

UNIFE Research & Innovation Activities



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UNIFE - THE EUROPEAN RAIL SUPPLY INDUSTRY**

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Foreword from the UNIFE Director General

Supplying nearly half of the global demand for rail products and employing over 400.000 people in the EU, the European rail supply industry is a strategic and innovative industry for Europe and the leader of the global rail supply market. However, competitive threats on the global and European markets require the attention from both rail stakeholders and transport leaders to ensure that this flagship European industry can maintain its global leadership. Research and innovation (R&I) is not only essential to overcome these competitive challenges to our industry, but also to ensure that the rail sector remains attractive to passengers and end users and that it is able to increase its modal share in the face of increasingly innovative road and air modes.

The European rail supply industry invests approximately 3.6% of its annual turnover in R&I, and this includes a significant contribution from the growing segment of small and medium sized rail supply companies (SMEs). This investment in innovation keeps the European rail industry at the forefront of the market; delivering the highest quality, cutting edge mobility solutions.

This is why innovation is at the core of UNIFE's mission to promote rail transport in Europe and internationally—and this commitment to R&I permeates all of UNIFE's activities. The European rail industry has delivered cutting edge rail transport technologies such as the very high-speed train, driverless metros, and ERTMS to name a few. To carry on this tradition, UNIFE is proud to have spearheaded with our members the initiative for the creation of the Shift2Rail Joint Undertaking—effectively trebling the EU budget for rail research, and confirming a significant, collaborative public-private commitment to the next step change in rail system technology.

Shift2Rail is an unprecedented joint effort of all the stakeholders of the European rail sector to invest together in research and innovation, in order to boost the attractiveness of rail transport towards passengers and businesses, and therefore achieve the ambitious objectives set by the European Commission in the 2011 White Paper on Transport, including the completion of the Single European Railway Area (SERA).

With continued significant investments into collaborative rail research initiatives such as Shift2Rail, a revolution in rail technology will occur and enable the broader rail sector to deliver attractive and environmentally friendly rail transport to confront the digital, environmental and societal challenges facing our world today. UNIFE calls on the European Commission to include a new ambitious rail research Public Private Partnership, Shift2Rail 2.0, in the next EU Research Framework Programme (Horizon Europe).

In this brochure, you can read more about UNIFE, our past, ongoing and future activities in rail R&I. I'd like to thank the European Institutions and the EU Member State governments for their tireless commitment to the development of rail transport—UNIFE and our members look forward to further fruitful collaboration in realising the EU's ambitious mobility goals.

Philippe Citroën,
UNIFE Director General



About UNIFE

Based in Brussels since 1992, UNIFE represents the European rail supply industry at both European and international levels and is a trusted partner of the European Union Institutions in all matters related to rail and transport.

UNIFE represents the interests of more than 100 small, medium and large sized companies in the rail supply industry. These UNIFE member companies are involved in the engineering, design, manufacture, maintenance and refurbishment of rail transport systems, subsystems and related equipment. All segments of the rail industry are represented within the membership: system integrators, railway infrastructure and energy suppliers, rolling stock manufacturers (including subsystem suppliers), signalling suppliers and railway engineering

companies. UNIFE members have an 84% market share in Europe and supply more than 46% of the worldwide production of rail equipment and services. UNIFE also brings together 12 national rail industry associations from across Europe.

Our members are committed to providing the best technology to meet the challenges arising from climate change and growing transport volumes. Furthermore, UNIFE, which is one of the supporting bodies of the Shift2Rail Joint Undertaking, the European Union Agency for Railways and the European Rail Research Advisory Council, works on interoperability standards and coordinates EU-funded research projects that work towards the technical harmonisation of railway systems.



System Integrators

UNIFE system integrators provide turnkey railway and urban rail systems—comprising infrastructure, rolling stock and signalling components—throughout the world



Rolling Stock and Subsystems

UNIFE members produce regional, intercity and high-speed trains, electric and diesel locomotives as well as freight wagons for all types of cargo. UNIFE members also produce tramways, metros and LRT systems. UNIFE also represents subsystem manufacturers from wheels to pantographs including door systems, couplers, HVAC units, on board signalling equipment and all the necessary equipment for trains.



Infrastructure and Energy

UNIFE members offer the world's best rail infrastructure/energy products and services: from the supply of rail, track and energy components, installation and maintenance equipment to the provision, building, maintenance and renewal of integrated track and energy systems. Suppliers and contractors deliver and maintain high-quality track infrastructure and energy systems in Europe and around the world.



Signalling

UNIFE members also produce signalling systems that help increase the capacity of the railway system. They are equally committed to developing ERTMS, a European system that will help overcome the differences between national signalling systems. For more and up-to-date information on ERTMS, please visit www.ertms.net.



Railway Engineering

UNIFE members also provide engineering expertise (e.g. planning, design and supervision works) for rail and urban transport.



UNIFE and European Rail Innovation - a rich history

UNIFE has a long and rich experience with European research and innovation (R&I); both as an advocate for increased EU funding for rail research and as a partner and coordinator of dozens of projects dealing with different railway subsystems (e.g. rolling stock, infrastructure, signalling, energy, etc.) over the past decades. The association is actively involved in the secretariat of the European Rail Research Advisory Council (ERRAC), the European Technology Platform dedicated to rail which is a trusted partner of the European Commission. The UNIFE Research & Innovation Committee is steering the UNIFE R&I activities.

Perhaps in its most notable role in rail R&I to date, UNIFE was at the origin of the Shift2Rail rail research initiative (now Joint Undertaking (JU)). The Shift2Rail journey began in 2009, when key European rail sector players, under the coordination of UNIFE, began imagining a policy instrument that could facilitate a step change for the European rail system. UNIFE was in charge of the proposal phase and gathered more than 100 partners, resulting in an official European Commission proposal in December 2013. Following a vigorous advocacy campaign spearheaded by UNIFE, the Shift2Rail JU was officially launched in July 2014 with a budget of €920 million after its official regulation was adopted by the European Parliament and Council. At present, 21 UNIFE members are involved in the JU.

