



INTERNATIONAL UNION
OF RAILWAYS

UIC

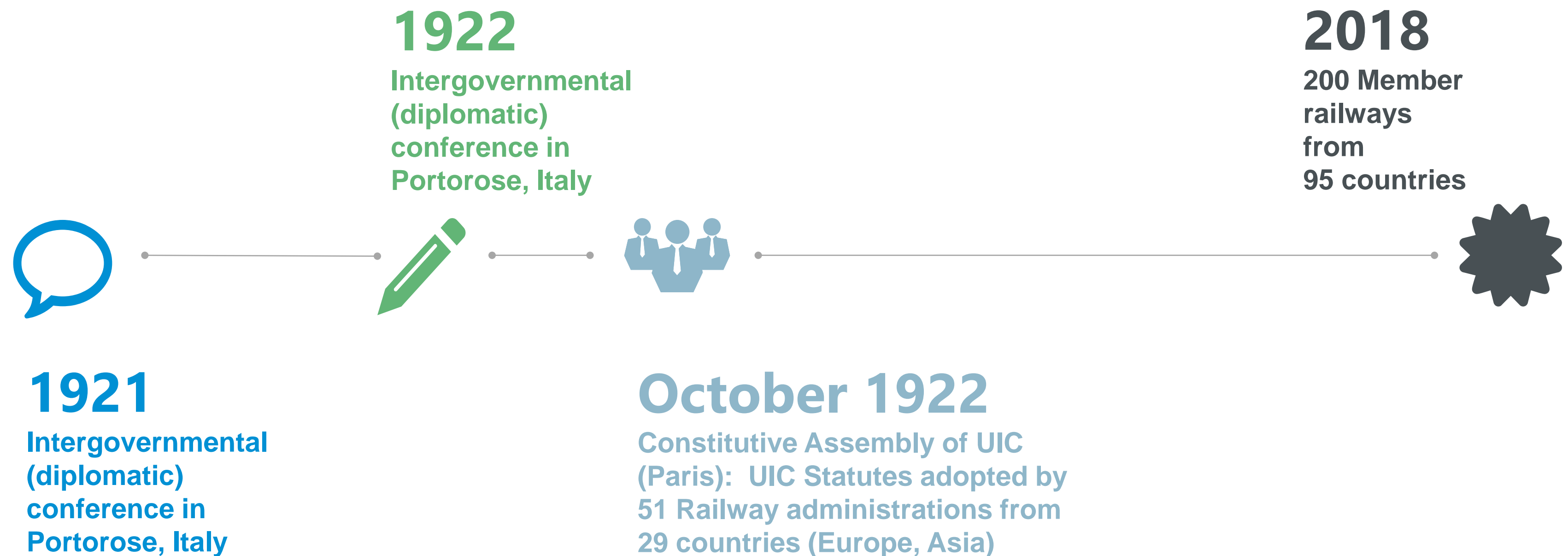
The worldwide railway organization

**International Scientific Discussion
Issues - European Railway Research**

PRAHA, 4.10.2018

Jozef FAZIK
UIC Senior Advisor

UIC, a long history at the service of member railways and international railway cooperation



UIC today

200

members in 95
countries

3,000

billion
passenger
kilometres

10,000

billion tonnes
kilometres

1

million
kilometres of
lines

7

million rail
personnel

Cooperation

with over **100**
institutions

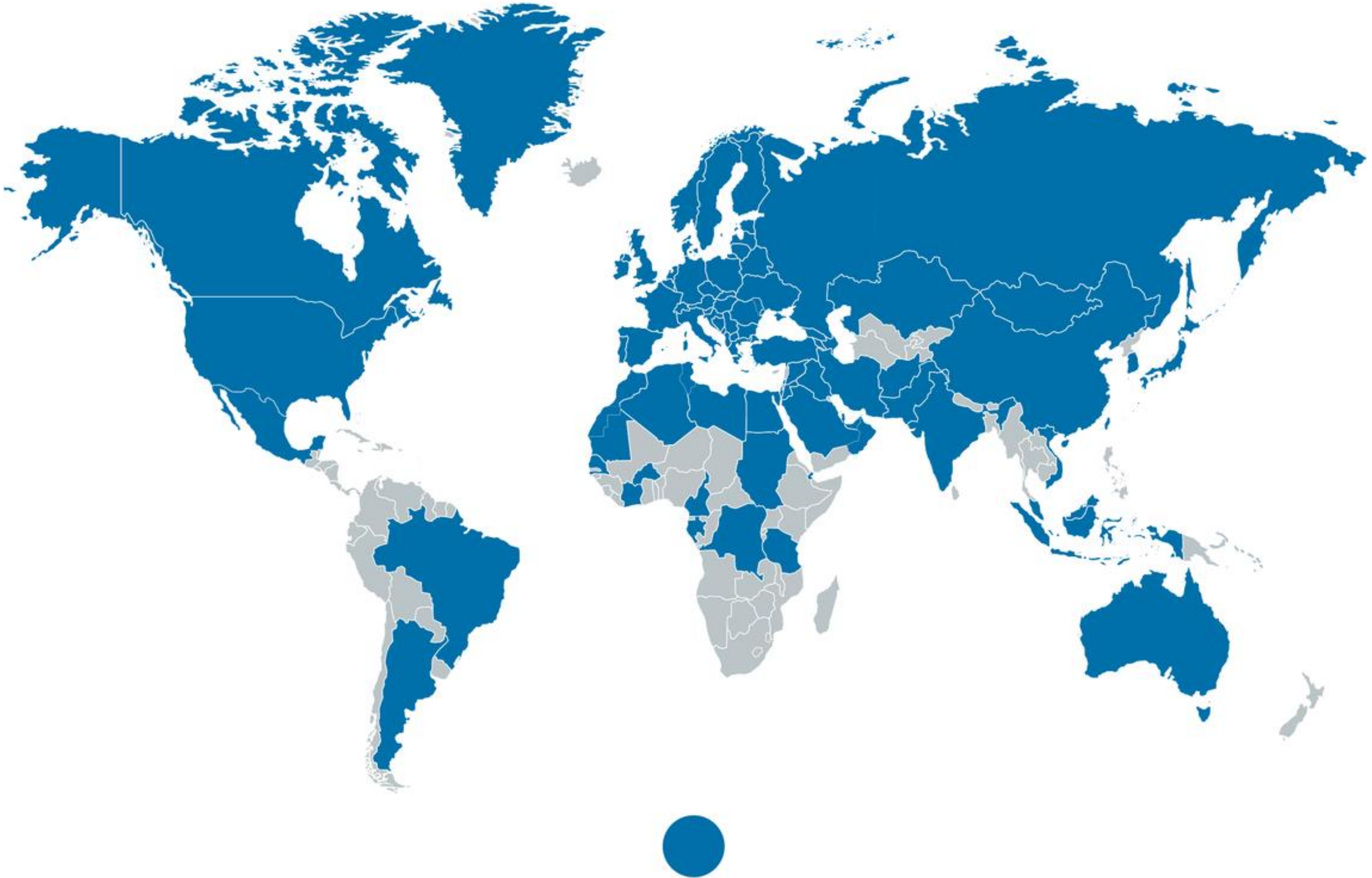
700

UIC Leaflets –
New International
Railway Solutions
(IRS)

