

50th Rolling Stock Conference

System Pillar Task 5

Harmonised European Railway Diagnostics (HERD)

Europe's Rail



Schaumaamoi

Harmonised European Railway Diagnostics

Harmonisation of diagnostic data as the foundation for Europe-wide data-driven asset management

Dr. techn. Emilia Andreeva-Moschen, ÖBB-Infrastruktur AG
emilia.andreeva-moschen@oebb.at

Jens Kilian, voestalpine Signaling Siershahn GmbH
jens.kilian@voestalpine.com

The project is supported by the Europe's Rail Joint Undertaking and its members.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Europe's Rail Joint Undertaking.
Neither the European Union nor the granting authority can be held responsible for them.

Harmonised European Railway Diagnostics

System Pillar Task 5 (HERD)

Main topics

- Introduction of ERJU System Pillar Task 5

  Harmonised European Railway Diagnostics – HERD

- How **Harmonised Diagnostic Interface (HDDI)** can contribute to achieve an effective asset management
- Demonstrator – Proof of Concept
- Our collaborative approach for your benefit

Team Structure and Competences

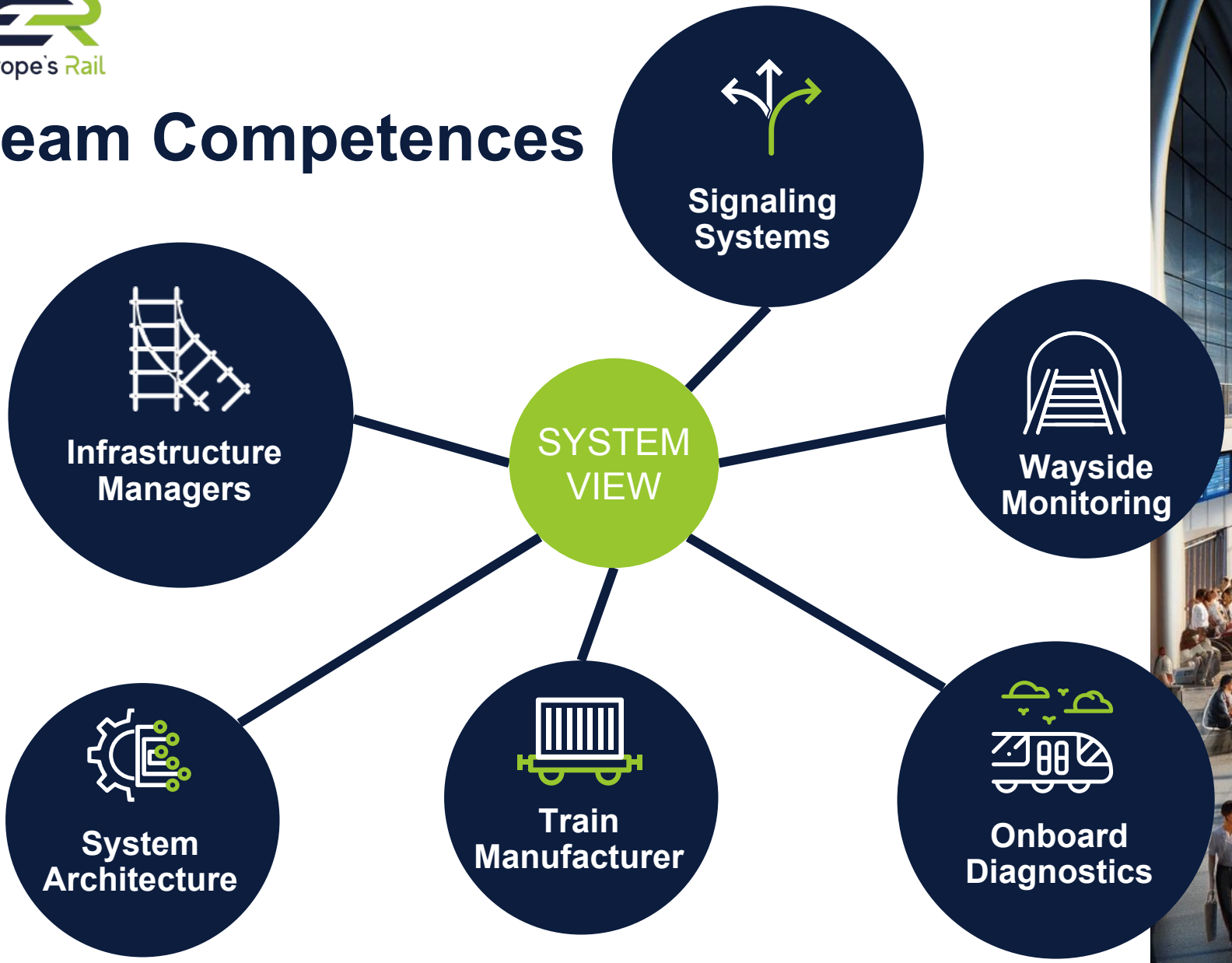
RAILWAY OPERATOR

- Administrador de Infraestructuras Ferroviarias
- Deutsche Bahn AG
- FH Wels
- ÖBB-Holding AG
  ÖBB-Infrastruktur AG
- Schweizerische Bundesbahnen AG
- Trafikverket

INDUSTRY & SYSTEM SUPPLIERS

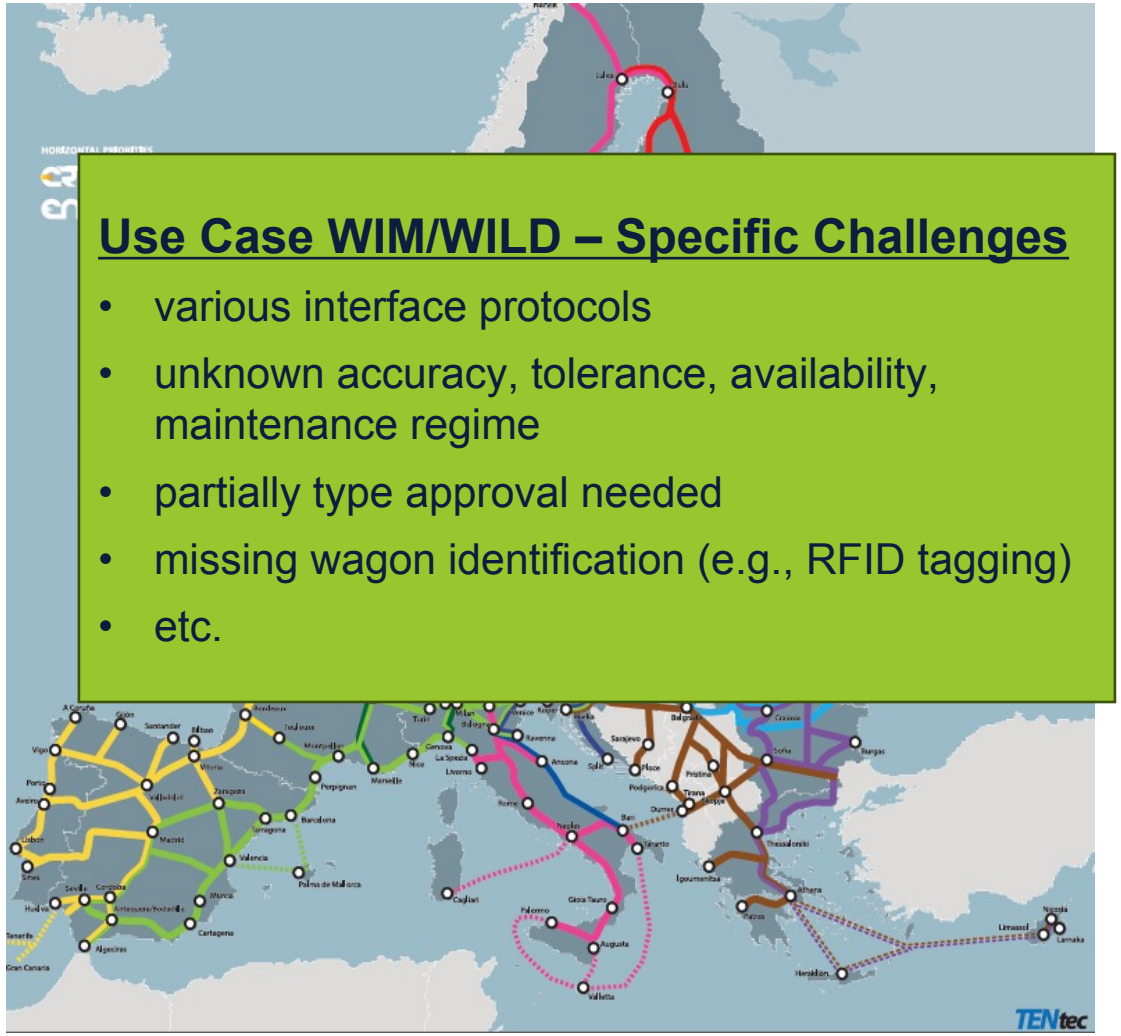
- Alstom Transport SA
- Construcciones y Auxiliar de Ferrocarriles, S.A.
- Hitachi Rail STS S.p.A.
- Knorr-Bremse Systems für Schienenfahrzeuge GmbH
- ANGELRAIL consortium led by MER MEC S.p.A
- voestalpine Railway Systems GmbH
- Progress Rail/Caterpillar