Regarding rail R&I, UNIFE seeks to:

- Advocate for sufficient European funding for collaborative rail R&I;
- Advise members of all R&I opportunities at the European Level, including providing all relevant information on Horizon 2020, Shift2Rail and other EU R&I programmes (e.g. satellite, cybersecurity and digital programme);
- Coordinate EU R&I projects essential for the European Rail Industry;
- Facilitate discussion with stakeholders interested in setting-up research consortia;
- Represent the rail industry within ERRAC and foster discussion between members and railway undertakings, infrastructure managers and academia;
- Prepare Shift2Rail 2.0 with the support of UNIFE members and the UNIFE Research & Innovation Committee. Shift2Rail 2.0 will be the new rail research Public Private Partnership in the next EU Research Framework Programme (Horizon Europe).

UNIFE is also involved in standardisation and regulation activities and aims to link European research projects and their outputs with the activities of the European Union Agency for Railways(ERA), CEN/CENELEC and ISO. UNIFE is a 'representative body' of ERA and a trusted partner of CEN/CENELEC and ISO. This cooperation enables UNIFE to ensure that the results of the relevant European rail research projects will be used by the relevant regulation and standardisation bodies.

UNIFE Research & Innovation Committee:

The UNIFE Research & Innovation Committee steers the association's technical activities in the field of the European research framework (including Shift2Rail). The committee is actively involved in the preparation

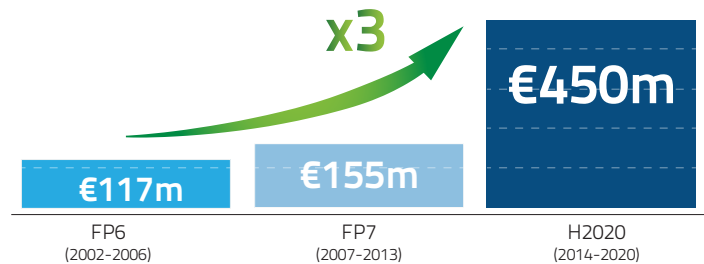
of Shift2Rail 2.0 and the follow-up of Shift2Rail, Horizon 2020, and ERRAC activities. This committee is composed of technical directors from the main UNIFE system integrators and subsystem suppliers.



Total value of European rail R&I projects with UNIFE involvement since 2002



Growth of EU-funded rail R&I Budget from 2002 to present



The European rail sector will commit over half of the resources to rail R&I projects co-funded under Horizon 2020/Shift2Rail





About the Shift2Rail Joint Undertaking



Shift2Rail is the first large-scale European rail research joint undertaking (JU) to seek focused research and innovation (R&I) and market-driven solutions by accelerating the integration of new and advanced technologies into innovative rail product solutions. Shift2Rail endeavours to boost the competitiveness of the European rail industry and meet changing European transport needs. As such, the R&I carried out within this Horizon2020-funded initiative will create the necessary technologies to help complete the Single European Railway Area (SERA). Furthermore, Shift2Rail aims to double the capacity of the European rail system, increase its reliability and service quality by 50%, all while halving lifecycle costs. In order to meet these ambitious targets, Shift2Rail has a robust framework and a sizeable multiannual budget of €920 million, jointly funded by the private sector (€470 million) and the EU (€450 million).

The R&I in Shift2Rail seeks to achieve the overall objectives by working on new technologies that will be tested and applied across the entire rail system and on all segments of the rail market (High-Speed/Mainline, Regional, Urban/Suburban, and Freight). To achieve such system-wide developments, the work is organised into five Innovation Programmes (IPs) and a number of Cross-Cutting Activities (see adjacent diagrams on page 9).


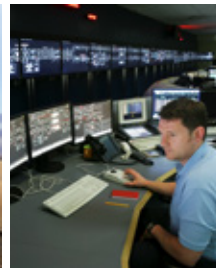


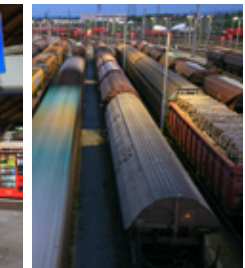
The Shift2Rail JU is composed of 27 Members: AERFITEC, Alstom, Amadeus, Hitachi Rail STS, AZD Praha, Bombardier Transportation, CAF, CFW, DB, DIGINEXT, EUROCC, Faiveley Transport, HaCon, Indra, Kapsch CarrierCom, Knorr-Bremse, MER MEC, Network Rail, SDM, Siemens, SmartRaCon, SNCF, SwiTracken consortium, Talgo, Thales, Trafikverket and VVAC+.

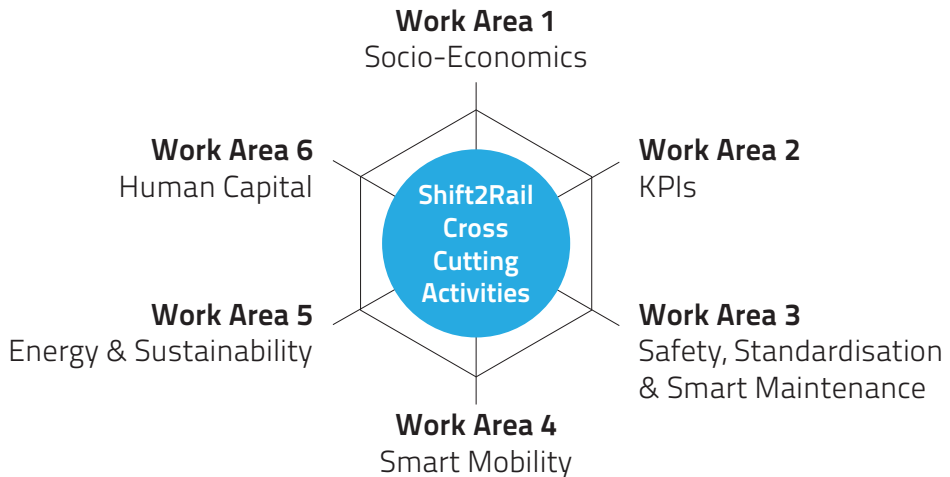
The JU Members engage in annual calls for proposals addressing the five IPs and CCAs (named Calls for Members (CFM)) aimed at the accomplishment of the Shift2Rail goals set in the Multi-Annual Action Plan (MAAP).