80

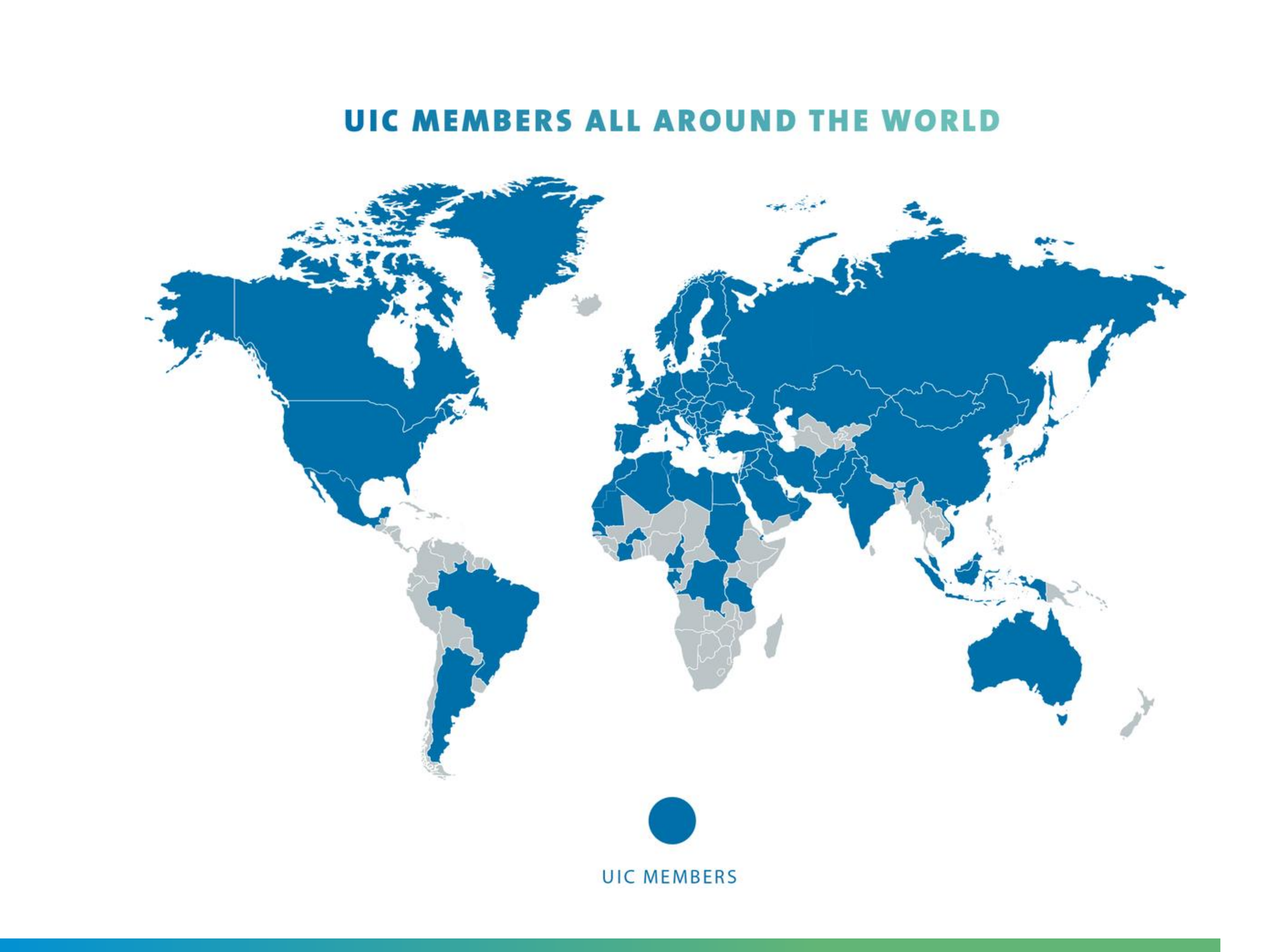
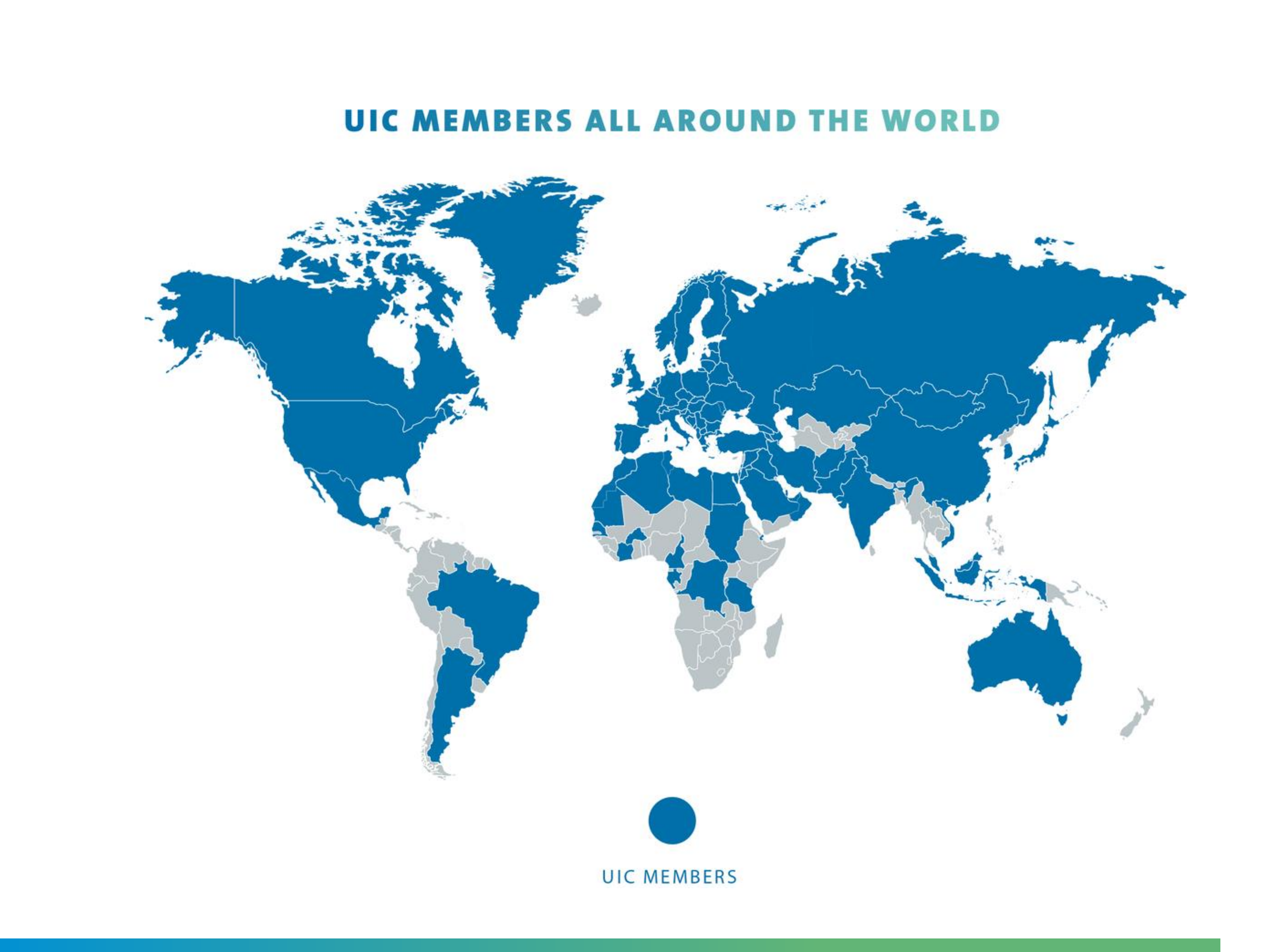
congresses,
conferences,
workshops

UIC MEMBERS ALL AROUND THE WORLD



A world map illustrating the global distribution of UIC members. Countries are color-coded: blue for UIC members and grey for non-members. UIC members are located in North America (USA, Canada), South America (Brazil, Argentina), Europe (UK, France, Germany, Italy, Spain, Portugal, Ireland, Poland, Czech Republic, Slovakia, Hungary, Austria, Switzerland, Belgium, Netherlands, Luxembourg, Denmark, Sweden, Norway, Finland, Iceland, Greece, Turkey, Cyprus, Bulgaria, Romania, Serbia, Croatia, Slovenia, Albania, Montenegro, Bosnia and Herzegovina, Macedonia, Kosovo, Albania, Bulgaria, Romania, Serbia, Croatia, Slovenia, Albania, Montenegro, Bosnia and Herzegovina, Macedonia, Kosovo), Africa (Egypt, Libya, Tunisia, Algeria, Morocco, Mauritania, Mali, Niger, Chad, Sudan, Ethiopia, Kenya, Uganda, Rwanda, Burundi, Tanzania, Zambia, Botswana, Namibia, South Africa, Lesotho, Swaziland, Mozambique, Zimbabwe, Malawi, Angola, Namibia, South Africa, Lesotho, Swaziland, Mozambique, Zimbabwe, Malawi, Angola), Asia (Russia, China, India, Pakistan, Bangladesh, Nepal, Bhutan, Myanmar, Thailand, Laos, Cambodia, Vietnam, Philippines, Indonesia, Malaysia, Singapore, Brunei, Timor-Leste, Australia, New Zealand), and Oceania (Australia, New Zealand). Non-members are located in South America (Colombia, Venezuela, Peru, Ecuador, Bolivia, Paraguay, Uruguay, Chile, Argentina), Africa (Libya, Tunisia, Algeria, Morocco, Mauritania, Mali, Niger, Chad, Sudan, Ethiopia, Kenya, Uganda, Rwanda, Burundi, Tanzania, Zambia, Botswana, Namibia, South Africa, Lesotho, Swaziland, Mozambique, Zimbabwe, Malawi, Angola, Namibia, South Africa, Lesotho, Swaziland, Mozambique, Zimbabwe, Malawi, Angola), Asia (Russia, China, India, Pakistan, Bangladesh, Nepal, Bhutan, Myanmar, Thailand, Laos, Cambodia, Vietnam, Philippines, Indonesia, Malaysia, Singapore, Brunei, Timor-Leste, Australia, New Zealand), and Oceania (Australia, New Zealand).