Team Competences





The European Railway Paradox – Opportunities and Challenges



Use Case WIM/WILD – Specific Challenges

- various interface protocols
- unknown accuracy, tolerance, availability, maintenance regime
- partially type approval needed
- missing wagon identification (e.g., RFID tagging)
- etc.

Some facts:

- more than 635 000 freight wagons
- more than 50% of EU rail freight volumes are cross-border
- more than 7% of passenger traffic is cross-border
- more than 1200 active licences in the EU-27
- at least 27 IMs in EU

Use Case: Wheel Monitoring

- ca. 450 monitoring sites (WIM/WILD*)
- many different suppliers

Opportunity: Effective asset management based on reliable, harmonised diagnostic data.

Challenge: The full potential of available data remains untapped due to a lack of harmonisation, standardisation, and data availability.

Sources: EUR-Lex - 52025DC0439 - EN - EUR-Lex; COM_2023_440.pdf; Rail - Mobility and Transport - European Commission; TENtec Map Viewers - Explore the TEN-T Network | European Transport Infrastructure; TEN_T_Schematic_mapERTMS_EmS14_04_26_FINAL_OUTLINED

*) WIM: Weigh-in-Motion (e.g., load of wheels and axles)
WILD: Wheel Impact Load Detection (e.g., unrounded wheels, wheel defects)

Europe's Rail

Harmonised European Railway Diagnostics

System Pillar Task 5



Vision

To deliver a **Harmonised Diagnostic Data Interface (HDDI)** for Infrastructure Manager, Railway Undertaking, Wagon Keeper and System Supplier by **eliminating barriers to diagnostic data exchange** and providing solutions for full utilisation of the asset management information.

- **Interoperable**
- **Flexible**
- **Sustainable**
- **Reliable**
- **Competitive**
- **High capacity**

Europe's Rail

Harmonised European Railway Diagnostics

System Pillar Task 5 (HERD)

Mission

HDDI (Harmonised Diagnostic Data Interface) becomes a trusted, interoperable, harmonised, and supplier-independent framework for the exchange of railway asset condition data, accelerating predictive maintenance, operational efficiency, and optimised asset management.

Establish a new European standard for diagnostic data exchange.

Unlock cross-border interoperability of asset condition data.

Enabling AI-ready diagnostics for the railway of tomorrow

Harmonised European Railway Diagnostics

System Pillar Task 5 (HERD)



Purpose of HDDI

- **unlocks** the value of railway asset condition data by
- making it **consistent, shareable, and usable**
- **across** the European railway system.

