

Railway Research and Innovation

The role of the UIC

Research and Innovation activities in UIC

UIC research and innovation activity has both a Global and a European focus.

UIC runs internal research and innovation projects and studies at the initiative of its members. Project proposals are initiated by the expert working bodies and co-funded by members.

Some current examples are projects on the Future Railway Mobile Communication System (FRMCS) and using drones to inspect bridges (DRONE4RAIL).

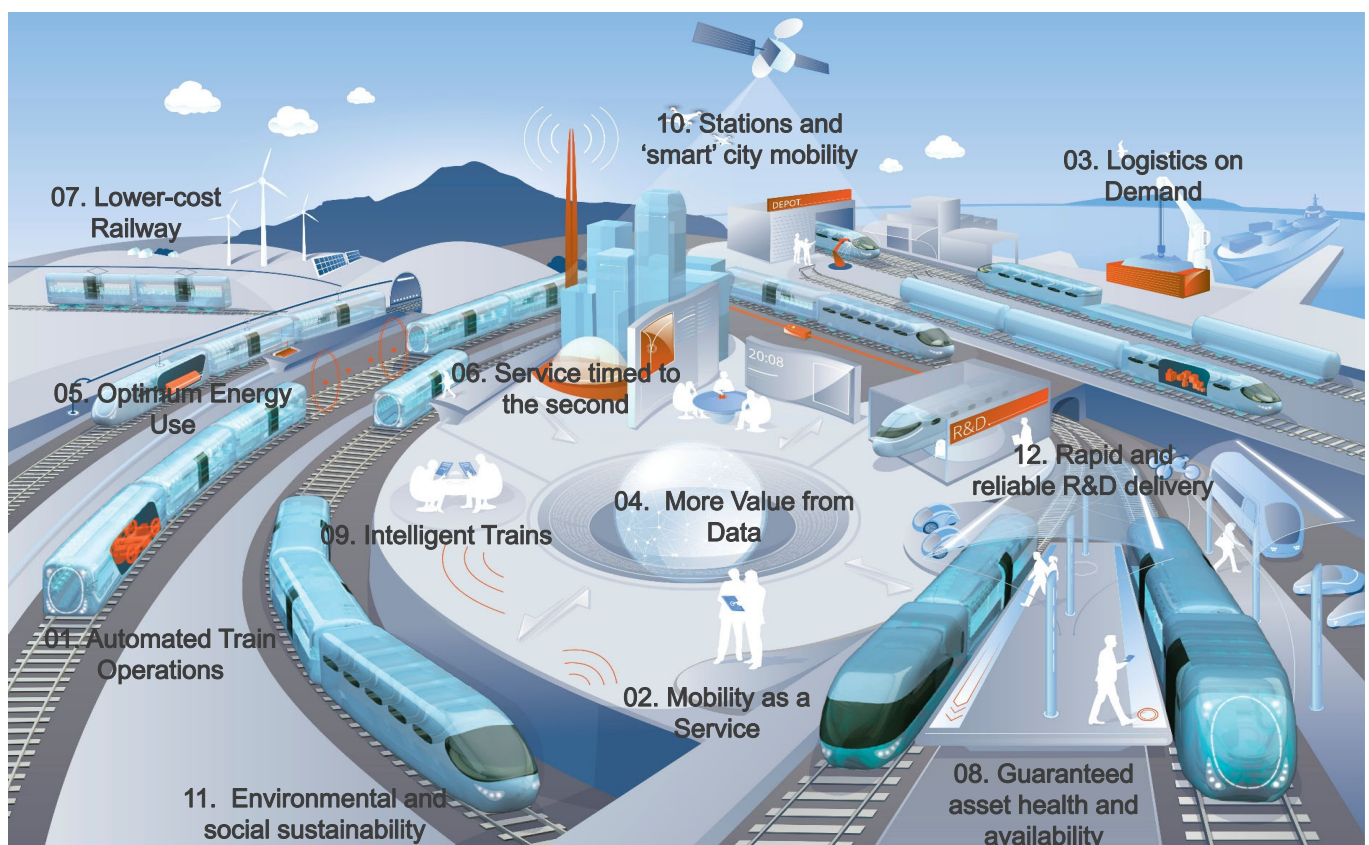
On behalf of its members, UIC has for many years supported their involvement in projects, with technical expertise, feedback input – user requirements etc.- disseminating the project results and in the role of project coordinator.

UIC has led work to specify the most important capabilities of the railway system of the future (The 12 Capabilities).