UIC MEMBERS

[illegible]

UIC Governance



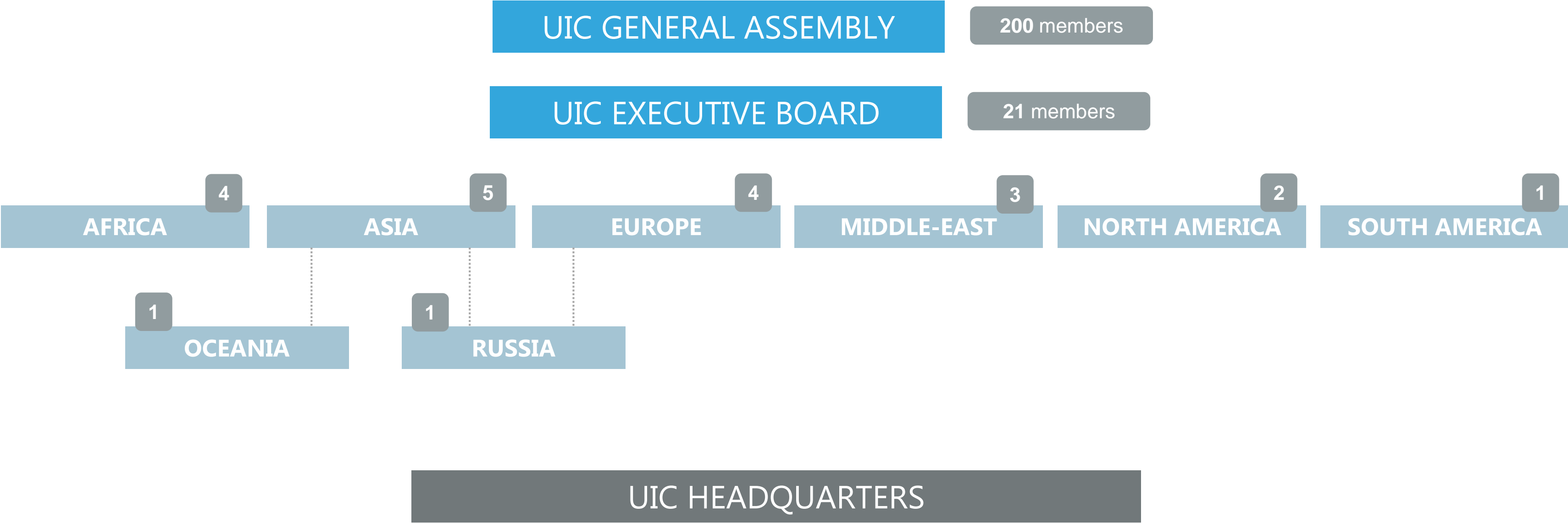
İsa **APAYDIN**
VICE CHAIRMAN



Gianluigi **CASTELLI**
CHAIRMAN



Jean-Pierre **LOUBINOUX**
DIRECTOR GENERAL



UIC, its **missions**

**Promoting the development
of rail transport at world
level**

**in order to meet
challenges of mobility
and sustainable
development**

KEY CHALLENGES IN TERMS OF

INNOVATION

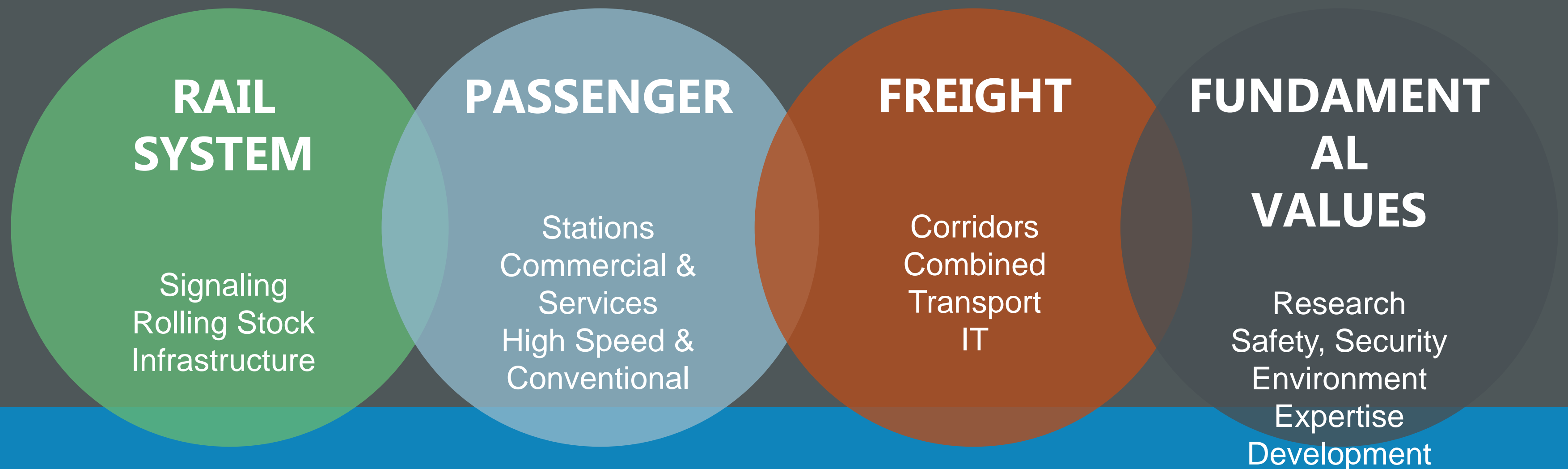
STANDARDISATION

TRANSMISSION

DISSEMINATION

STRATEGIC ADVICE

UIC organisation structure



COMMUNICATIONS • **INSTITUTIONAL RELATIONS** • **HR & SOCIAL** •
FINANCE

UIC global cooperation issues serving the entire railway community



**Environment &
Sustainable Development**



Safety & Security



**Freight / Intercontinental
corridors**



**Railway Signalling &
Control Command**



Standardisation
UIC leaflets, IRS (International
Railway Solutions)

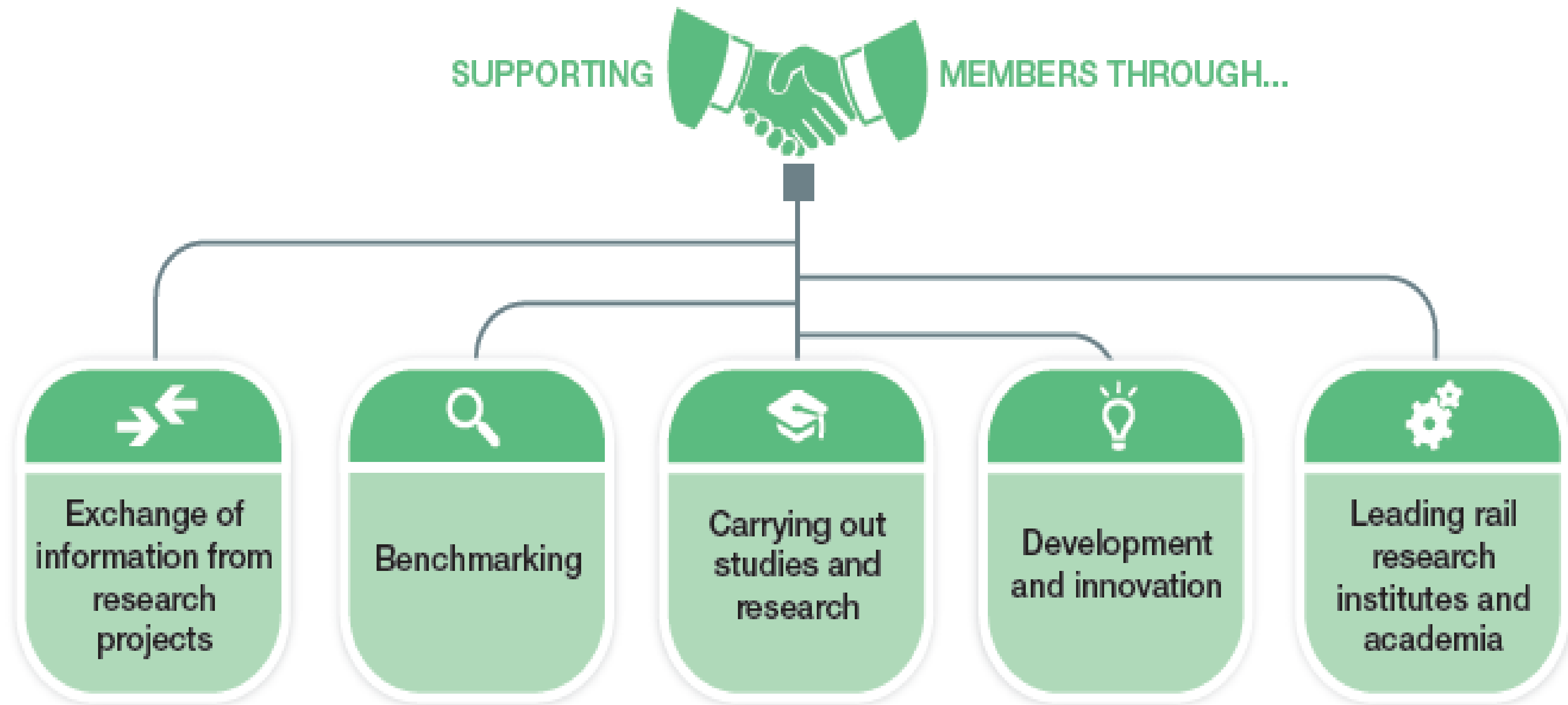


**Research
& Expertise development**



Railway Research and Innovation

UIC plays a crucial role as **driver, disseminator, knowledge manager**, as well as a **platform for discussion and exchange of experience and best practice**.