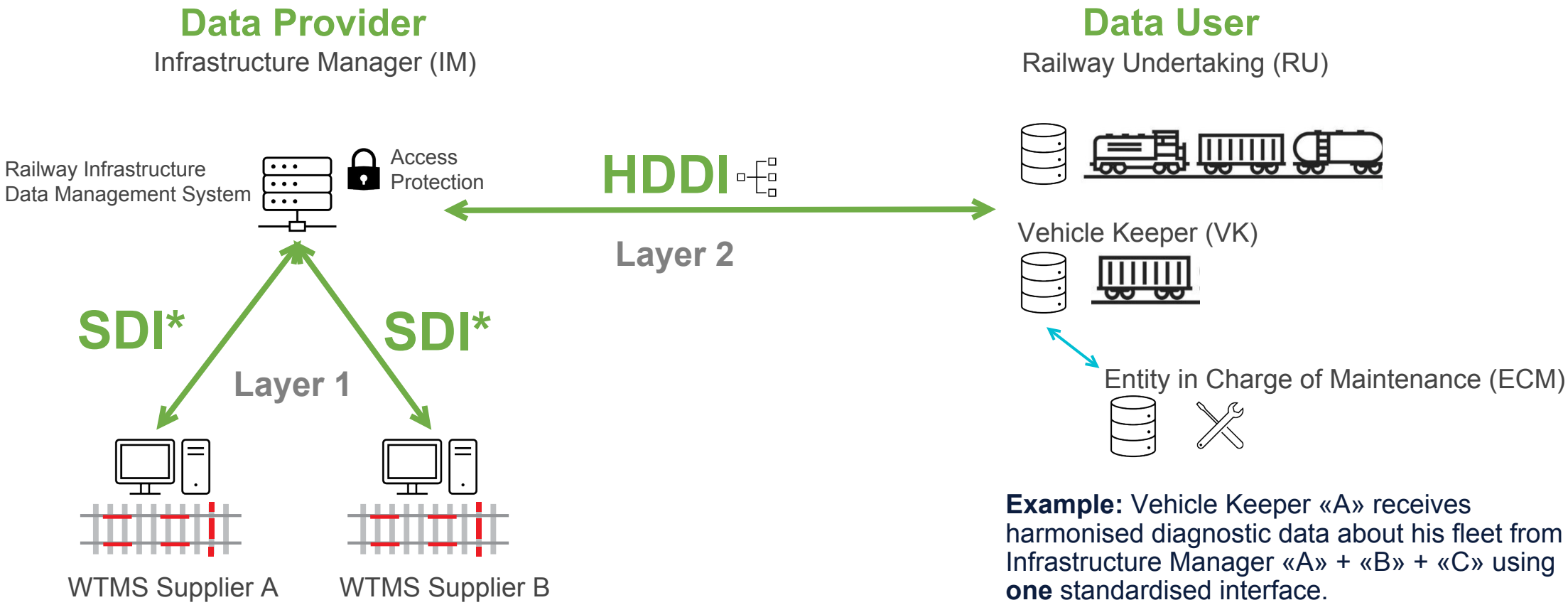
Properties of HDDI

- HDDI does not require changes in existing diagnostic systems.
- HDDI is public and transparent for all stakeholders.
- HDDI is data provider and data user independent.
- HDDI considers the relevant best practice.
- HDDI does not change, interpret, or store the data to be transferred at all.
- HDDI is based on the available ERA-ontology.

Harmonised Diagnostic Data Interface (HDDI)

Competition: HDDI overcomes proprietary interfaces between WTMS suppliers and drives innovation.

