main contribution to this increase originates from ERTMS Level 3 with approx. 40%<sup>10</sup>, followed by ATO with approx. 10%, and Digital Capacity Management with approx. 4%<sup>11</sup>.



10. S2R: combined effect of ERTMS Level 3 with ATO 50%; expert estimate of the additional effect of ATO in the case of ERTMS Level 3 “moving blocks”: 10%

11. DB Netz

## Accelerate innovations

The rail sector is innovating every day in every section of its complex activities.

Rail already demonstrates performance in energy consumption. Nevertheless, a further reduction of energy consumption and emissions is being pursued, together with an effort to increase the global efficiency of the rail system:

- ▶ Ensure rail's **leading position in terms of energy consumption** based on dedicated renewable energy generation and storage, smart grids, hydrogen and batteries, and improvement to electrification technology, making it easier and cheaper to install/maintain.
- ▶ Develop **lighter trains**: short-distance trains operating on existing railway lines, or on closed lines to be reopened. They will connect sparsely populated areas to urban areas and cities.
- ▶ Increase the **resilience of railway infrastructures and rolling stock to climate change** (floods, higher temperatures and stronger winds) including, in particular, the design of new infrastructure and rolling stock, more accurate weather forecasts and operational mitigation measures.
- ▶ **Accelerate the cycle of innovation** through operational rules adapted to the market uptake of innovative solutions, and dissemination of innovative solutions.
- ▶ Support Europe's Rail System and **Innovation Pillars**.



To achieve these objectives, UIC decided in 2021 to focus on its added values.

Those added values have been described in the UIC document called **“Technical Solutions for the Operational Railway”**<sup>12</sup>.

<sup>12</sup> [uic.org/IMG/pdf/20201126\\_uic\\_technical\\_solutions.pdf](https://uic.org/IMG/pdf/20201126_uic_technical_solutions.pdf).  
Or watch: [www.youtube.com/watch?v=UBsZEtqGHhc](https://www.youtube.com/watch?v=UBsZEtqGHhc)

## UIC digital enablers

### FRMCS: 5G for rail

The introduction of 5G FRMCS (Future Railway Mobile Communication System), that will start to replace the current GSM-R as per 2025, will enable several aspects of train digitisation: for example, the control-command and signalling system evolution and the development of autonomous trains.

This will have significant effects on capacity (increase of train frequencies on a given infrastructure), punctuality and more generally the global quality of service.



**UIC is working on both the specifications of the future UIC FRMCS and the specific operational rules adapted to the new use cases enabled by UIC FRMCS.**

### Modelling

One of the key criteria of performance and quality of service improvement is the speed to market, meaning the capacity of an industry to adapt rapidly to new usages, new technologies and new needs.

The railway industry is committed to achieving a convergent global digital model managing the various dimensions of modelling, such as asset management, construction, project management, geographical methods, functional description or even simulation.



Ensuring the continuity of the railway digital chain, **this digital twinning of the full railway system** will be an essential element permitting rapid, sound and cost-optimised evolutions going forward.

## EXAMPLE OF ACHIEVEMENT IN EUROPE

### FRMCS European railway strategy

The evolution of the control command system and the associated railway telecom systems are a key element in dealing with the challenges and exploiting the full benefits of train digitalization. This is the reason why UIC, as a continuity to the creation and development of GSM-R over the last 20 years, decided to focus on the introduction of 5G in the future rail system. This feature will be the enabler for train automatization, advanced signalling and remote control and monitoring systems. Moreover, it will foster the upcoming digital applications that will ensure a qualitative and quantitative leap in the railway domain.

The Future Railway Mobile Communication System (FRMCS) program set up by UIC, in full coordination with its railway members and with the permanent support and contribution from the railway telecom manufacturers, is now on the very cusp of its first implementation, involving:

- ▶ the issue of initial, stable functional and system specifications,
- ▶ the introduction of consistent railway telecom standards at worldwide level in 3GPP,
- ▶ the implementation of frequency harmonization for FRMCS in Europe,
- ▶ the first prototyping and functional validation phases within the framework of the 5GRail Horizon 2020 project, coordinated by UIC with key stakeholders from the railway telecom and signalling industries.

The objective is to achieve all the aspects necessary for the market readiness of FRMCS 1<sup>st</sup> Edition by the deadline of 2025-2026, with the early implementation of 5G FRMCS lines in different railway networks.