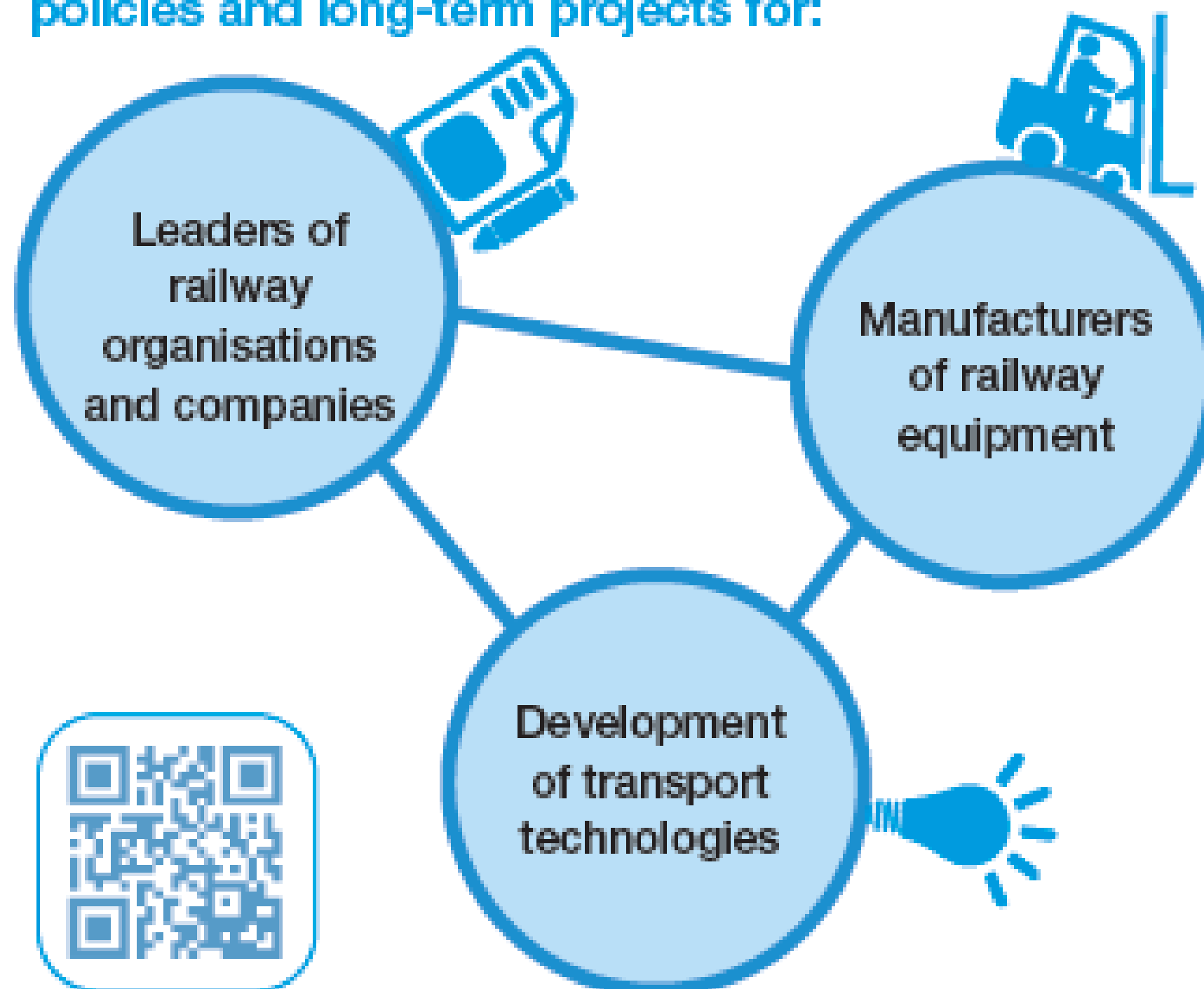
Research is a core and fundamental task of UIC, supporting the efforts of its members in their need to resolve operational issues and problems.

For the last 20 years UIC has been involved in research and development programmes.

The value of carrying out research in close cooperation with other partners, and jointly delivering its results, is much more efficient than for it to be developed individually.

Vision & Innovation

The GVRD is a benchmark to help create policies and long-term projects for:

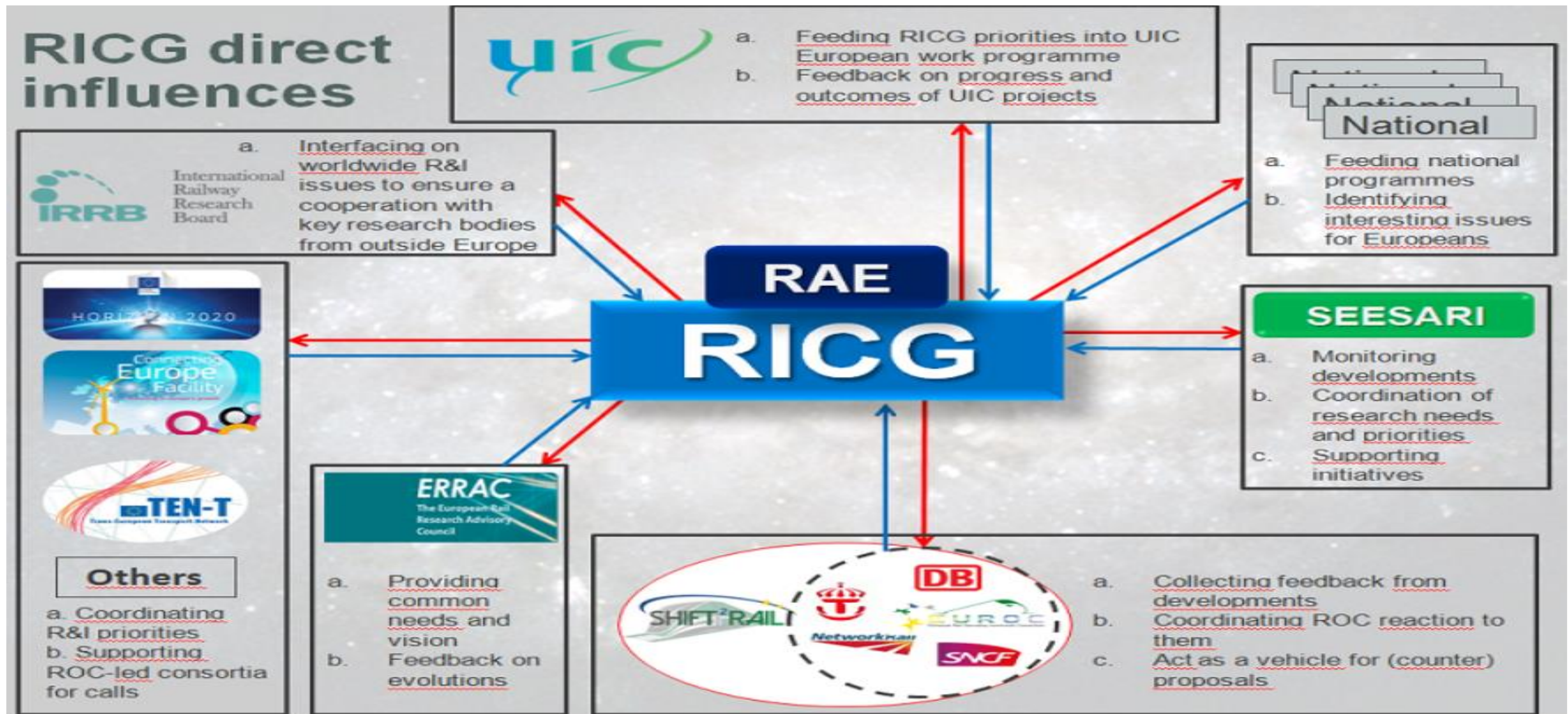


UIC has developed a strategic document called the **Global Vision for Railway Development (GVRD)**, to meet the challenges of research and innovation in the rail sector.

It provides a broad spectrum of possible measures and targets for the innovation of rail transport for the coming decades and is reviewed periodically in consultation with the UIC working bodies and its Regional Assemblies.

On a European level, UIC helps to deliver the objectives of the vision document “Challenge 2050” through the **Research and Innovation Coordination Group (RICG)**.

And UIC is involved in the joint undertaking programme called “Shift2Rail”*.