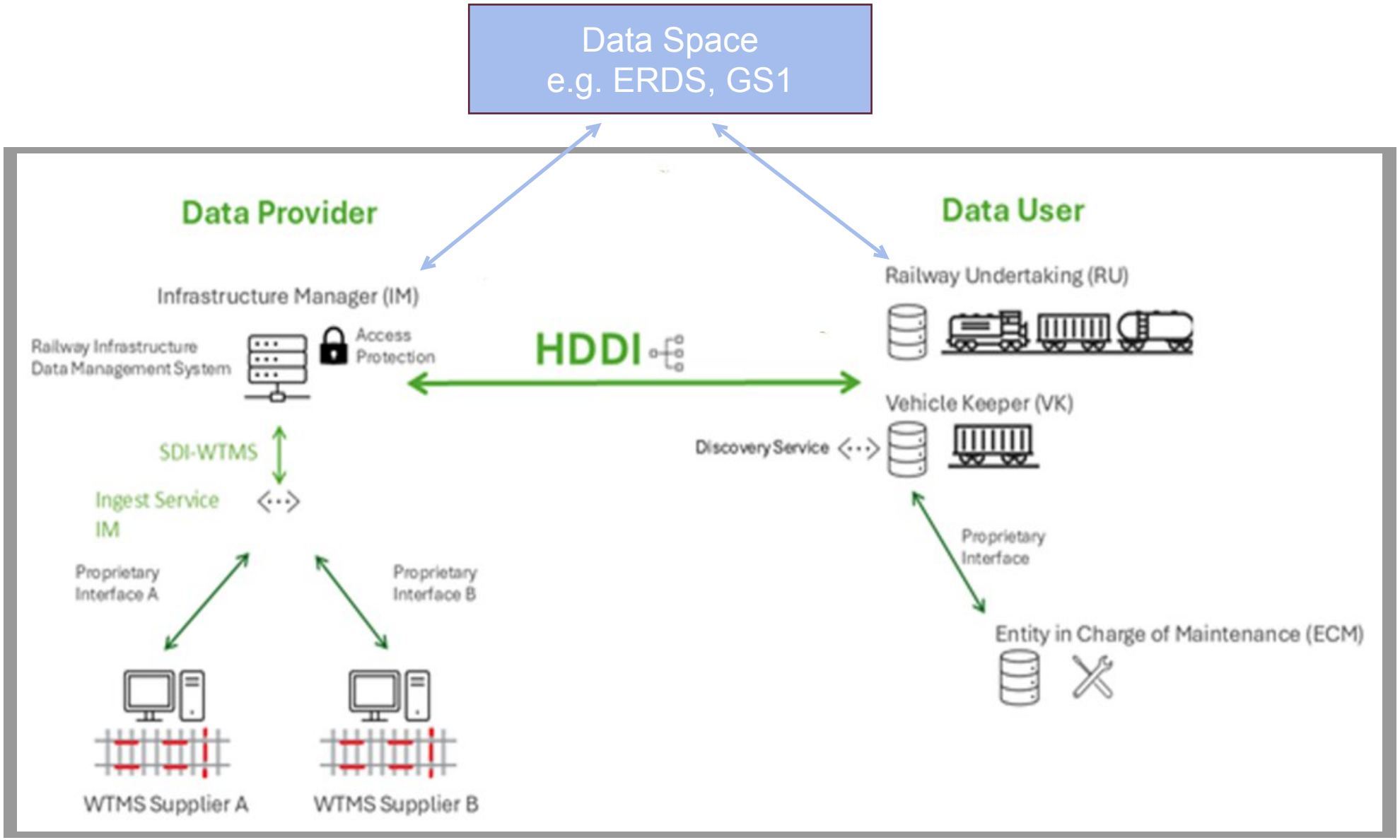
Next step: Input for the HDDI demonstrator in IM4RAIL-2 (ERJU/Innovation Pillar/Flagship Area 3/Wave 2).



Example: Vehicle Keeper «A» receives harmonised diagnostic data about his fleet from Infrastructure Manager «A» + «B» + «C» using **one** standardised interface.

*** Payload of HDDI – Applicable as a standard for new systems**

Harmonised Diagnostic Data Interface (HDDI)