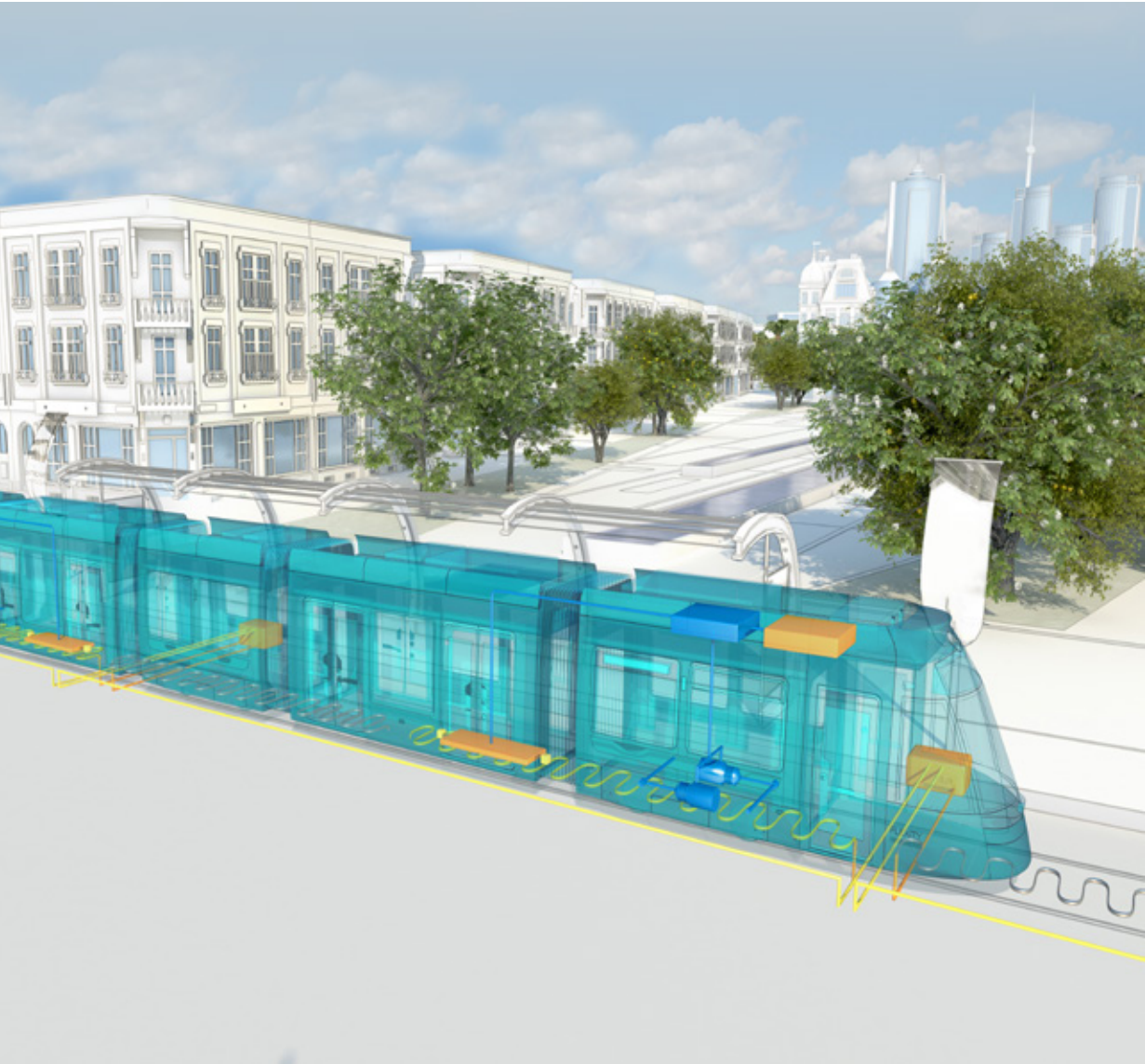
In addition to these CFMs, Shift2Rail offers all interested stakeholders not directly involved in the JU (referred to as non-JU members) the opportunity to participate in competitive Open Calls which are issued in parallel to the CFMs. The purpose of the Open Calls is to contribute to the work planned in the S2R MAAP and not directly handled by the Members of the Shift2Rail JU.



Innovation programmes

IP1	IP2	IP3	IP4	IP5
<p>Cost-efficient and reliable trains, including high-capacity trains and high-speed trains</p>	<p>Advanced Traffic Management & Control Systems</p>	<p>Cost-efficient and Reliable High-Capacity Infrastructure</p>	<p>IT Solution for Attractive Railway Services</p>	<p>Technologies for Sustainable & Attractive European Rail Freight</p>
				





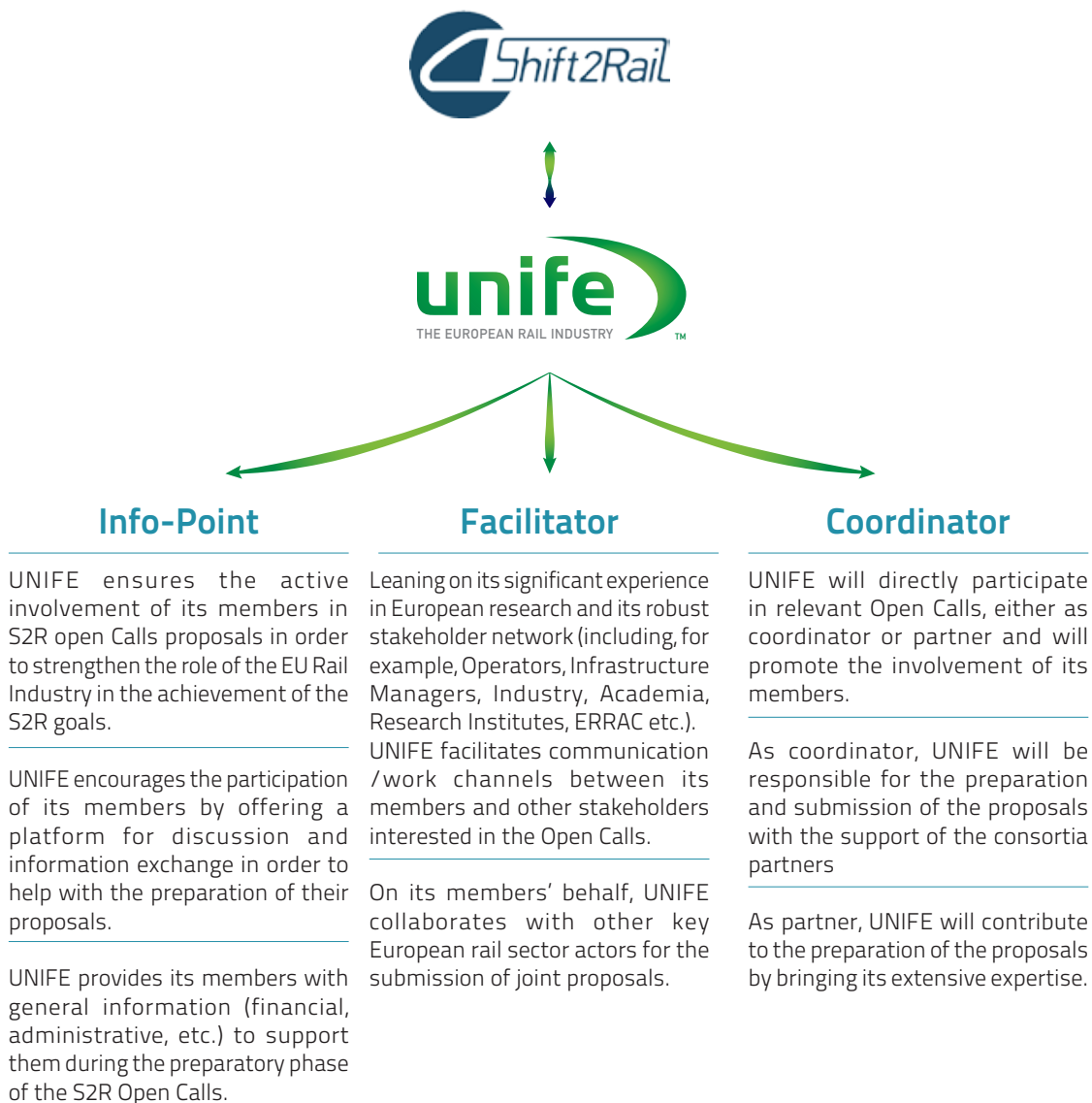
UNIFE involvement in the creation of Shift2Rail