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

The RICG meets four times a year linked to around important UIC meetings (European Management Committee Assistants EMCA, European Management Committee EMC, Regional Assembly for Europe RAE, etc.) and consists of a Steering Committee and three Working Groups (WG):

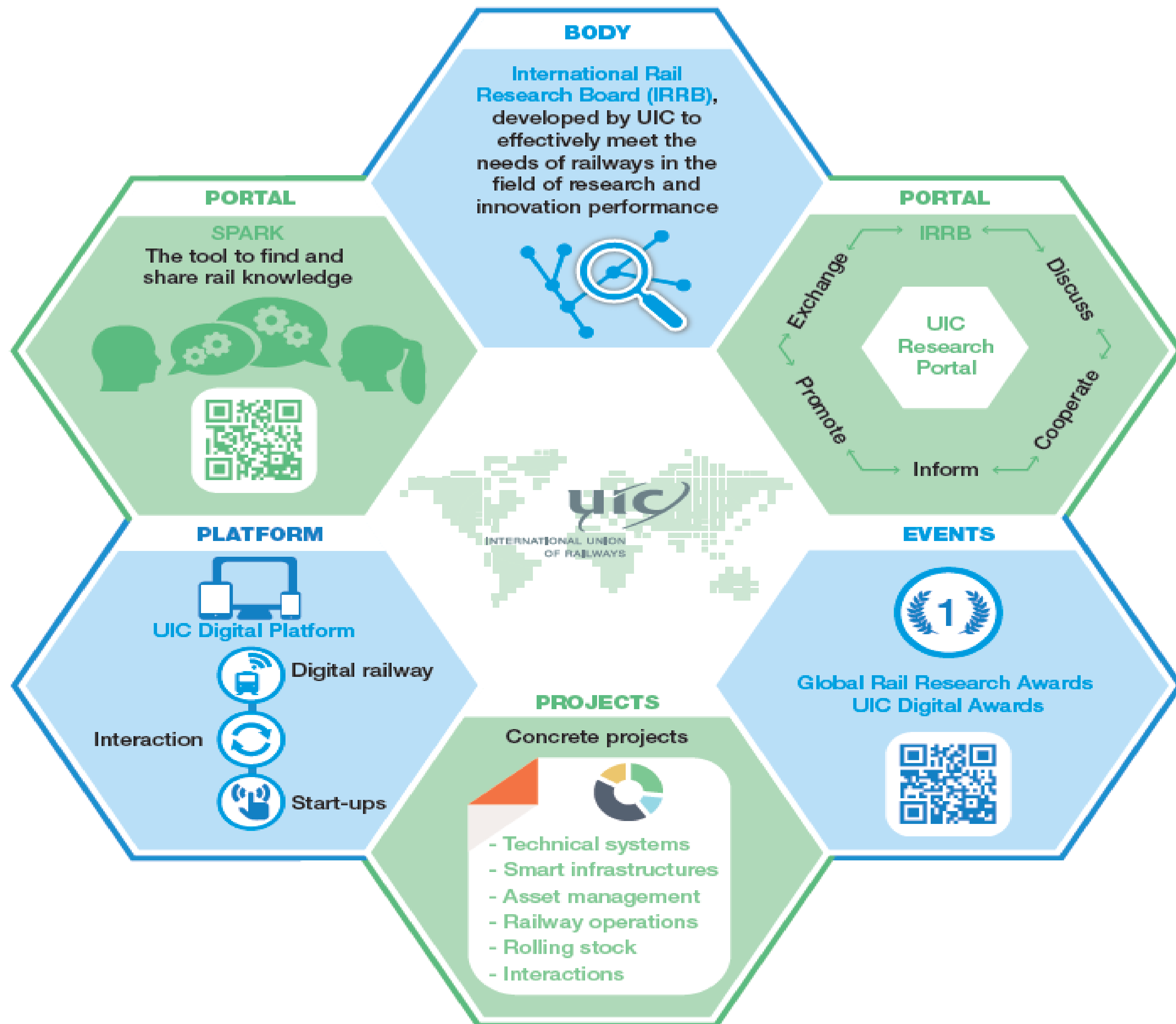
- Working Group 1 Vision & Strategy (core activity)
- Working Group 2 Common Collaboration (internal)
- Working Group 3 Liaison (external)



A GLOBAL VISION FOR RAILWAY DEVELOPMENT

The International Railway Research Board (IRRB) has prepared the UIC Global Vision for Railway Development (GVRD) structured around the core themes set out in the strategic documents of the UIC Regions (e.g. Challenge 2050, Rail Technical Strategy Europe (RTSE), Asia-Pacific Regional Strategy and the strategy paper of the African Region, Destination 2040), as well as other relevant documents such as the Strategic Rail Research and Innovation Agenda (SRRIA) published by ERRAC, the European Rail Research Advisory Council.

The GVRD can help railways develop and optimise rail systems of the future in order to realise opportunities and satisfy customer and societal requirements.