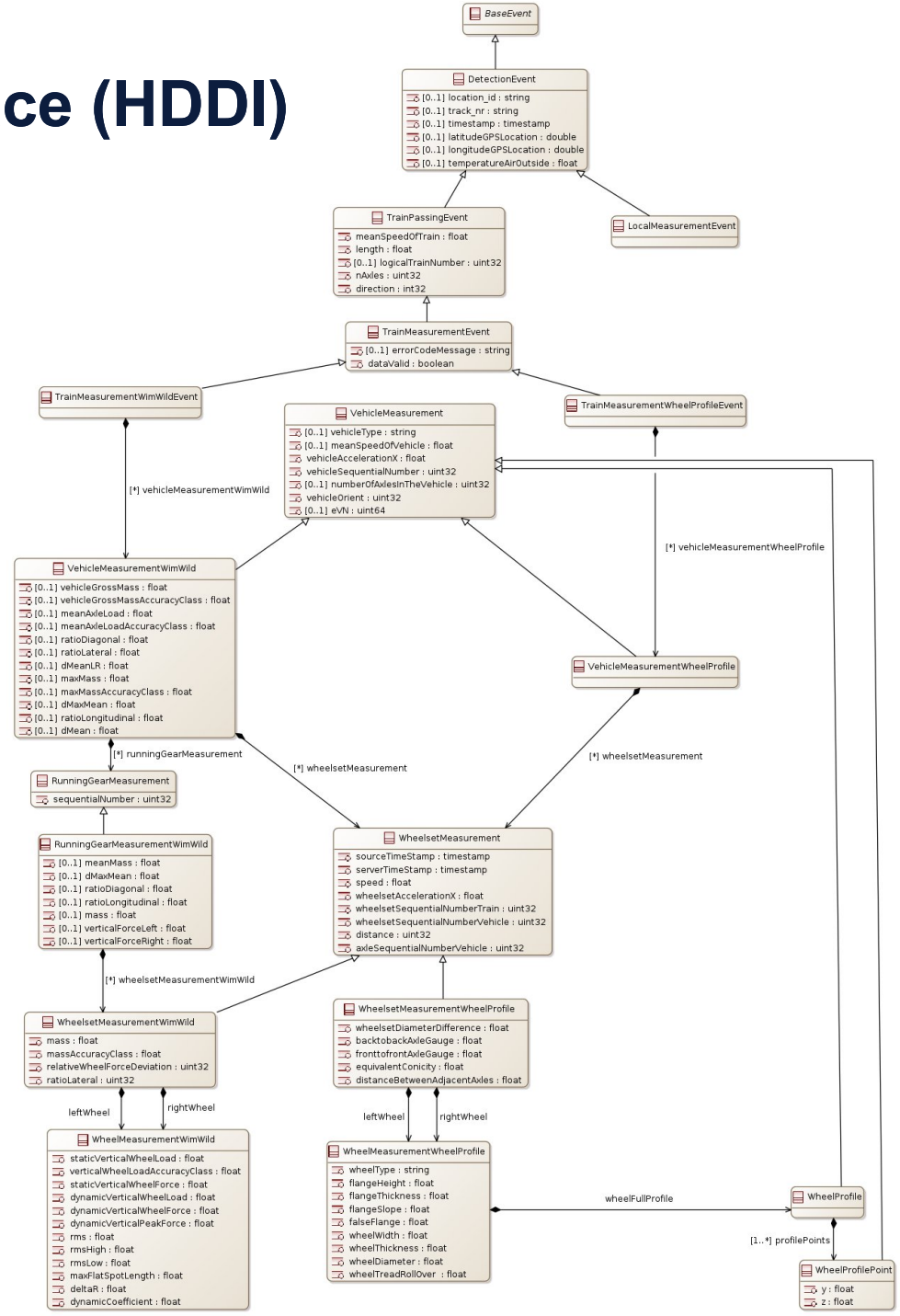
Harmonised Diagnostic Data Interface (HDDI)

Product Group Model: SDI-WTMS

Developed for

- **Weigh-in-Motion** WIM (e.g. Load of Wheels and Axles)
- **Wheel Impact Load Detection** WILD (e.g. unrounded wheels, wheel defects)
- **Wheel Profile Measurement** WPM

- ➢ Generic data model available
- ➢ Extendable for other measurement systems
- ➢ Reviewed by **Infrastructure Managers** and **System Suppliers**



Supporting a Demonstrator in IAM4RAIL-2 WP4

FIRST HDDI DEMONSTRATOR FOR WHEEL DIAGNOSTIC DATA

SYSTEM PILLAR
Task 5 Harmonised Diagnostics

- Supports the alignment of the parameter harmonisation
- Updates the HDDI specification according to the FP3-feedback
- Analyses and considers the lessons learned