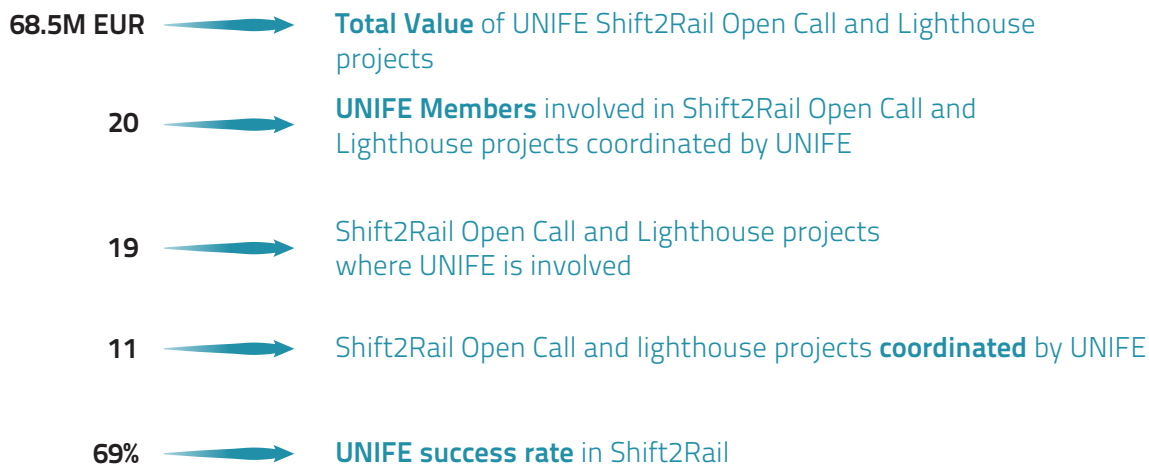
Following on research carried out by UNIFE and its members into other major EU transport rail research initiatives such as CleanSky and SESAR, UNIFE played a major role in the creation of Shift2Rail as the coordinator of the entire preparatory phase from its conception in 2009 to its formal adoption by the EU Institutions in June 2014. Specifically, UNIFE coordinated the in-depth input of hundreds of engineers and produced a detailed Technical Proposal submitted in late 2013 to the European Commission. Throughout 2013 and 2014,

UNIFE also organised and participated in national information events in 24 EU Member States with the aim of visibly increasing the number of stakeholders involved in the technical working groups of this preparatory phase. Finally, with the support of its members, UNIFE led the successful advocacy campaign to convince not only the European Commission but also the European Parliament and the 28 EU Member States to adopt the Regulation that would legally create the Shift2Rail Joint Undertaking in June 2014.

UNIFE's current and future role in Shift2Rail

UNIFE is proactively involved in the annual Open Calls and will continue to support its members by playing three crucial roles:





UNIFE is working on Shift2Rail 2.0

Staying at the forefront of research and innovation will be a key factor if Europe wants to maintain its industrial lead against the threat of foreign competition. The establishment of Shift2Rail fosters the creation of strong sectoral ecosystems bringing together a wide range of players – from the industry, academia and EU institutions – enabling them to build solid relationships together and develop strategic partnerships. Therefore, UNIFE fully supports Shift2Rail as the key platform to address future rail challenges and to deliver disruptive innovation.