Going forward and beyond the FRMCS 1<sup>st</sup> Edition, the aim is to progressively evolve this new railway telecom technology to enable and manage all the air-ground digital applications that will be deployed in the future railway system.

As was the case for GSM-R, FRMCS is designed as a worldwide system that all railways may decide to adopt in the near future.



© Antoine Jézéquel | FRL Production (video)



© Antoine Jézéquel | FRL Production (video)

VIDEO: [www.youtube.com/watch?v=R4viEXd2VzU](https://www.youtube.com/watch?v=R4viEXd2VzU)

### Open Source Software

 The pace of evolution of applications is largely driven today by the logic of open source software, where it is possible to decrease the effort dedicated to software development, in terms of conception and realization while increasing its added value for the railway service. This logic also accelerates the adoption of new relevant applications, both in the public and professional domains.

 With this ambition, the railway industry will put in place a not-for-profit organization to provide an open space to foster innovation and software development in the railway sector : **the “OpenRail Foundation”** ([openrailfoundation.org](http://openrailfoundation.org)).

### Artificial Intelligence (AI)

 **UIC is working on artificial Intelligence applied to predictive maintenance** to improve the reliability and availability of both rolling stock and infrastructure, and to ensure better integration in operations.

 In addition, based on Machine Learning, Natural Language Processing and robotics, UIC is ready **to support its members in the research and development of new use cases based on AI**: face recognition, chatbots and virtual assistants for passengers, sales prediction through machine learning, and also robotics in railway stations, trains and warehouses.

### Cyber security

The introduction of new technologies, particularly new ICT technologies, in all transport domains is a potential risk for security, due to cyber-attacks.

 The railway sector is committed to achieving this introduction of new technologies together with the adapted **cyber-security solutions**, so that the train of tomorrow will keep, and even increase, a very high level of security in comparison with other transport modes.

### Quality of service and continuous improvement of railway services

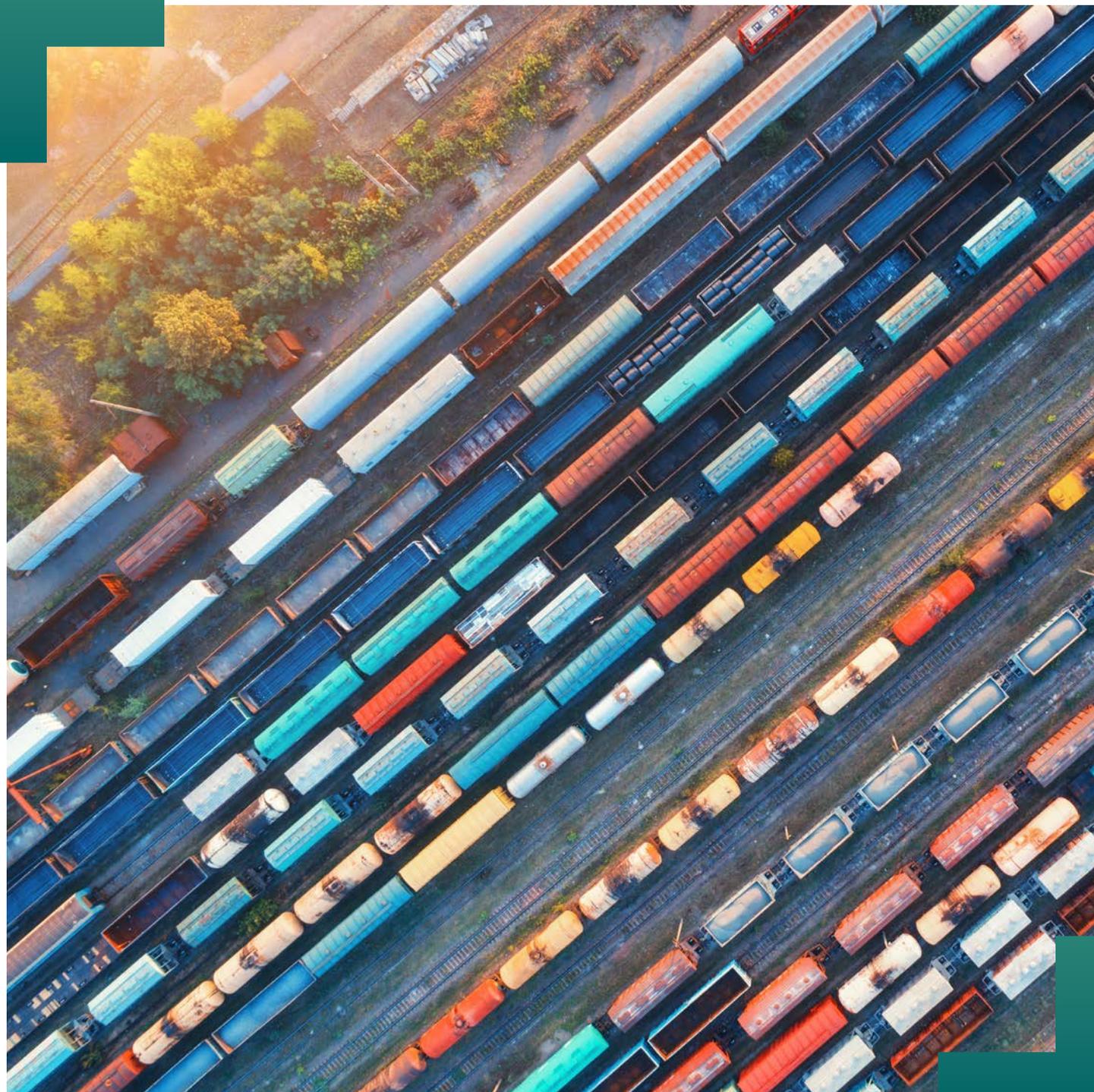
 ▶ Improve operational performance through:

- **operational rules** enabling robust and resilient timetables, increasing punctuality and improving management of disrupted situations (future railway-operations traffic control centre).
- **DAC**: harmonised operational rules for freight traffic and combined transport efficiency, such as increasing the length and hauled mass of freight trains.

 ▶ **Improve safety** of the system through

- **new methods for safety demonstration and risk analysis** processes, aiming at the certification and approval of innovative systems on a global scale, aiming at an internationalization of certification and approval of innovative systems, through an integrated safety approach.
- **Shared Return of EXperience (REX)**: organising the “REX” within the UIC organisation, so that Operations & Safety are correctly monitored via an integrated safety approach. This would drive a library of bowties and safety barriers classifications, including the JNS processes with the European Union Agency for Railways and also future CSM ASLP processes, such as SAIT, etc.





## INTERMODALITY AND SEAMLESS CONNECTIONS

Recent global events have put pressure on the global supply chains and on the passenger services. They are confronting the rail sector with a number of challenges (e.g. how to become more agile and flexible) but they are also opening a window of opportunities. Customers and clients are starting to actively research the vulnerability of their supply chains and, more generally speaking, of the transport systems. They are discovering that rail can deliver a part of a solution. Here are the innovations that UIC is implementing for delivering services that meet the market and society expectations.

### Fostering combined transport

Global and intercontinental supply chains have mostly been relying heavily on one mode of transport. If something happened to that mode (e.g. Ever Given and the Suez Canal), major issues appeared downstream. One of the solutions is to truly develop a multimodal and synchromodal strategy where rail plays an integral part.

Working simultaneously with more modes of transport and assuring that they link up seamlessly will increase the overall flexibility and agility.



This is what drives the action of the **Combined Transport Group**. The purpose is to develop cooperation at international and Community level between railway undertakings with a view to advancing and **promoting intermodal techniques** and making them reliable, competitive and better suited to the requirements of the market and the environment.



With the motto of “driving a train should be as easy as driving a truck”, **UIC Freight is supporting members in implementing seamless international freight**. One of the issues tackled was that of removing the language barriers between drivers and signallers in international train operation. **The UIC project Xborder, subsequently complemented by the S2R project Translate4Rail, investigated this topic.**

By continuously monitoring evolutions in multi-modality and by providing knowledge to the different stakeholders, **UIC is an incubator of multimodal solutions where they did not exist before.**



**UIC works closely together with other organisations and actively participates on the international scene.** As an example, the **Modus European project** brings together representatives from air and rail to analyse the performance of the overall transport system by considering the entire door-to-door journey holistically within an integrated, intermodal approach.



### International corridors

**UIC has been a key player in corridor development belts** both in Europe and across other continents. Corridors are a vector of growth and support the international approach needed for the growth of rail freight.

In Europe, the **ECCO Group** (Efficient Cross Corridor Organisation) supports the harmonisation of processes and their implementation along the rail freight corridors. It contributes to the development of policies by coordinating the operational requirements that need to be met.