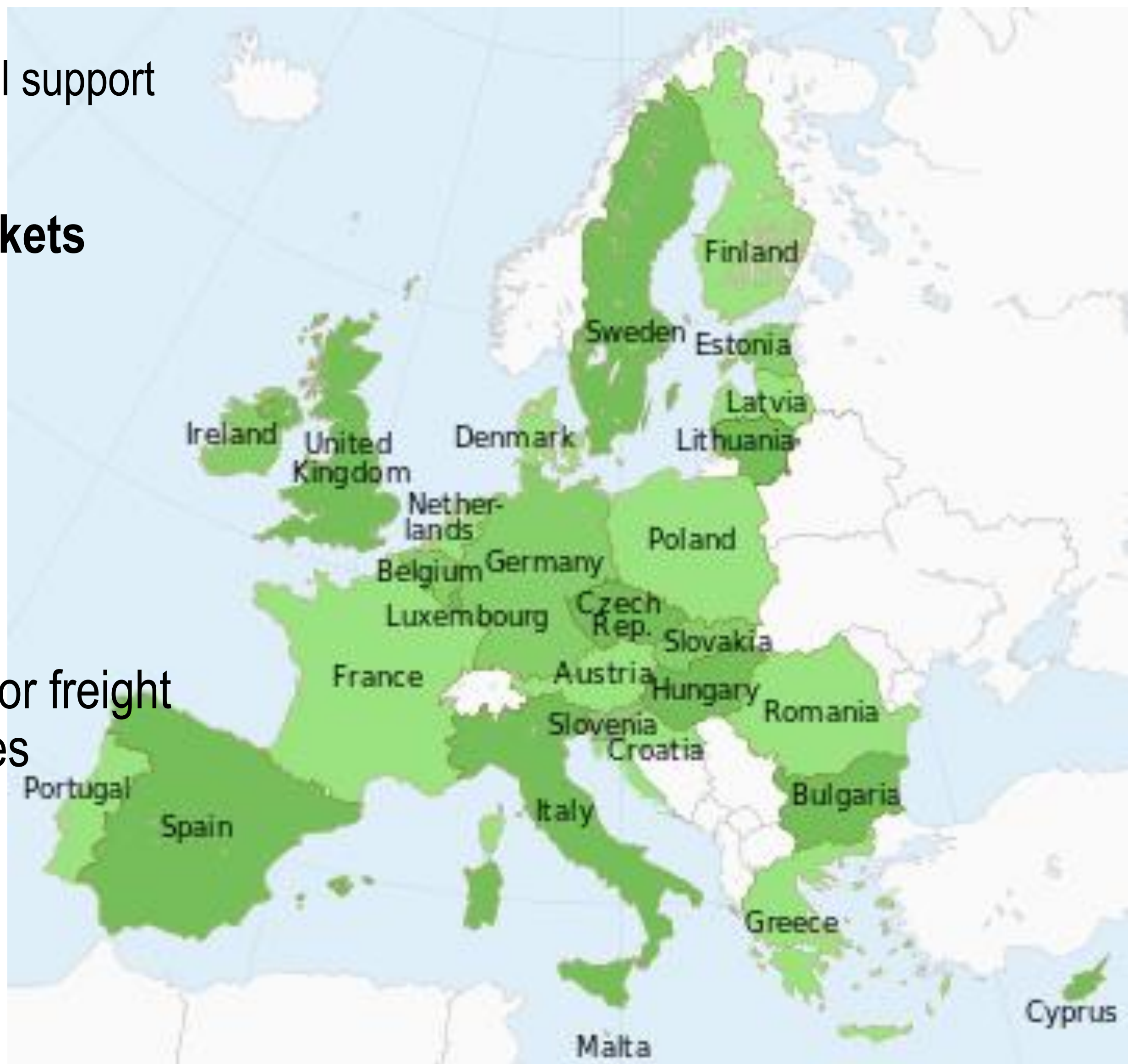


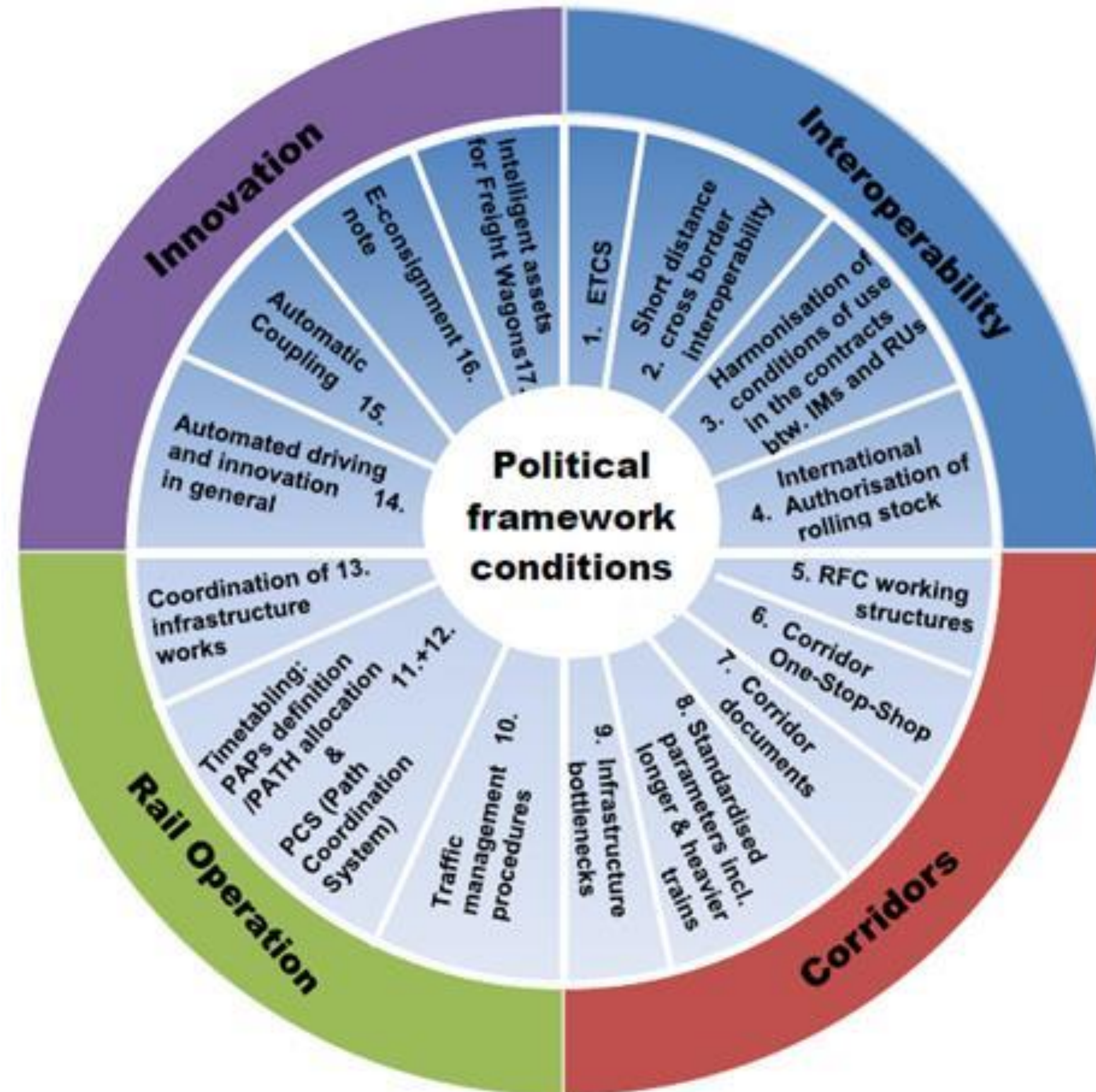
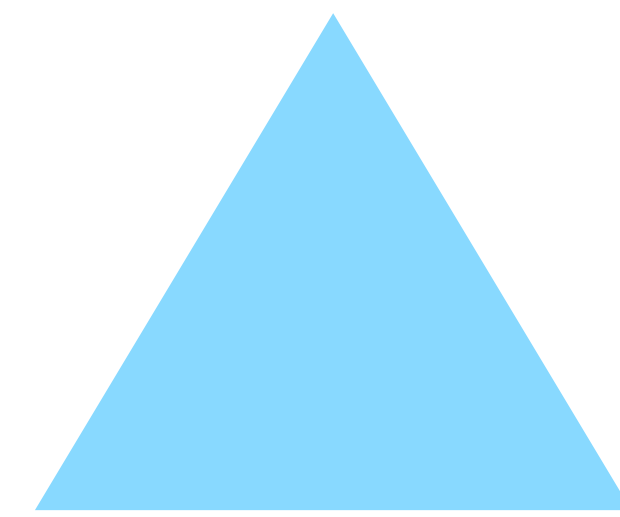
UIC leads and promotes research activities through a number of bodies, platforms, portals and events

European Landscape

14

- 28 Member States
 - Collaboration and technical support for **CER** role & activities
- **Liberalised Transport Markets**
 - Separation of Infra and Operators
- **Technical Specifications for Interoperability**
 - Telematic applications for freight and passengers services
- Large Scale **Research and Development**
 - Shift2Rail





➤ Reduce cost of rail and improve productivity & reliability:

eRailfreight
e-Wag
Driver language
CEO TF, Raildata

➤ Reduce cost of rail and improve safety, productivity & competitiveness

ATO, Automatic coupling –
CEO TF

➤ Improve capacity management:

EU project cluster 2.0

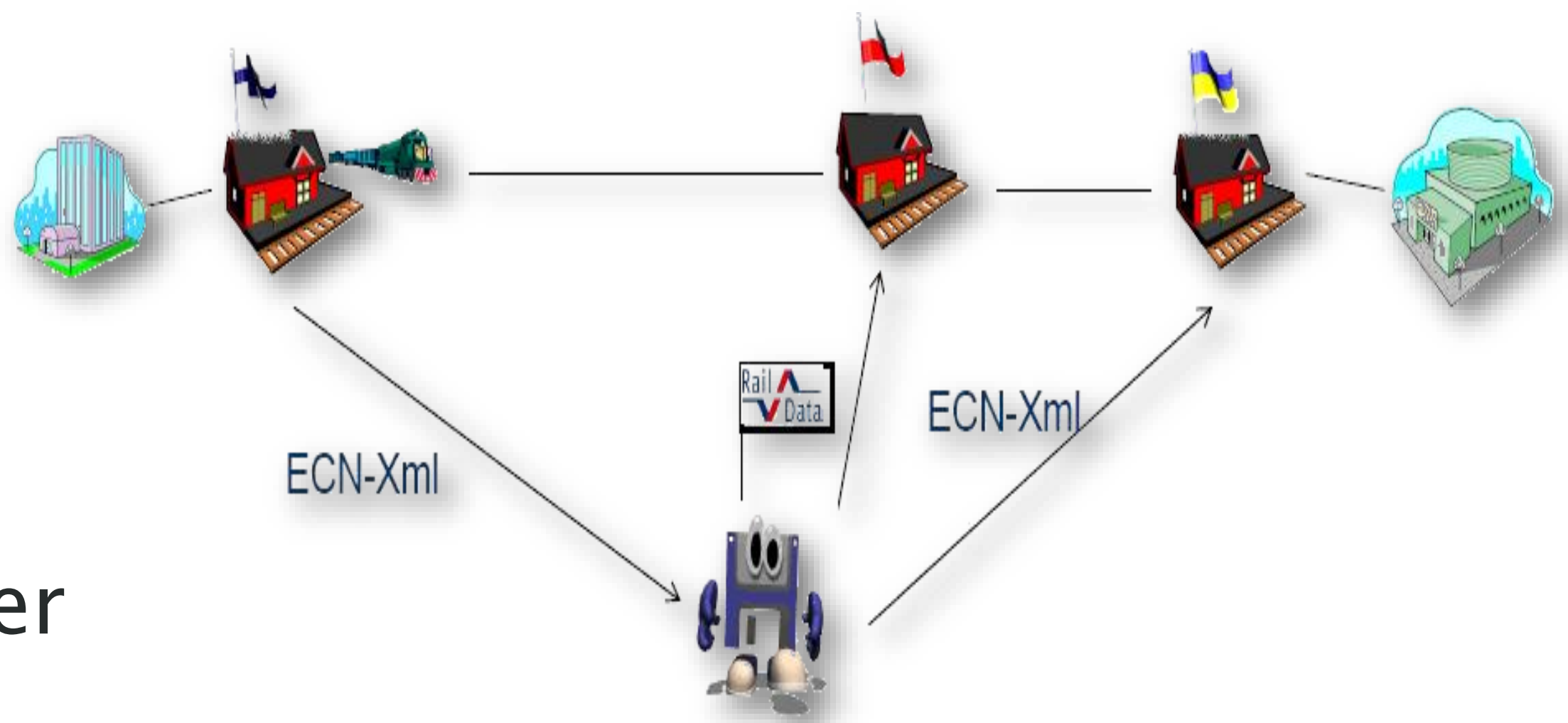
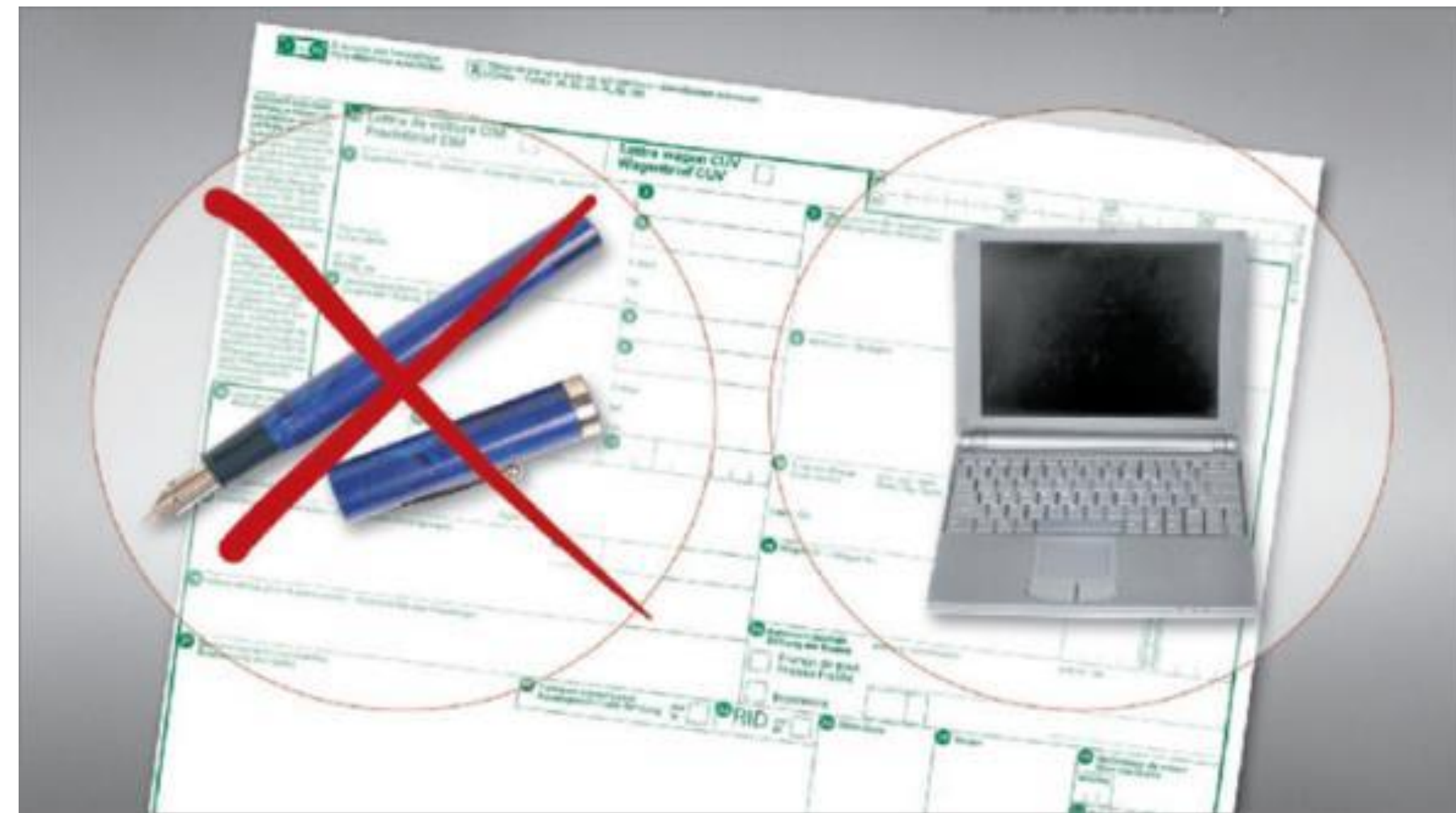
ORFEUS

