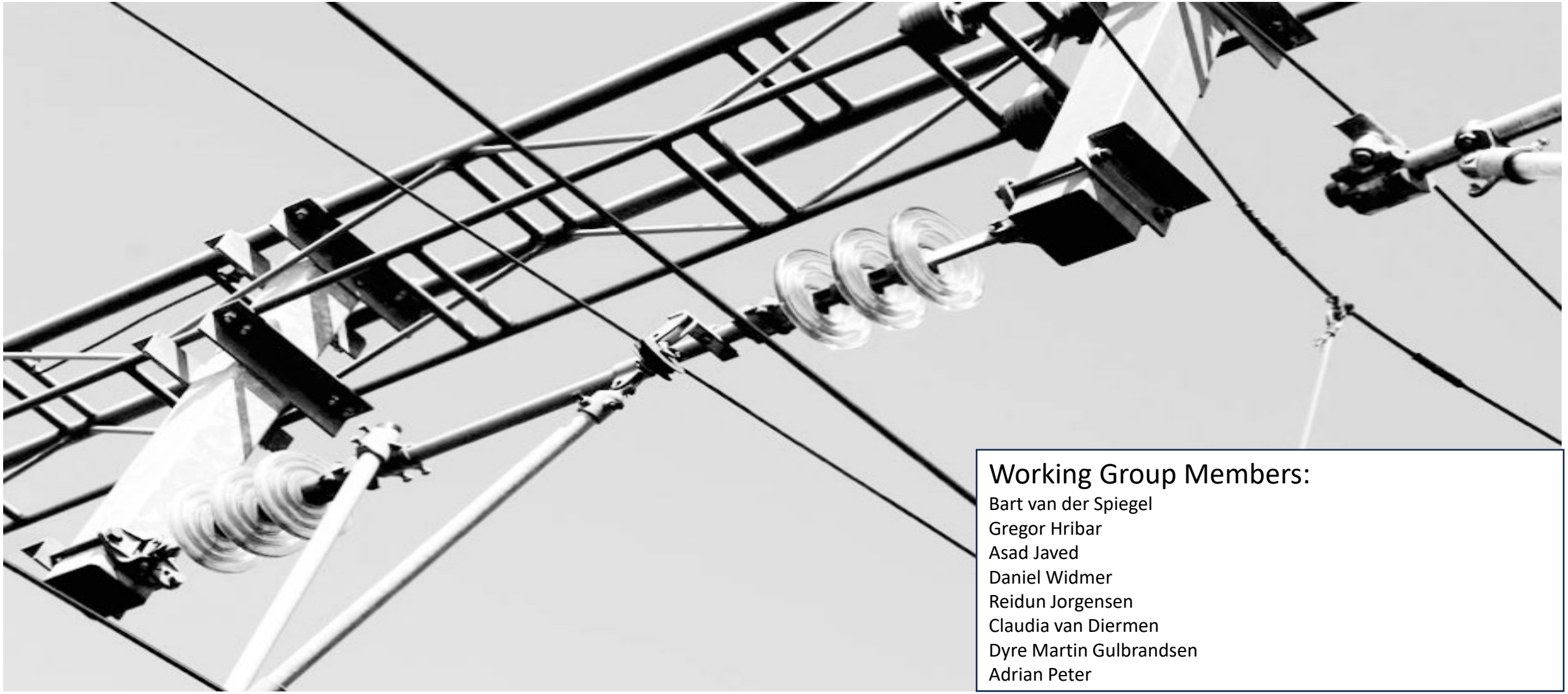
Analysis of EMS cross-acceptance:
Classification of Painpoints of train operators and vehicle keepers (and possible measures.)



Working Group Members:

Bart van der Spiegel
Gregor Hribar
Asad Javed
Daniel Widmer
Reidun Jorgensen
Claudia van Diermen
Dyre Martin Gulbrandsen
Adrian Peter

In June 2024 an Eress Forum workshop was conducted.

Topic 1: Ensuring Correct Exchange of Energy Data

- Focus: Addressing challenges faced by Train Operators (TOs) and Vehicle Keepers (VKs) in exchanging accurate energy data across Europe.
- Goal: Improve data reliability, accessibility, and standardization for billing and operational efficiency.

Topic 2: Cross-Acceptance of Energy Measurement Systems

- Focus: Achieving mutual recognition and acceptance of EMS across European countries.
- Goal: Standardize type testing, certification, and data verification processes to reduce redundancies and ensure compliance with regulations.