In terms of **cross-continental developments**, **UIC has implemented a market watch of business developments and supports** key partners (UNECE, TRACECA, BSEC, to name but a few) on several issues linked to the implementation of corridor management. **UIC is driving forward an integrated approach of international corridor activities** with efforts on the level of combined transport by linking together closely with international organisations such as FIATA, UIRR or CLECAT representing other modes of transport.

The scope of the cross-continental activities has so far focused on Asia and the Middle East. A next step will be to engage with partners in the other UIC regions. This started with the African region for which a dedicated webinar was organised at the end of February 2022 with a focus on the resilience of the logistics chain.

### Digital platforms for interoperable and seamless data exchange

**UIC is coordinating a European sector initiative** designed to address the high complexity, poor connectivity and lack of interoperability **in the field of data exchange in the rail freight ecosystem**.

**The Digital Platform initiative** aims to achieve a decisive leap forward towards completing the SERA (Single European Rail Area) by transforming the current fragmented data exchange landscape through the creation of an open European Digital Ecosystem. In this way, interoperability barriers will be removed in compliance with the EU standards, as defined by the latest TSI Regulations (Technical Specifications for Interoperability).

Based on contemporary federated data-model approaches, the project will facilitate information flows between all rail freight partners. Information will then be exchanged via standardised messages through a common digital platform, enabling interoperable, end-to-end transport and efficient freight automation across Europe.

### DAC (Digital Automatic Coupling)

The railway sector in Europe still does not have an Automatic Coupling for its freight operations. Over 600,000 wagons in Europe are, to a large extent, shunted manually. Now, the European railway sector is working on implementing a Digital Automatic Coupling on the whole fleet. With this digital coupling, it will point the way forward for the sector world-wide.

The EU DAC program runs under the umbrella of Europe's Rail Joint Undertaking and will transform the sector completely. Already the specific technology has been selected. Over the next 8 years, DAC will be rolled out in the European wagon fleet.

The automatic coupling will bring the necessary efficiency improvement in the freight business, which is needed to create a more level playing field in comparison with other modes of transport, while maintaining and even enhancing the already existing high safety standards.

**DAC** is a **sector initiative** where all the stakeholders – operators, industry and policy makers – are aligned with one goal: making running trains through Europe as easy as running a truck.

### Seamless connections for passengers: OSDM



The complexity of purchasing rail tickets is a disincentive for customers to switch to rail, especially for international journeys that include connections to public transport.

**UIC and the FSM (Full-Service Model) initiative have therefore developed the concept of OSDM** (Open Sales and Distribution Model) to simplify the purchase of tickets, and to enable all ticketing stakeholders to have common standards and procedures.

The Open Sales and Distribution Model (OSDM) is a **rail-sector specification** enabling interoperable ticket sales for trains and other modes of transport and is defined in the new UIC International Railway Solution (IRS) 90918-10.

The aims of OSDM are twofold:

- ▶ To substantially simplify and improve the booking process for customers of public transport
- ▶ To lower complexity and distribution costs for distributors and carriers.

**OSDM is jointly developed by the members of UIC** and ticket vendors, with the members of EU Travel Tech and the European Travel Agents' and Tour Operators' Association.

**Railway customers** will be able to purchase rail and multimodal transport tickets across Europe more easily, at the most beneficial prices and tariff conditions. Thanks to OSDM's ability to provide any combination of fares, customers will be able to purchase fares in accordance with existing fare combinations as well as new fares and/or combination models.

**Railway operators** will be able to provide better services and attract new customers thanks to OSDM technical innovation and smart mobility solutions for seamless travel. By streamlining the distribution process, the railway sector benefits from reduced development and distribution costs.

By collaborating more closely with Ticket Vendors (FSM initiative) using the OSDM single IT protocol between the various stakeholders (distributors, allocators, carriers), the railway sector as a whole has taken a major step forward in simplifying ticket distribution for passengers, including through-ticketing and multimodality, and in developing a consumer-driven, innovative and competitive distribution solution based on transparency and sustainability. OSDM is already implemented by IT companies and ticket vendors, and the major railway companies have defined an implementation plan.

Finally, the Community of European Railway and Infrastructure Companies (CER) has included the implementation of the UIC products in its Ticketing Roadmap, such as OSDM.

**VIDEO:** [www.youtube.com/watch?v=TVxQdq8nMAI](https://www.youtube.com/watch?v=TVxQdq8nMAI)

## Multimodality and innovative data models

Multimodality is essential to enable travellers to use public transport. It begins with better transfers in databases from one mode to another, including new urban transport modes such as electromobility, or future modes such as the autonomous car. Making modal change more accessible is also a challenge for transport players.