16

Electronic Consignment Note

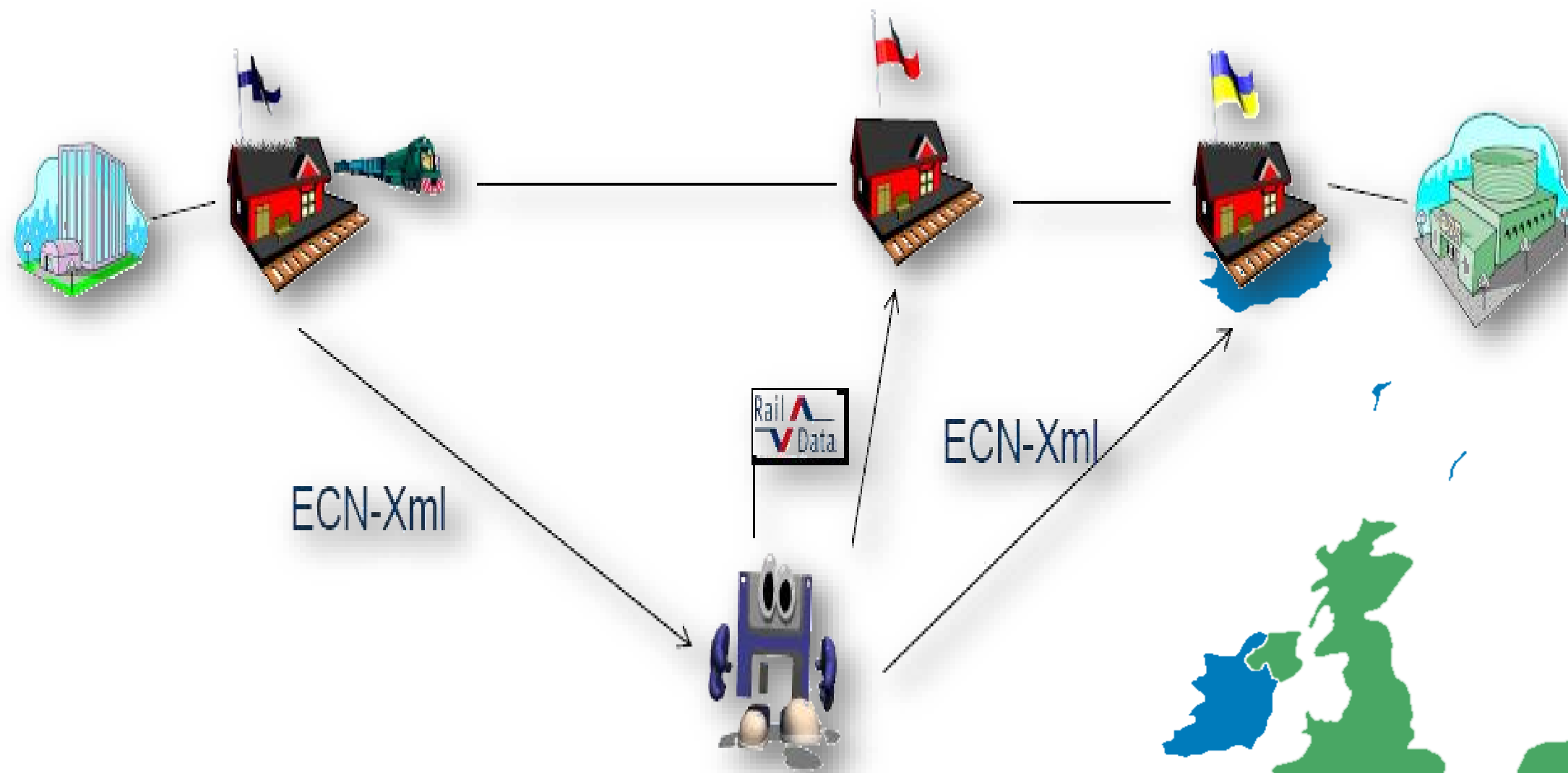
What is Electronic Consignment Note?

- Single data capture
 - For all involved parties
- Paperless transport
 - Independent and ahead of train movement
- Data available
 - ❖ Anytime
 - ❖ Anywhere
 - ❖ Electronic or paper



Roll-out

17



ORFEUS - RUs

= 80% of European t-km

Next steps to develop

- **Substitute carrier**
 - Simplified message flow

- **Implementations for**
 - Intermodal transports
 - Trilateral transports

- **Common CIM-SMGS message format**
 - In collaboration with CIT and OSJD
 - Single document **for Eurasian corridors**

E-Wag

Digital Freight Train

Use Cases - Tracking & Tracing

- Last known position
- Positions in time interval
- Mileage
- Estimated time of arrival
- Detection of delays



Brake Monitoring

- **Monitoring brake valve (pressure)**
- **Monitoring hand brake (on/off)**
- **Capturing of train formation (list of wagon)**
- **Train integrity check (passed/failed)**
- **Automatic brake test (passed/failed)**



Shock detection

- Detection of shunting shocks
 - ☐ shock,
 - ☐ time,
 - ☐ position
- Automatic derailment detection
 - More, repetitive vertical shocks within short time period
 - Time stamp first shock, position



Weighting / (Over) Load detection

- Loading state [Loaded / unloaded / unknown]
- Uneven load detection
- Overload condition detection*
- Loading shock detection
- Weighting