Key Questions Explored in the workshop

Group 1: Correct Exchange of Energy Data

1. What problems do TOs and VKs face with energy data exchange?
2. At which process level (metering, collection, exchange, settlement) are most issues observed?
3. What solutions can address these problems (e.g., regulation, incentives)?
4. What are the negative business consequences of these issues?

Group 2: Cross-Acceptance of EMS

1. How can the type testing process for EMS be improved?
2. Are there countries not accepting homologated EMS, and why?
3. Are retrofitted vehicles compliant with new standards, and accepted for settlement?
4. What information should Settlement Responsibles receive?
5. Should Settlement Responsibles share data and avoid redundant tests?

Key Problems indentified during the workshop

SOME FEEDBACK EXAMPLES:

Lack of control and access to the data flow as a Vehicle Keeper

"Problem that each Infrastructure Manager have own approval routines for EMSs. This should be standardised "

"EMS should be registered once and information should be shared by the IM (Infrastructure Manager)"

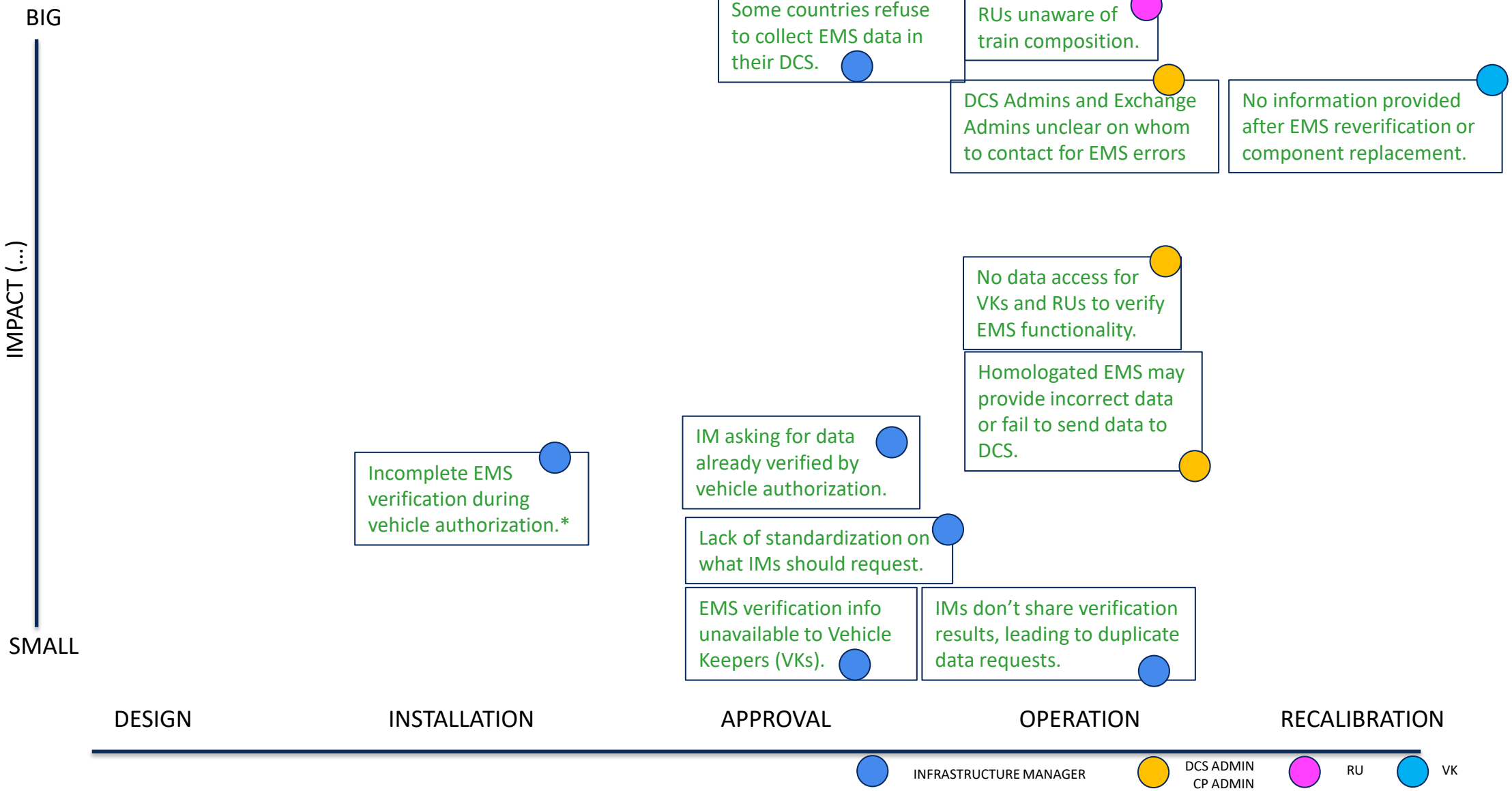
"Every country has several documents, that must be fulfilled, instead of a common standard in the different countries »