- ⚙️ **UIC, in conjunction with IATA** with which it signed a Memorandum of Understanding in January 2020, **is working on multimodality projects between air and rail modes.** These projects aim to overcome the current challenges in improving cooperation between air and rail operators. Industry associations can contribute to:
  - ▶ Providing technical guidance and standards in order to facilitate integration and increase confidence of players in investing,
  - ▶ Providing technical solutions, including enabling platforms, to accelerate adoption and facilitate multilateral approaches,
  - ▶ Encouraging open innovation around intermodal integration through initiatives aimed at members and technology players (e.g. start-ups).

⚙️ **UIC is also in the process of developing a multimodality project between rail and urban public transport.**

This project aims at facilitating the development of intermodality between rail and other surface transport. UIC actions are threefold:

- ▶ Facilitating partnerships between member rail companies and other surface transport providers by removing technical obstacles and providing accelerators for developing integrated offerings,
- ▶ Facilitating the development of digital integrated mobility solutions by member rail companies, helping them to evolve from pure transport operators to providers of door-to-door mobility to their customer,
- ▶ Facilitating the development of an ecosystem and marketplace of digital integrated mobility services by allowing third-party developers to create innovative travel applications and services bringing value to the services offered by member rail companies.



⚙️ In the **freight domain, the UIC Special Group Raildata and X-Rail** are developing a Mobile Application for Rail Freight Services (MARS). MARS is a user-friendly web application to ensure the communication flow between partners operating in the first mile, last mile and transit on behalf of a lead RU. Testing of the first MVP (minimum viable product) is in progress.

## EXAMPLE OF IMPLEMENTATION IN ASIA-PACIFIC

### Multimodality and High-Speed Rail

Smoother connectivity with air, metros and other modes of transport is ongoing or under development. Suburban trains operating around cities, linking urban and suburban areas, railways and metros. Commuter traffic is increasing everywhere in the region with an annual two-digit percentage in some major cities.

HSR is also an opportunity to develop innovative solutions like popular and modern ticketing on vending machines, e-ticket (600 million users in China) with ID cards, ancillary service reservation, multi-ride tickets and e-pass. Thanks to those innovation, flexible tariffs, marketing actions for stimulating demand such as new pricing policies, peak/off-peak management may be implemented.

The integration of various transport modes has become a reality for smoother transport and a seamless connection between HSR and other modes, direct links to airports and integrating HSR into urban and suburban railways. Initiated in the Asia-Pacific region, stations are becoming huge transit hubs and developing ancillary services and business in stations, including real-time information on those services and city development around stations.

Innovative train services are being put in place everywhere to improve the customer experience in the Asia-Pacific region, such as new catering: on-board high-quality meals or local specialties; other innovative, on-board dedicated services such as quiet cars and cars with business facilities are impacting not only HSR rolling stock but also other regular services.

Finally, some areas in the Asia-Pacific region are currently experimenting on connecting passenger services with last-mile freight delivery. The modernisation of railways through HSR will benefit hundreds of people all around the region, making HSR a real passenger delight.





## CUSTOMER-ORIENTED CULTURE

Nowadays, every railway operator is asking or should ask itself the following questions: how can we bring passengers and freight back to rail? What are the main actions that are needed to attract new customers?

The answer is more than ever based on a customer-oriented culture from the top management down to every person working for the company, in the front line or in the back office. All the members of the staff should be aware and share the importance of being innovative and emphasising the customers' needs.

Railways must prove that they are the best option: they must be reliable, punctual, safe and secure, of course, but they must also fulfill the expectations and the ever-evolving needs of different types of customers in terms of comfort, accurate information and accessibility to allow access to as many people as possible.

### Accessibility and inclusion

It is essential that more people feel able to travel by rail. Travelling by rail must become more welcoming and easier for a wider range of people, in particular those with disabilities. Rail services must be designed to meet the requirements of a wider range of needs.

In this sense, the **UIC PASSAGE accessibility group of experts** has been working during the last decade to improve the assistance to people with reduced mobility or with disabilities when autonomous access is not possible with the creation of an IRS (International Railway Solution) and a practical tool (**PRM Assistance Booking Tool**) which is useful for ensuring assistance for international rail journeys all around Europe.

The railway workforce, including its supply chain, must become a more diverse and inclusive place to work.