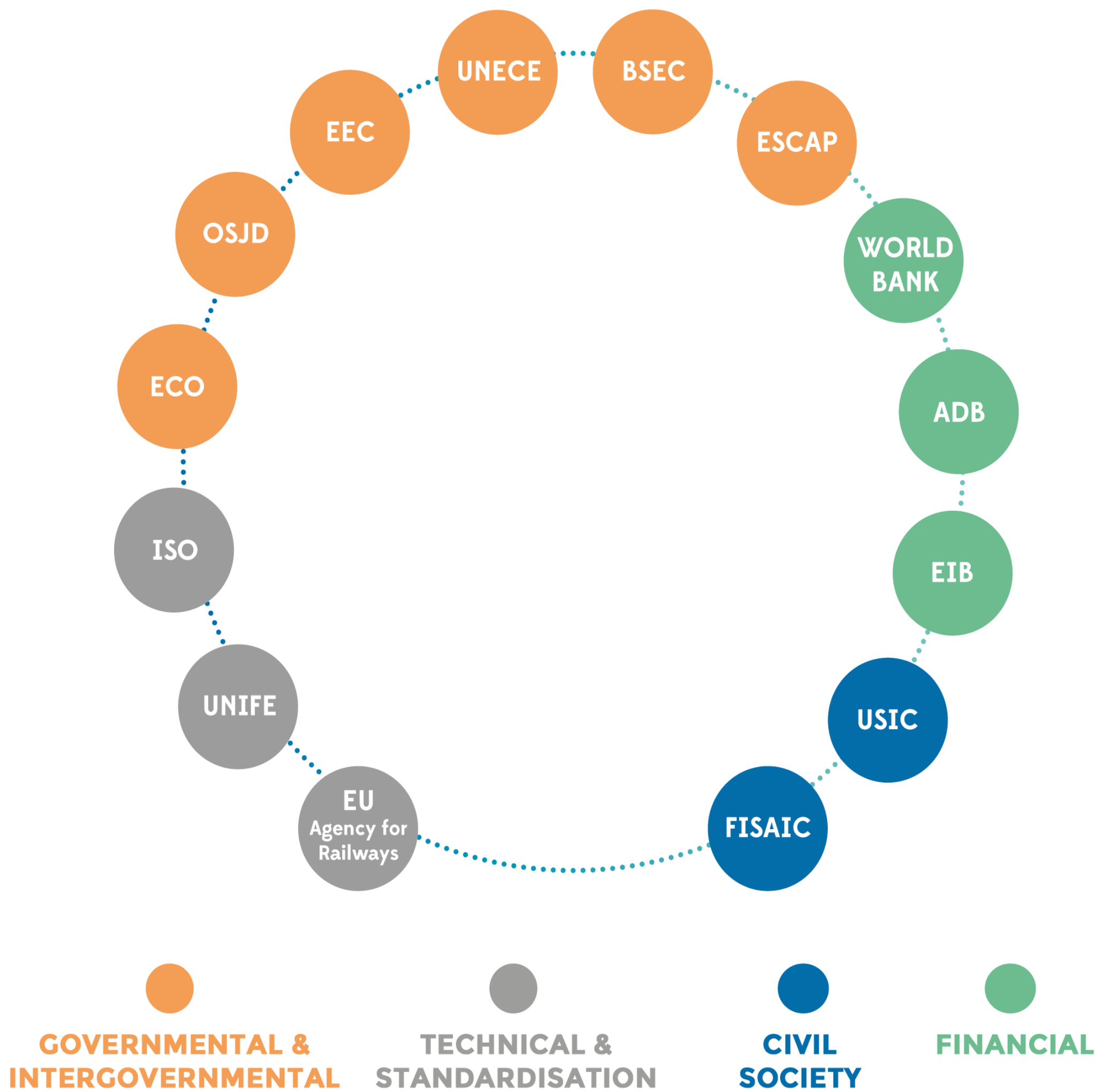


Condition based maintenance

- **Monitoring of wear down**
 - Brake blocks
- **Monitoring of technical condition**
 - Valves
- **Identification of components**
 - Traceability
- **Flat spot detection**
 - Axle ID



SYNERGIES DEVELOPED BY UIC WITH LEADING INSTITUTIONS

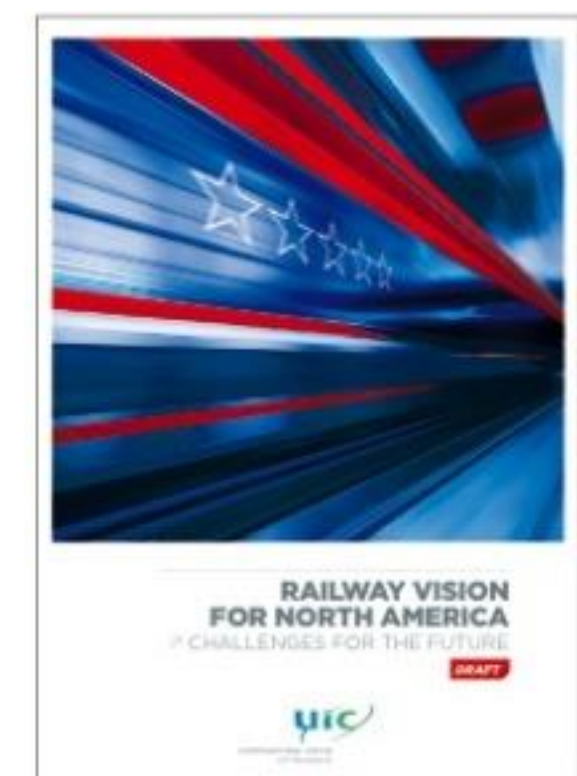
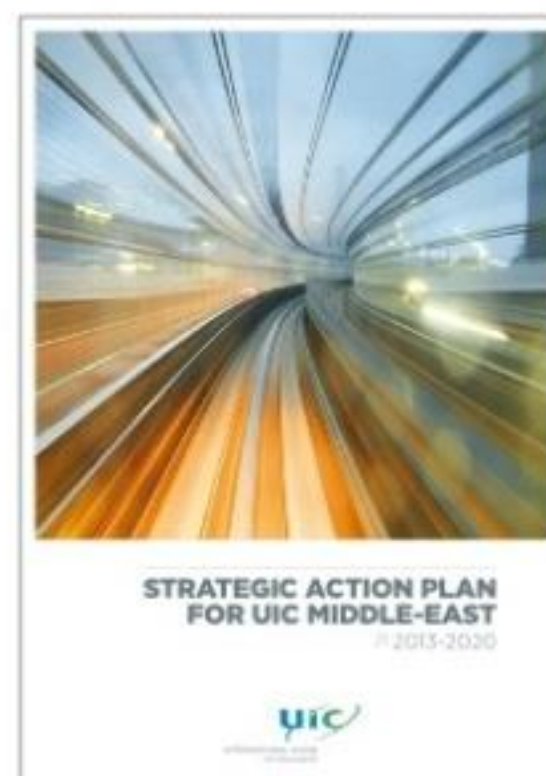
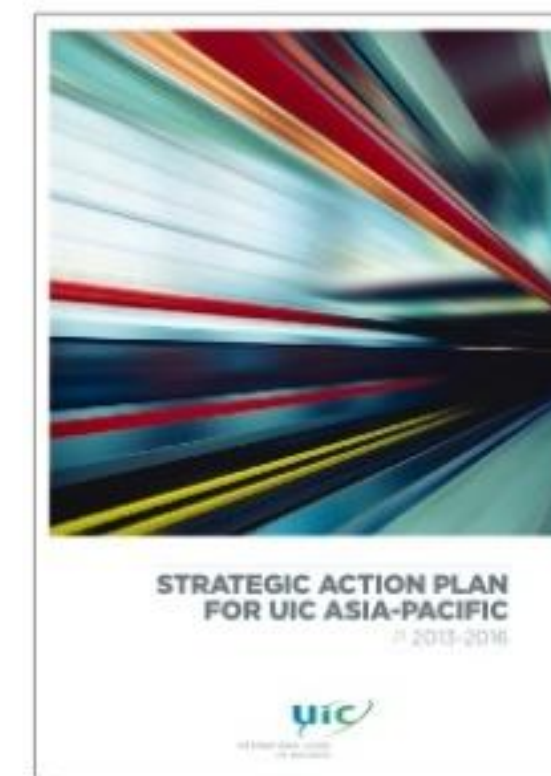
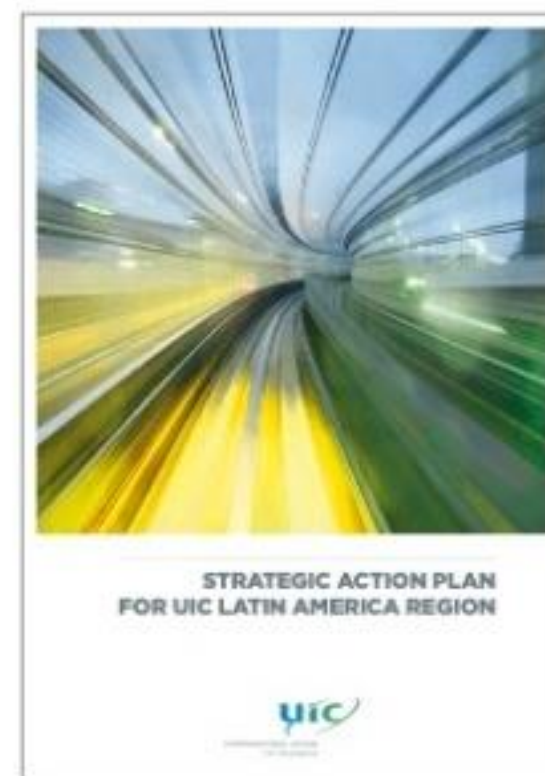


- ADB:** Asian Development Bank
- BSEC:** Black Sea Economic Cooperation
- EEC:** Eurasian Economic Commission
- ECO:** Economic Cooperation Organisation
- EIB:** European Investment Bank
- ESCAP:** The Economic and Social Commission for Asia and the Pacific
- FISAIC:** Fédération Internationale des Sociétés Artistiques et Intellectuelles de Cheminots
- ISO:** International Organization for Standardization
- OSJD:** Organisation for Cooperation between railways
- UNECE:** Economic Commission for Europe
- UNIFE:** Union des Industries Ferroviaires Européennes
- USIC:** International Railway Sports Association

A strategic vision for the rail development in every region of the world



INTERNATIONAL UNION
OF RAILWAYS



VISIONS
Railway challenges for the future



Thank you for your kind attention.

Stay in touch with UIC!

www.uic.org



#UICrail