UIC is one of the founding members of ERRAC since 2001 and with UNIFE is one of the main contributors to ERRAC also in terms of funding the secretariat.

Besides the main working bodies (Platforms and Forums) and a number of technical expert groups covering very specific topics, there are two main working bodies dealing with Research & Innovation: **The Research & Innovation Coordination Group – RICG (European focus)** and the **International Rail Research Board – IRRB** (global level). RICG's recent work has included defining the next stage to deliver the capabilities, specifying topic areas for 'big projects' to be included in the next EU funded research programmes, and inputs to the overall design and governance of those programmes (Horizon Europe). IRRB used learning from its 'Global Debate on Mobility Challenges' held in Warsaw, to inform the development of its strategy and work programme. Transport system resilience, cyber-security and horizon-scanning techniques were explored, as key attributes needed by the future railway and its research function.

Developing the Capabilities of the Railway



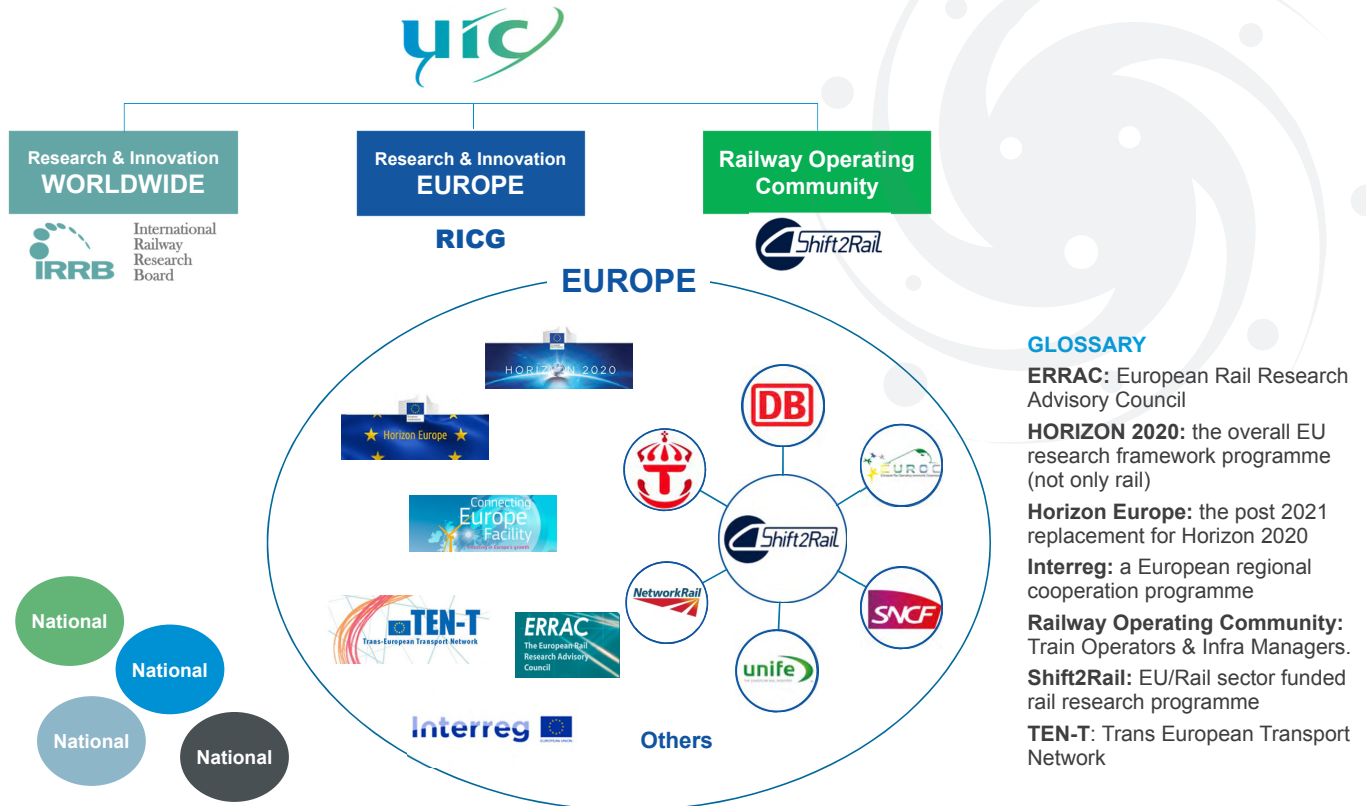
Picture courtesy of RSSB

The work of these groups is based upon the main strategy documents of the UIC such as the “Railway Technical Strategy Europe – RTSE and the Global Vision for Railway Development II – GVRDII, <https://uic.org/research/>.