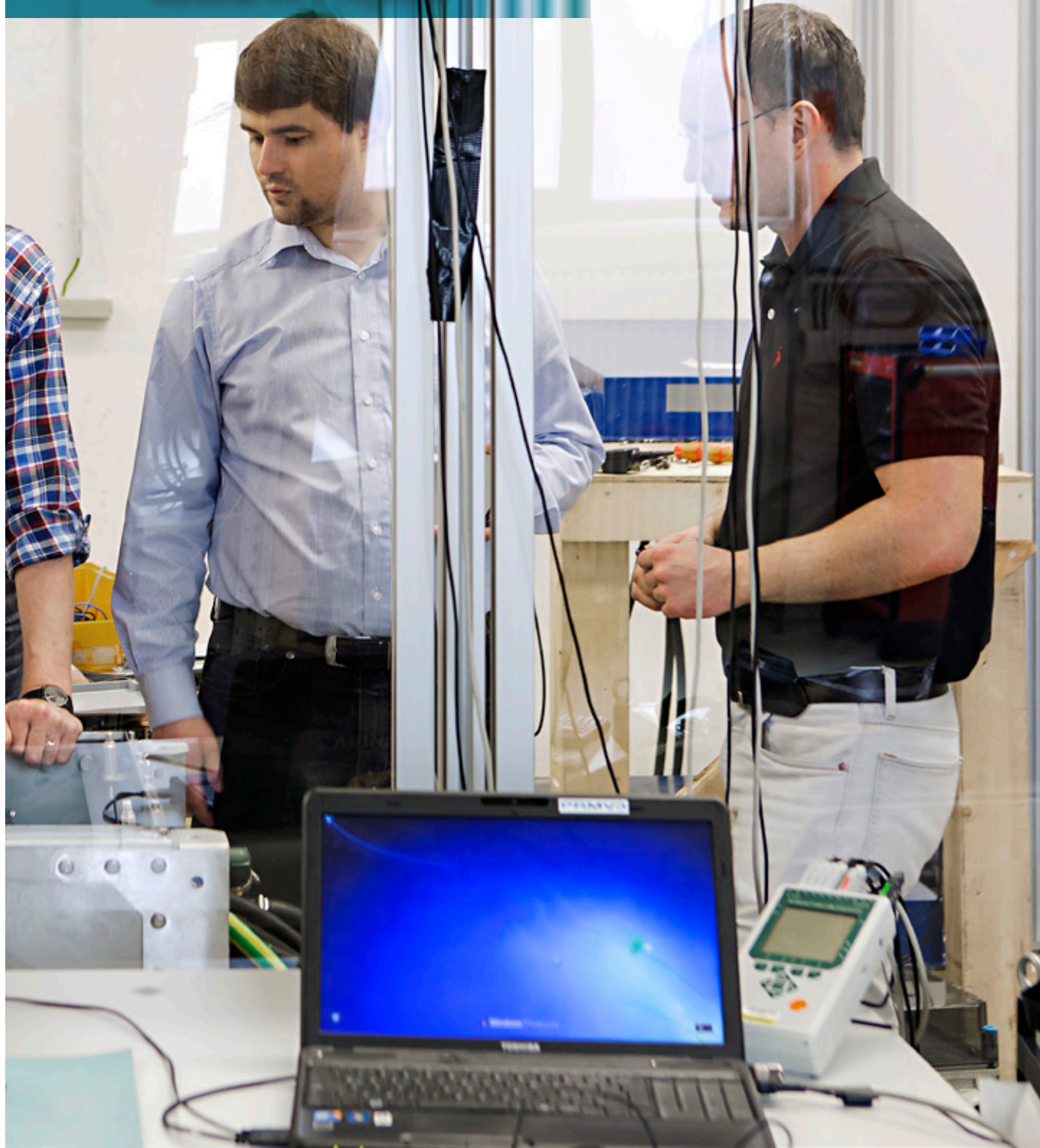
Building on the success of Shift2Rail, tomorrow's Shift2Rail 2.0 should take into account the ongoing mega-trends, especially in terms of urbanisation, growing interest for environmental issues and an ageing population. In this respect, the increasing need for shared mobility, customer-focused, digital and intermodal transport tools should be a guiding principle

of Shift2Rail 2.0 in developing solutions addressing the challenges of future urban and intercity traffic in a multimodal transport context.

The broadest range of stakeholders would eventually take advantage from the disruptive solutions Shift2Rail 2.0 will bring to the market. Automated rail transport operations, seamless & customised end-to-end journeys and digital technologies, combined with enhanced security in the whole rail system, will considerably benefit end-users – i.e. travellers and shippers – The digitisation of the supply chain with improved maintenance and energy efficiency tools will extend those benefits to the entire rail transport community.

UNIFE, with the support of the UNIFE Research and Innovation Committee and UNIFE members, is actively involved in the preparation of the Shift2Rail 2.0 programme that could start in the early 2020s.

Research Projects





Duration: 25 Months
(December 2018 - December 2020)

Budget: €2 million

Partners: 8 (1 UNIFE member)

Topics addressed: IT solutions

Links with Standards/Regulation: The project encourages both semantic interoperability and open standards, but links to Standards and Regulation will be made wherever applicable, with TAP TSI being an example

UNIFE Contact: Stefanos Gogos
(stefanos.gogos@unife.org)

Website: www.sprint-transport.eu

Relying on the foundations already set by previous projects dealing with the Interoperability Framework (IF), the Semantics for Performance and Scalable Interoperability of multimodal Transport (SPRINT) project will make steps towards the uptake of the multimodal transport ecosystem of Shift2Rail's fourth Innovation Programme (IP4), focusing on its IF. It will achieve that by addressing the following specific challenges:

- Improve IF performance and scalability to sustain a large deployment.
- Simplify/automate all the necessary steps needed to integrate new services and sub-systems in the IP4 ecosystem.

At the same time, this should be accomplished by masking the complexity of interoperability to travel applications and providing additional technical means to operate on the "web of transportation data".

Duration: 24 Months
(December 2018 - November 2020)

Budget: €1 million

Partners: 9

Subsystems addressed: Signalling and Control Systems

Links with Standards/Regulation: The project is expected to provide valuable and critical input for GNSS certification and authorization process into the ETCS/ERTMS

UNIFE Contact: Jose Bertolin
(jose.bertolin@unife.org)

Website: www.gate4rail.eu

Gate4Rail (GNSS Automated Virtualized Test Environment for RAIL) is a Shift2Rail IP2 Open Call project within the Horizon 2020 Programme aiming at complementing and contributing to the GNSS developing process in the railway sector.

The main objective of GATE4RAIL will be the definition, design and development of a geo-distributed simulation and verification infrastructure to evaluate the GNSS performances in the railway environment. GATE4RAIL foresees the identification of methodologies and tools aiming at simulating GNSS behavior in different railway scenarios and situations (nominal or in presence of global/local hazards.) and automated updating of tests environment. In these contexts, GATE4RAIL envisages to develop a standardized method to derive and describe GNSS/railway test cases and taking into account all the requirements coming from Notified Bodies to build an infrastructure capable for future approval by an Independent Safety Assessor.

Thanks to the capacity of the GATE4RAIL virtualized test facility to stress the system with very rare fault and events, it will contribute to the reduction of time, costs and resources allocated to long and expensive measurement campaigns.