CONTINUOUS EXCHANGE

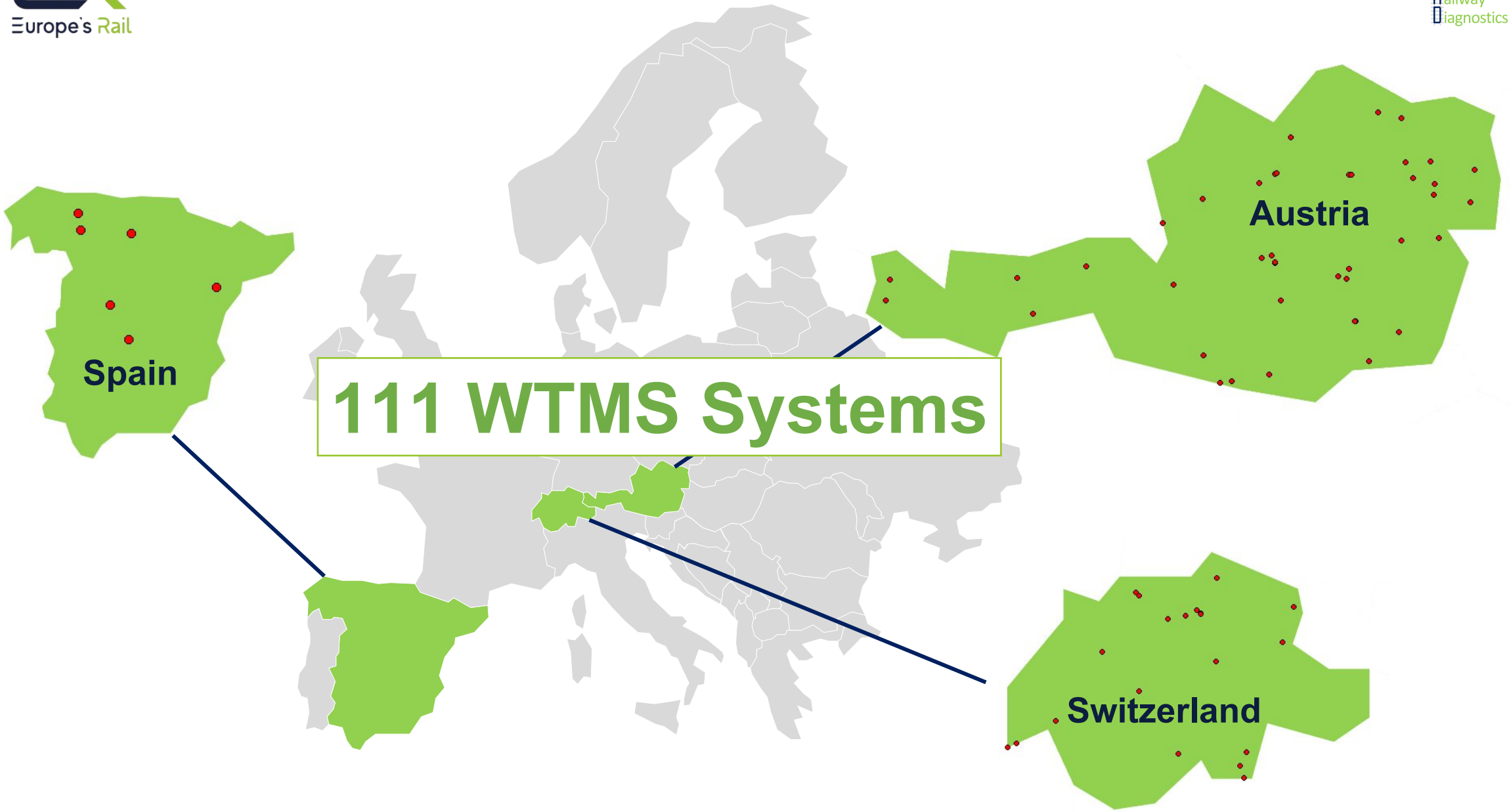
INNOVATION PILLAR
FA3 IAM4RAIL-2 WP4

- HDDI demonstrator implementation
- Pilot project management and monitoring
- System validation
- Outcome evaluation
- Shares findings and with SP

Benefits:

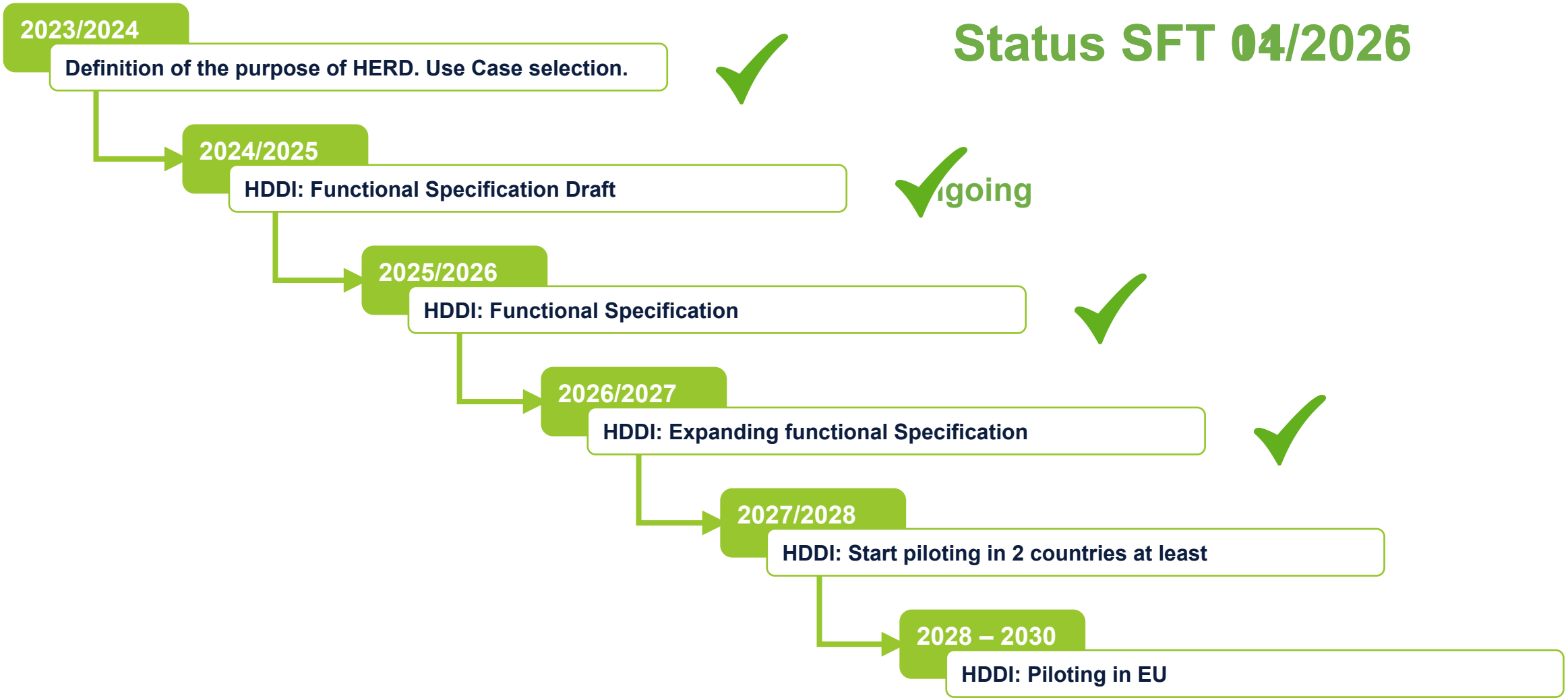
- **Harmonised Data Exchange**: Seamless, standardised data exchange
- **Cross-Border System Compatibility**: Harmonised diagnostic data handling across different European countries and checkpoint systems.
- **Scalability & Future-Proofing**: Contribution to European automated inspection by generating harmonised data for future applications (e.g., IAMS, Digital Twin, Predictive Maintenance).

Demonstrator in FA3 IAM4RAIL-2 WP4



HERD Strategy 2024 - 2030

Harmonised European Railway Diagnostics



Invitation to join us



Innovate.

Deliver.

Collaborate.

**Together,
we create solutions that
no company and
no country in Europe
can achieve alone.**

- Create the standards of tomorrow
- Your expertise can make the difference
- Shape the future together
- Share knowledge, expertise and create industry-wide impact
- Be part of a growing network of forward-thinking companies
- Overcome challenges, solve challenges, and drive progress
- Connect, contribute, and create value together
- Partner with industry leaders