This change is necessary to meet the skills requirements of the industry as well as to make it a more creative and productive place of work. Improving the standards of the working culture, flexible arrangements, inclusive recruitment and management practices across the industry will help promote a more inclusive workplace where staff feel safe and accepted.

### Tourism by rail

The capillarity of regional trains makes them complementary to high-speed lines to reach final destinations. Even more, regional networks can capitalize on the renewed interest in nearby destinations to expand their portfolio of services, creating rail tourism offers by making the link by rail (combined with other modes such as bikes, for example) to destinations with leisure interest more visible.

These innovative examples on how to make rail more attractive while optimizing resources by identifying new opportunities for railways based on leisure needs are part of the work done within the **UIC TopRail sector**.



## Security

Security is very often in people's minds when choosing train transport for a journey and it is essential to be able to ensure an acceptable level of security for passengers throughout their journey at regional, national or international level.

Both objective security (video protection, security staff, technical monitoring systems, predictive systems, etc.) and subjective security (feeling of security of the passengers when travelling) need to be addressed by the railways together with the authorities.



**Innovative solutions based on security by design or artificial intelligence** are being developed and the **involvement of UIC and its members in research and innovation projects will help to design solutions to better protect trains and stations** and thus increase resilience against security threats.



## Just-in-time delivery for goods

Part of rail freight's business success will depend on the extent to which it is able to connect to contemporary supply chain demands like just in time and just in sequence, agility and synchromodality.

Leveraging on developments in the domain of digitisation and automation, freight should be able to compete with other modes of transport on the level of On-Time and In-Full performance.



**The Digital Platform initiative** is aiming to provide the tools to enable seamless and interoperable data exchange which will lead to more reliability and transparency.



## EXAMPLE OF ACHIEVEMENT IN THE MIDDLE EAST

Recent studies conducted by Roland Berger on behalf of the UIC freight department have clearly shown the potential for rail freight development on the Middle-East and Southern Corridors. In these corridors, the Middle-East countries play a prominent role.

With appropriate action, these corridors can become as successful as the current Silk Road or Northern corridor. By UIC, action is being taken on:

- ▶ Awareness creation and promotion while continuing the knowledge build-up
- ▶ Foster cooperation and coordination through seeking alignment and coalition building from the operator's community side
- ▶ Digitisation and harmonisation through its expert groups and best-practice sharing.

For example, in Saudi Arabia, through heavy haulage operation, massive volumes are carried in a single journey. For phosphate ore, a single train carries 15k T / journey displacing 600 trucks off the roads, saving more than 318k litres of diesel and reducing the emissions by more than 85%.

The mining company quoted was 60%-70% for the direct cost savings. Other benefits being realised include the reduction in loading and off-loading processes, time and cost.

During the pandemic, truck transportation was disturbed but the train operations continued with the same momentum, proving that rail freight is a more sustainable and resilient alternative.



## Improving environmental performance



Through collaborative knowledge sharing and research projects, **the UIC Sustainability platform will help the railway community to develop strategies and new ways of working to reduce negative environmental impacts.**

As well as the work on energy efficiency and decarbonisation, priority environmental topics include:

- ▶ Sustainable Land Use: reducing collisions with animals, reducing the use of harmful pollutants to land and water and enhancing the biodiversity and social value of the railway trackside.
- ▶ Noise and Vibration: new technology and innovation in track and rolling stock design will reduce noise at source. Beyond technical aspects, effective community engagement and communications approaches are equally important.
- ▶ Air quality: to monitor and reduce dangerous levels of emissions to air from railway sources, including particulate matter from wear.
- ▶ Circular Design: extending the life of the resources in use in the railways, improving resource efficiency such as water saving, sourcing more recycled and recyclable materials, improving recycling facilities for passengers, and reducing waste for disposal.

A key mechanism that railway actors can use to effect change is through the products and services it buys.



For this reason, **UIC is working with the procurement experts within members in the special group “ERPC”** to integrate sustainability into the purchasing process.



For the railway sector to better understand and demonstrate its contribution to a more sustainable future, the **UIC is launching the Rail Sustainability Index (RSi)** this year.



This new online reporting tool has been designed for and by the global railway community. With the RSi, UIC members can report using both qualitative and quantitative measures that support 7 key UN Sustainable Development Goals, and receive an annual benchmarked score. This tool will allow members to plan and track their progress, demonstrate performance to external stakeholders and UIC can also use this important information to promote the role of rail in a more sustainable future.



[www.uic.org](http://www.uic.org)



#UICrail



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