IN2DREAMS

Duration: 30 Months
(September 2017 - February 2020)
Budget: €1.7 million
Partners: 9 (2 UNIFE members)
Topics addressed: Signalling and Control Systems
Links with Standards/Regulation: ERTMS, EN50159
UNIFE Contact: Jose Bertolin
(jose.bertolin@unife.org)
Website: www.etalon-project.eu

The main objective of the 'ETALON' project is the adaptation of energy harvesting methodologies for trackside and on-board signalling and communication. ETALON will contribute to the enhancement of train integrity functionalities, providing a suitable energy supply for on-board train integrity detection and a robust radio communication system between vehicles. ETALON will also contribute to the reduction of cost, providing an energy harvesting solution for Smart Radio connected wayside objects and implementing an off-board radio communication system with object controllers.

As a result, ETALON considers the specification and development of energy harvesting solutions to support on-board train integrity and Smart Radio connected wayside objects which are economically viable and suitable. It will take into consideration onboard and offboard radio communication solutions, safety critical aspects as well as reliability and availability in difficult rail environments.

Duration: 26 Months
(September 2017 – October 2019)
Budget: €2.2 million
Partners: 14 (1 UNIFE member)
Topics addressed: Energy Management, Asset Management, Energy systems
Links with Standards/Regulation: EN50463 and EN50155 standards. IEC 61968-9, IEC 62056, IEC 62051-1, ITU-T G.9955, 9956, SEGCG/M490 CEN CENELEC ETSI, ISO 50001, ISO/TC 307, ISO/IEC JTC 1/WG 9, ISO/IEC JTC 1/SC 32, ISO/IEC JTC 1/SC 38
UNIFE Contact: Stefanos Gogos
(stefanos.gogos@unife.org)
Website: www.in2dreams.eu

The predicted growth of transport, especially in European railway infrastructures, is expected to introduce a dramatic increase in freight and passenger services by the end of 2050. To support sustainable development of these infrastructures, novel data-driven ICT solutions are required. These will enable monitoring, analysis and exploitation of energy and asset information for the entire railway system including power grid, stations, rolling stock and infrastructure. IN2DREAMS (INtelligent solutions 2ward the Development of Railway Energy and Asset Management Systems in Europe) will address these challenges through two distinct work streams: WS1, focusing on the management of energy-related data and WS2, focusing on the management of asset-related data. IN2DREAMS will develop and demonstrate a modular cloud-based open data management platform (ODM) facilitating ubiquitous support of both energy and asset services.



Duration: 25 Months
(September 2017 - September 2019)
Budget: €2.7 million
Partners: 15 (2 UNIFE members)
Topics addressed: Rolling Stock
Links with Standards/Regulation: LOC&PAS, WAG, NOI TSI as well as the main mandatory and some non-mandatory related EN standards
UNIFE Contact: : Marta Andreoni
(marta.andreoni@unife.org)
Website: www.run2rail.eu

RUN2RAIL (Innovative **RUN**ning gear solu**Ti**Onsfor new dependable, sustainable, intelligent and comfortable **RAIL** vehicles) is a Shift2Rail Open Call project within the Horizon2020 Programme..

The overall objective of the project is to identify and develop the key methods and tools that are required to allow the design and manufacture of the next generation of running gear. Looking into ways to design trains that are more reliable, lighter, less damaging to the track, more comfortable and less noisy, RUN2Rail has explored an ensemble of technical developments to contribute to build a Running Gear Technology Demonstrator that paves the way for the next generation of passenger rail vehicles.



Duration: 26 Months
(September 2017 - October 2019)
Budget: €1.8 million
Partners: 6 (2 UNIFE members)
Topics addressed: Signalling and Control Systems
Links with Standards/Regulation: ERTMS/ETCS, LOC&PAS TSI, WAG TSI, CCS TSI, EN50126 and EN50129
UNIFE Contact: Marta Andreoni
(marta.andreoni@unife.org)
Website: www.astrail.eu

The main objective of the ASTRAIL project is to increase the railway sector's efficiency and safety. ASTRAIL will contribute to enhance the signalling and automation of the railway system thanks to innovative solutions that exploit cutting edge technologies already present in other sectors, such as the avionics or the automotive sector. Examination of such technologies and assessment of their reusability in the railway field will be done taking into account all issues related to safety and performance in the rail system.

ASTRail is split into 4 main technical work streams:

1. GNSS technology into the ERTMS Signalling System
2. Hazard Analysis of the railway system (with a focus on 'moving block signalling')
3. Automatic driving technologies for Automatic Train Operations
4. Formal language and method to be applied in the railway field.



Duration: 26 Months
(September 2017 - October 2019)
Budget: €0.7 million
Partners: 11
Topics addressed: Smart Maintenance
& Traveller Experience
Links with Standards/Regulation: n.a.
UNIFE Contact: Marta Andreoni
(marta.andreoni@unife.org)
Website: www.smart-rail.eu

SMARTE (**S**mart **M**aintenance and the **R**ail **T**raveller Experience) is a Shift2Rail CCA Open Call project within the Horizon2020 Programme. SMARTE brings together two related but distinct areas of research. Smart maintenance and human factors are coupled with digitisation and the use of information to enhance decision making, either by industry players in respect of maintenance decisions, or by users of the system in employing smart applications to navigate the rail system and its interaction with other modes. The challenge of the smart maintenance stream of this work (henceforth referred to as smart maintenance) is to improve current railway train maintenance systems, through the integration of predictive data analysis algorithms and online optimisation tools within an improved Condition Based Maintenance strategy.



Duration: 24 Months
(December 2017 - November 2019)
Budget: €3.1 million
Partners: 14 (1 UNIFE members)
Topics addressed: Signalling and Control Systems
Links with Standards/Regulation: The project is expected to provide valuable and critical input for ERTMS specifications and the evolution of EGNSS requirements to implement efficiently virtual balises
UNIFE Contact: Jose Bertolín
(jose.bertolin@unife.org)
Website: www.ersat-ggc.eu

The ERSAT GGC project aims to fill the last but fundamental gap before putting into service the ERSAT. This system will enable the European Rail Traffic Management System (ERTMS) to use satellite services, after it has been demonstrated that satellite technology can withstand the certification process for rail operations.

Primary goals of ERSAT GGC are to allow RFI (Rete Ferroviaria Italiana) to launch an operational line by 2020, the same year Galileo services will be operational and to accelerate the standardisation process at European level for including the satellite requirements into the new ERTMS STI (Standard for Technical Interoperability).