In a nutshell, the strategy under both documents is that rail should become the backbone of mobility and our research therefore be dedicated to delivering this.

The diagram below shows the principal actors relating to UIC in the galaxy of research and innovation, including the global, European and national level organisations and associations.

UIC and... the European Research & Innovation Galaxy



The Research and Innovation Coordination Group (RICG)

Main tasks:

- Identifying and coordinating members' R&I needs and interests;
- Supporting ERRAC activities and developing a common vision;
- Monitoring Shift2Rail, the main railway research delivery programme in Europe, from the perspective of railway operators;
- Acting as a platform for the exchange of information.

RICG meets four times a year and consists of a Steering Committee and three Working Groups (WG):

Working Group 1: Vision & Strategy

This group actively develops the railway operating community's strategic vision for research and innovation, including support for ERRAC's 'Rail 2050 Vision' and 'Rail 2030 Priorities' publications.

Specifically, it developed and delivered the 12 Capabilities which have been adopted in the sector's key strategy documents and the work programme of Shift2Rail.

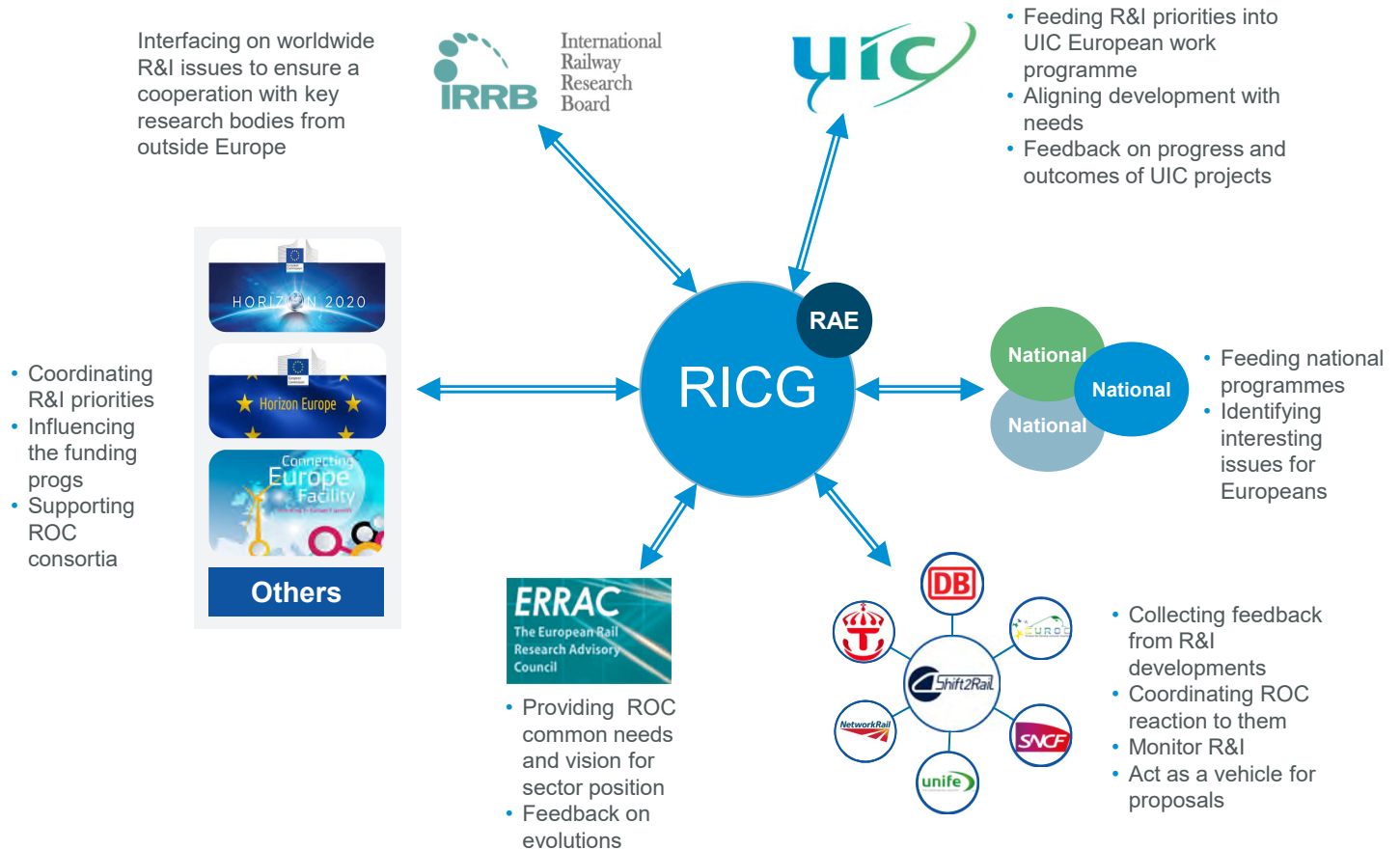
Working Group 2: Common Collaboration

This group supports members to work together to develop research efficiently to deliver the vision and strategy and avoid duplication. It has led the work to produce two handbooks of the projects in which RICC and its members have participated (one specifically for EU-funded projects).