- **Energy Data Exchange Issues:**
  - Faulty or missing EMS, leading to reliance on estimated data.
  - Incomplete datasets per CEBD rules; lack of standardized approval routines.
  - Limited access to data for VKs and TOs; cross-border data exchange gaps.
  - Country-specific documentation and procedures complicate processes.
- **Cross-Acceptance Challenges:**
  - Lack of standardized type testing and certificate recognition across Europe.
  - Some countries even reject homologated EMS due to extra requirements.
  - Retrofitted vehicles may not comply with TSI standards, affecting settlement.
  - Inconsistent information sharing and trust between Settlement Responsibles.
- **Business Impacts for RU's:**
  - Higher operational costs due to repeated work for
  - Missing data and EMS not accepted for energy billing can lead to penalties and lost opportunities.
  - Reduced overall confidence in the system.

An Eress internal working group has begun to work on following topics

1. Find and categorize current common pain points ✅
2. Confirm pain points with Interviews ✅
3. Collect commisioning procedures form Eress partners → Survey ✅
4. Make proposals for improvement ✅
5. Create a best practice document.

The working group has categorized the different pain points



Next steps

1. Find and categorize current common pain points
2. Confirm pain points with Interviews
3. Collect commisioning procedures form Eress partners → Survey
4. Make proposals for improvement
5. Create a best practice document.

→ The proposal / results of the working will be presented during the Eress Forum coming 12.June 2025.

(https://eress.eu/events/eress/eress-forum-2025/)

Proposals for improvement : Add a procedure

- What information should we collect from an EMS to ensure we can trust the data coming from him over the lifetime of the vehicle?
- Can we add some data to the Masterdata and exchange this with other concerned parties?
- Does this give sufficient trust avoiding each IM requesting other information to the VK or RU?

Proposal to add two forms to collect the data:

- Installation Type Test: information on EMS equipment type and on Traction Unit Type
- Installation Routine Test / Component replacement / Reverification: very limited set of information especially in case a maintenance plan under supervision of ECM is in place

Information: LOC&PAS TSI defines the maintenance of EMS

4.2.8.2.8 On-board energy measurement system

4.2.8.2.8.1 General

(8)

The fitment of an EMS, its on-board location function, the description of on-board to ground communication and the metrological control including the accuracy class of the EMF shall be recorded in the technical documentation described in point 4.2.12.2 .

4.2.12.2. General documentation

(9)

The maintenance documentation described in point 4.2.12.3 shall include any periodic verification procedure to ensure the required accuracy level of the EMS during its lifetime.

4.2.12.3. Documentation related to Maintenance

4.2.12.3.2 The Maintenance description file

(1)

The maintenance description file shall describe how maintenance activities shall be conducted.

(2)

Maintenance activities include all activities necessary such as inspections, monitoring, tests, measurements, replacements, adjustments, repairs.

(3)

Maintenance activities are split into:

Preventive maintenance; scheduled and controlled

Corrective maintenance.

Information : Entity in Charge of Maintenance

An Entity in Charge of Maintenance (ECM) plays an important safety role in the European railway system by ensuring that the vehicles for which it is in charge are in a safe state of running by means of a system of maintenance.