Duration: 20 Months

(November 2016 - June 2018)

Budget: €1 million

Partners: 10 (1 UNIFE member)

Topics addressed: Rolling Stock

Links with Standards/Regulation: CCS TSI and OPE TSI, EN50239, EN50126 and EN50129

UNIFE Contact: Nicolas Furio

(Nicolas.furio@unife.org)

Website: www.dynafreight-rail.eu

DYNAREIGHT (Innovative technical solutions for improved train DYNAMics and operation of longer FREIGHT Trains) is a Shift2Rail IP5 Open Call project within the Horizon2020 Programme. DYNAREIGHT will contribute to the next railway freight propulsion concepts addressing two main topics: freight running gear for locomotives and operation of long freight trains. The high-level objectives are:

- Improved performances: traction, speed, running dynamics and wheel/rail efforts;
- Reduced rail freight noise at the source;
- Enhance capacity/traffic throughput with the operation of longer trains (up to 1,500m);
- Reduced of operation and maintenance costs (reduce wheel and rail wear, smarter maintenance, etc.).



Duration: 24 Months

(November 2016 - October 2018)

Budget: €2 million

Partners: 16 (2 UNIFE members)

Topics addressed: IT solutions

Links with Standards/Regulation: The project encourages both semantic interoperability and open standards, but links to Standards and Regulation will be made wherever applicable, with TAP TSI being an example

UNIFE Contact: Stefanos Gogos
(stefanos.gogos@unife.org)

Website: www.gof4r.eu

The primary objective of the **G**overnance of the Interoperability Framework **f**or Rail and Intermodal Mobility (GoF4R) project is to define sustainable governance for the Interoperability Framework (IF) that will create the right conditions to introduce seamless mobility services and foster the development of multi-modal travel services. GoF4R will help overcome the obstacles that are currently impeding on the development of market innovation and will improve a large acceptance of the semantic web for transportation. Another key objective is to ensure the appropriate dissemination of key concepts, progress and communication strategy within the Shift2Rail community and towards the global ecosystem and future users of Shift2Rail's fourth Innovation Programme (IP4). Participants of the IP4 Technology Demonstrators (TDs) will therefore play the role of the IP4 ambassador towards the EC organisation and any other key stakeholder's communities such as TAP-TSI, Full Service Model (FSM), Smart Ticketing Alliance (STA) and any other connected initiatives.

Duration: 24 Months

(November 2016 - October 2018)

Budget: €1 million

Partners: 8 (1 UNIFE member)

Topics addressed: IT solutions

Links with Standards/Regulation: The project encourages both semantic interoperability and open standards, but specific links with TAP TSI and Full Service Model (FSM) are made in the project

UNIFE Contact: Stefanos Gogos
(stefanos.gogos@unife.org)

Website: www.st4rt.eu

The primary objective of the ST4RT (Semantic Transformations for Rail Transportation) project is research in semantic, ontology-based automation of transformations between heterogeneous data formats and its application to a complex 'after-sales' process use case in an actual run-time demonstration scenario. The demonstrator tool will therefore provide ontology-based transformations between different standards and protocols, resulting in enhanced semantic interoperability between disparate, heterogeneous legacy systems.

Such transformation technology is essential to achieve the goals for the Interoperability Framework (IF) that will provide the right tools in order to introduce seamless mobility services, foster the development of multi-modal travel services and help to overcome the obstacles currently hindering the development of market innovation and limiting a large acceptance of the semantic web for transportation.



Duration: 30 Months

(May 2015 - October 2017)

Budget: €16 million

Partners: 31 (9 UNIFE members)

Topics addressed: Rolling Stock

Links with Standards/Regulation: IEC 61375, EN 12663, EN 15227, TSI Electromagnetic compatibility with train detection systems, TSI requirements for Brakes

UNIFE Contact: Nicolas Furio

(Nicolas.furio@unife.org)

Website: www.roll2rail.eu

Roll2Rail is a research project which aims to develop key technologies that will overcome hurdles to innovation in rolling stock development and forms part of a longer-term strategy towards revolutionising today's rolling stock. Roll2Rail focuses on technological innovations in different subsystems of the vehicles which contribute to identified objectives of the vehicle and railway system level in terms of capacity, reliability, efficiency, comfort and life cycle cost improvements.



Duration: 36 Months

(May 2015 - April 2018)

Budget: €12 million

Partners: 27 (4 UNIFE members)

Topics addressed: IT solutions

Links with Standards/Regulation: The project encourages both semantic interoperability and open standards, but links to Standards and Regulation will be made wherever applicable, with TAP TSI being an example

UNIFE Contact: Stefanos Gogos

(stefanos.gogos@unife.org)

Website: www.it2rail.eu

The IT2Rail (Information Technologies for Shift2Rail) project was a first step towards the long term IP4 -'IT Solutions for Attractive Railway Services', one of the Shift2Rail Joint Undertaking's Innovation Programmes. Through the introduction of radical new technologies and solutions, the European citizen's global travel interactions will be revamped into a fully integrated and customised experience, rendering a natural extension of citizens' work and leisure environments to the entire European transportation system, across all modes, local and long-distance, public and private.

IT2Rail aimed at creating:

- A seamless travel experience: a complete multimodal travel system, connecting the first and last mile to long distance journeys combining air, rail, coach and other services.
- Seamless access to all travel services: enhancing the travel experience through the integration of an abundance of travel services supported by innovative digital technologies.



Duration: 36 Months
(May 2015 - April 2018)

Budget: €18 million

Partners: 54 (14 UNIFE members)

Topics addressed: Railway Infrastructure / Energy / Traffic Management

Links with Standards/Regulation: The results of the project are related and may contribute to the following TSIs and Standards: INF TSI, Energy TSI, Wagon TSI, TAF TSI, SRT TSI, railML, EN50152, EN50388

UNIFE Contact: Nicolas Furio
(Nicolas.furio@unife.org)

Website: www.in2rail.eu

The In2Rail (Innovative Intelligent Rail) project aims to set the foundations for a resilient, consistent, cost efficient, and high capacity European network by delivering important building blocks that unlock the innovation potential in Shift2Rail. Innovative technologies will be explored, and the resulting concepts will be embedded in a systems framework where infrastructure, information management, maintenance techniques, energy and engineering are integrated, optimised, shared and exploited. In2Rail will take steps towards the Shift2Rail objectives including: enhancing the existing capacity and fulfilling user demand, increasing the reliability by delivering better and consistent quality of service and reducing life cycle cost resulting in increased competitiveness of the European rail system. To achieve the above, a holistic approach covering Smart Infrastructures, Intelligent Mobility Management (I2M) and Rail Power Supply and Energy Management will be applied.