Working Group 3: Liaison

This group promotes effective communication both inside RICC and externally. Its deliverables have included updates for UIC's RICC webpage.

RICG direct influences



This diagram shows the principal interfaces between UIC's Research and Innovation Coordination Group and European rail research.

Shift2Rail is a joint EU/railway sector-funded research programme comprising both railway undertakings, Infrastructure Managers and manufacturing companies. RICG acts to coordinate the involvement of RUs that are involved in S2R. UIC also has facilitated the EUROCC Consortium of railway undertakings and InfraManagers, an Associate Member of S2R.

The UIC is engaged in many of the open calls issued by Shift2Rail, most in collaboration with other stakeholders.

TRA – Transport Research Arena



UIC participates in TRA through ERRAC which represents the rail sector on the Management, Programme and Organising Committees.

Following the increasingly successful railway participation in TRAs in Warsaw 2016 and Vienna 2018, preparations are well advanced for Helsinki 2020. Plans feature a railway themed Special Focus Session, railway speakers at several of the Strategic Sessions and an exhibition stand.

Examples of UIC participation in recent EU-funded projects are:

OPEUS (Modelling and strategies for the assessment and Optimisation of Energy USage aspects of rail innovation) develops a simulation methodology and accompanying modelling tool to evaluate, improve and optimise the energy consumption of rail systems, with a particular focus on in-vehicle innovation.

OPTIYARD (Optimised Real-time Yard and Network Management) will provide decision support tools to yard managers with consideration of the surrounding network with a view to ensuring problem-free marshalling, essential for the overall efficiency of the transport chain (Shift2Rail open call).

SAFER-LC (Safer level crossings by integrating and optimising road-rail infrastructure management and design), aimed at improving safety and minimising risk by developing a fully integrated cross-modal set of innovative solutions and tools for the proactive management and design of level-crossing infrastructure.

TER4RAIL, aimed at reinforcing cooperation between rail-related stakeholders to improve the efficiency of research in the rail sector in order to facilitate emerging innovative ideas and cross-fertilisation of knowledge from other disciplines or of disruptive technology and innovation (Shift2Rail open call).

The International Railway Research Board (IRRB)



Main tasks:

➤ **Promoting** effective and efficient research and development activities by UIC members around the world, to learn from each other and contribute to railway global development.

As an example, the IRRB took the initiative to plan and organise a future-oriented event, called the “Global Debate on Mobility Challenges for the Future Society”, in Warsaw, Poland in November 2018. It created the opportunity to stimulate an “out of the box” discussion on transport needs and the ideal transport system in 2050 and the role of railways/ guided transport systems therein. This fed into and benefited, the final version of the update of the Global Vision on Railway Development (GVRDII).

The aim of GVRDII is to:

- Help railways develop and optimise rail systems of the future in order to take advantage of opportunities and satisfy growing customer and societal requirements,
- Identify best practice in order to provide examples and guidance; most appropriate examples of best practice provided as case studies from in and outside the railways,
- Support the Rail Operating Community in making rail more attractive to users and eventually to establish rail as the backbone of the transport system.

➤ **Informing** research institutions of the research needs and activities of each UIC Working Body (e.g. Rail System Forum, Passenger Forum, Freight Forum and Platforms).

This has allowed powerful stakeholder input from academics and others to focus on and improve the work being undertaken in key areas such as train control systems of the future, freight train efficiency, and overcoming human factors issues such as cross-border communications barriers.

➤ **Discussing** common regional research needs and priorities.

For example, this fed into the recent UIC publication of the Strategic Action Plan for UIC Middle East Railways 2018-20 and will inform the development of further UIC Regional strategies.

➤ **Organising** the UIC Research and Innovation Awards.

These awards recognise the achievements of rail researchers in six main categories relating to the main areas of the railway system, plus two honorary awards, the UIC Lifetime Achievement Award and the Young Researcher Award.