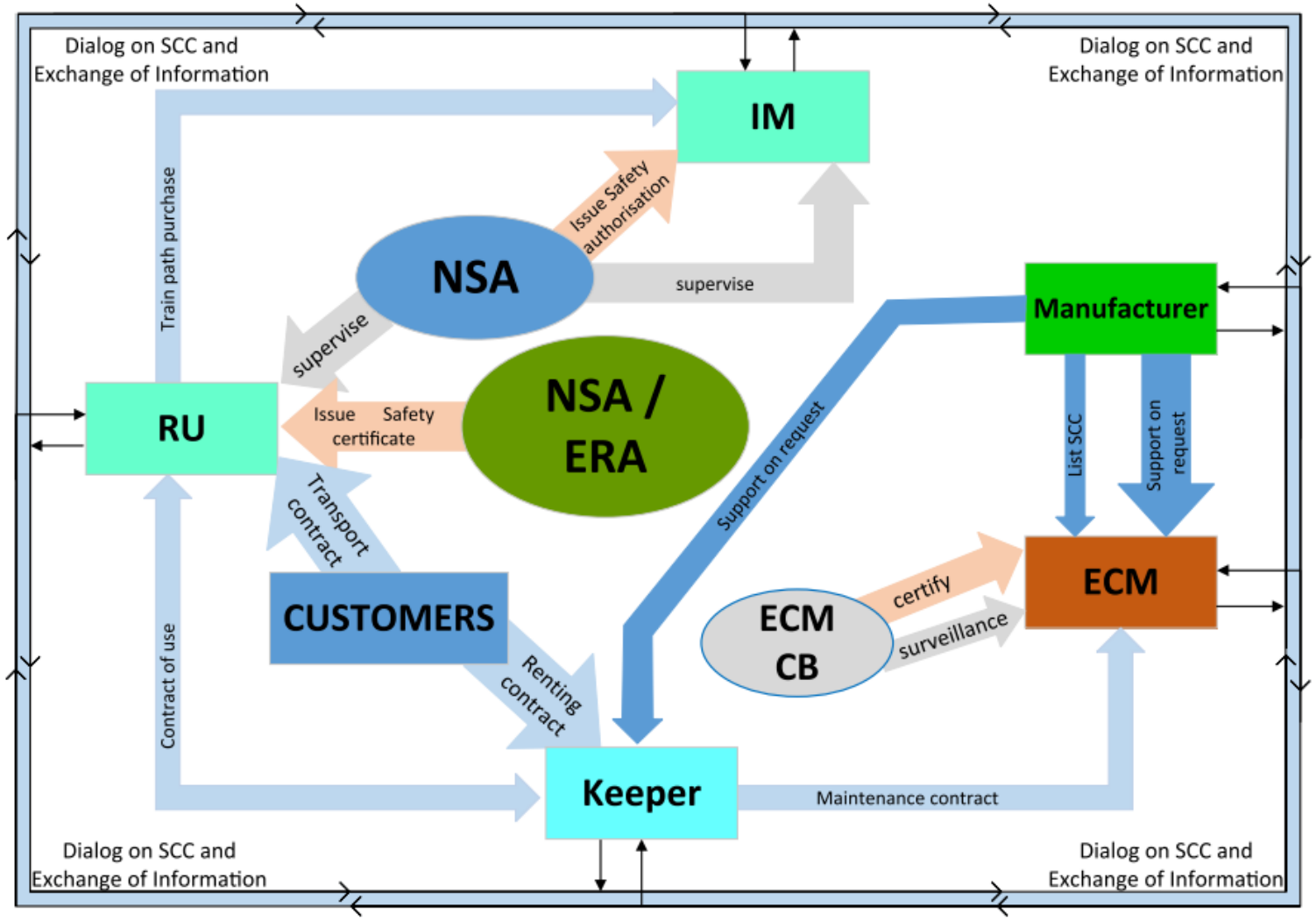
This European system of certification for ECMs has been set up in Regulation 2019/779, that defines:

- The criteria to be applied for the accreditation or recognition of ECM's and maintenance functions' certification bodies;
- The requirements and assessment criteria applicable for the certification of ECMs and the certification of maintenance functions.

The system of certification provides evidence of responsibility and traceability of the maintenance undertaken on vehicles. It sets out also a certification process that ensures a transparent and structured management system for maintenance functions described in article 14(3) of Directive (EU) 2016/798 and will help to reduce the burden and duplication of controls and/or audits across the rail sector.

- ECM 1: supervises and coordinates the maintenance and ensures the safe state of the vehicle;
- ECM 2: responsible for the management of the maintenance documentation;
- ECM-3: manages the vehicle's removal for maintenance and its return to operation after maintenance;
- ECM-4: delivers the required technical maintenance of a vehicle or parts of it.

Information: Entity in Charge of Maintenance



Drawing related to Safety Critical Components (SCC), but also showing the relations between the different actors.