Duration: 34 Months

(February 2016 - November 2018)

Budget: €4.5 million

Partners: 17 (6 UNIFE members)

Subsystems addressed: Signalling and Control Systems

Links with Standards/Regulation: The project is expected to provide the valuable and critical input to ERTMS specifications.

UNIFE Contact: Jose Bertolin
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Website: www.stars-rail.eu

The STARS (Satellite Technology for Advanced Railway Signalling) project aims to fill the gap between the ERTMS needs for safety-critical applications and E-GNSS services, through the characterisation of the railway environment and the assessment of GNSS performance in that environment.

Key objectives of the project are:

- To develop a universal approach to predict achievable GNSS performance, especially for safety-critical applications within ERTMS, and to determine the necessary evolution of ETCS to include GNSS services;
- To quantify the economic benefits through reduction of cost, which will increase the market appeal of ERTMS;

The STARS project finalized in November 2018 with a Final Conference at GSA premises that gathered 50 experts from rail and aerospace sector. The event was a good opportunity for Work Package Leaders to present the main results of the project and establish a proactive and instructive dialogue between the participants to discuss the results, upcoming activities and potential benefits for end-users.



Duration: 36 Months
(September 2013 - February 2017)

Budget: €10.96 million

Partners: 21 (7 UNIFE members)

Topics addressed: Control Systems

Links with Standards/Regulation: The project is expected to provide the valuable input to specifications for both ERTMS and various standards regarding mass transit train control systems

UNIFE Contact: Jose Bertolin
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Website: www.ngtc.eu

Next Generation Train Control (NGTC) is the first research project partially funded by the European Commission under the 7th Framework Programme, where all main rail system signalling suppliers together with mainline operators and infrastructure managers and urban rail operators collaborate to develop the next generation of train control systems.

The technical objective of the project is to pave the way for standardised train control systems for mainline and urban domains which provide complete ATP (Automatic Train Protection), ATO (Automatic Train Operation), and ATS (Automatic Train Supervision) functionality and support train operation from Grade of Automation GOA0 to GOA4.

In addition to the development of the next generation train control systems specifications, the project is specifically focusing on the evolution of functionalities such as Moving Block, IP-Based Radio Communication or Satellite Positioning for ERTMS.

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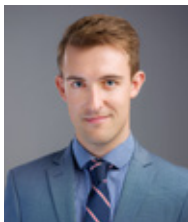
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For more information on all UNIFE activities (Standardization, Public Affairs, ERTMS, IRIS Certification™, ERWA) please visit www.unife.org

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➤ Promoting Rail Market Growth for Sustainable Mobility ➤

How UNIFE Works:

I. Public Affairs

- Advocating policies that increase the global competitiveness of the European Rail Supply Industry
- Supporting modal shift policies that give priority to rail
- Encouraging investment in rail projects
- Promoting rail transport as the best solution to meet social challenges of the future

III. European Rail Research

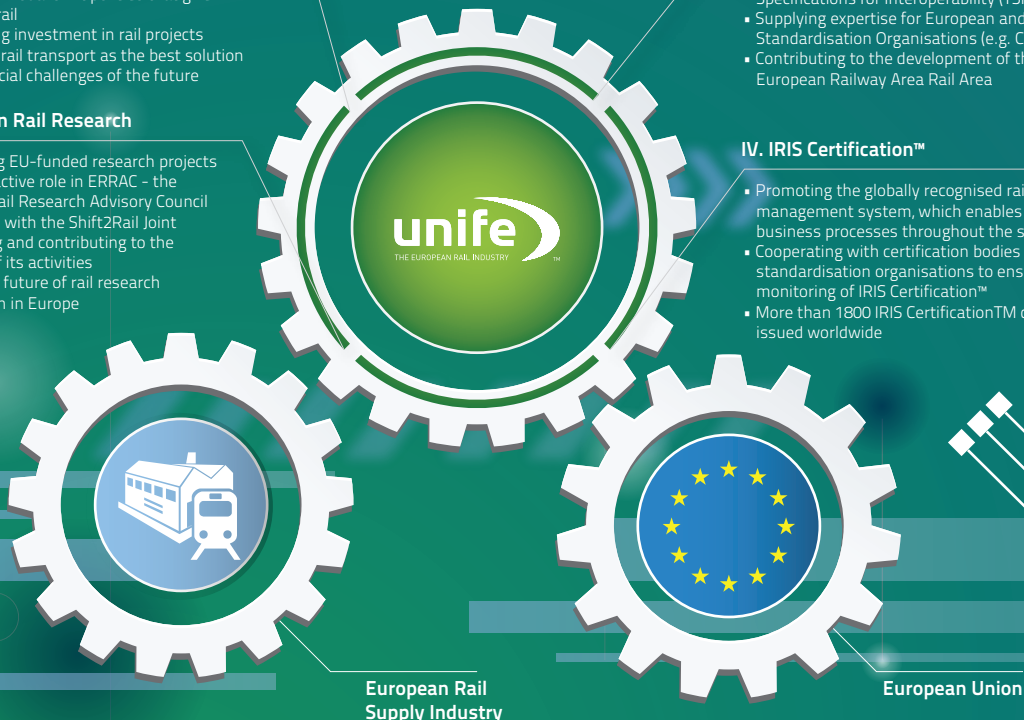
- Coordinating EU-funded research projects
- Playing an active role in ERRAC - the European Rail Research Advisory Council
- Cooperation with the Shift2Rail Joint Undertaking and contributing to the follow-up of its activities
- Shaping the future of rail research & innovation in Europe

II. Standardization & Harmonisation

- Collaborating with the EU Agency for Railways on the definition of rail regulations (including the Technical Pillar of the Fourth Railway Package) and Technical Specifications for Interoperability (TSIs)
- Supplying expertise for European and International Standardisation Organisations (e.g. CEN/CENELEC, ISO)
- Contributing to the development of the Single European Railway Area Rail Area

IV. IRIS Certification™

- Promoting the globally recognised rail quality management system, which enables efficient business processes throughout the supply chain
- Cooperating with certification bodies and standardisation organisations to ensure the monitoring of IRIS Certification™
- More than 1800 IRIS Certification™ certificates issued worldwide



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