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Functional Specification and Guideline for Interoperable Vehicle Sensors and Telematic Devices



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Foreword

An International Railway Solution (IRS) is a document drawn up by consensus and applied on a voluntary basis which aims to facilitate and harmonise railway operation.

IRSs are gradually replacing UIC leaflets.

Members of the International Union of Railways (UIC) participate in the creation of IRSs, of which they benefit in full. Furthermore, marketing to railway stakeholders contributes to the sharing and harmonisation of good practices, in accordance with UIC's primary goal.

While IRSs do not have the force of law, they are created and published in a professional manner and with technical approval on the basis of UIC procedures, and have full technical legitimacy in the railway sector.

The "General application" section constitutes the heart of the IRS and contains the working group's expertise applicable in the broadest manner. The addition of a "Specific application" aims to cover factors specific to a region, a type of service, etc.

Some provisions shall be implemented in all cases to ensure correct application and maintain the system's cohesiveness. Certain operational circumstances require that specific provisions be systematically applied by all users of the document.

For the purposes of understanding, the user acknowledges that the expression of:

- obligation indicates requirements to be respected in order to comply with the expertise expressed in the document (usually "shall");
- recommendation indicates options that are favourable but not essential (usually "should");
- permission indicates options that are recognised but without consequence (usually "may");
- capacity indicates possibilities from a technical standpoint and not permissions or probabilities (usually "can").

Obligation, recommendation and capacity can be expressed in the negative to indicate prohibiting, non-recommendation and incapacity.

If applicable, notably for the purposes of compliance with a UIC approval, passages that are recommended or mandatory for the cohesiveness of the system will be accompanied by the letters "R" and "MCS" respectively.

This IRS reflects the following UIC working group expertise:

eWag2 - Intelligent Wagon and Intelligent Train

It integrates in full or in part the following UIC leaflets:

- none

It complements the following standards:

- *ITSS Standard Specification Interface1 V1-1*

The following IRSs constitute a complementary series:

- none

Executive summary

This IRS is a "Functional Specification and Guideline for Interoperable Vehicle Sensors and Telematic Devices." The use cases defined will allow the integration of data to be applied to intelligent train.

The IRS will enable RUs ([see Abbreviations and Symbols - page 6](#)), Fleet Managers and Wagon Keepers to more easily evaluate and choose devices that will lead to interoperability **in addition to defining how data is used and exchanged**. It will greatly add to data quality measures that can enable:

- Better tracing and tracking of vehicles across borders/Infrastructures;
- Better data quality, including timeliness, leading to better customer information;
- Basis upon which connected train can be developed in the future, leading to better operations and train integrity;
- Better definition of basic data content, confidentiality and access rules and service levels.

Field of application

To assure uptake of truly interoperable solutions that can be applied across the EU 28+, the suppliers will need to respect minimum functional specifications defined by RUs, fleet managers and keepers. This will assure that minimum data (depending on use cases) can be received consistently, by all sensors, with the defined frequency, accuracy, availability and timeliness to be useful.

This IRS specifically addresses use cases that operators, fleet managers and wagon keepers have identified as important. The use cases outline the functional requirements and certain service levels that are necessary for the practical application of sensor data. This includes, but is not limited to:

- *Applicability to intra-train or wagon;*
- *Current status of development/deployment/market uptake;*
- *Actors involved in Use Case;*
- *What functionalities and benefits are envisioned by each actor?*
- *Frequency of data capture (real-time, hourly, event-driven, etc.);*
- *Timing of information exchange with partner.*

Questions pertaining to data confidentiality and intellectual property were discussed during the course of the project, but it was decided that the team needed to integrate legal experts for this work. Therefore, these issues are NOT addressed in this IRS at this time.

Reference documents

The following documents are cited in this IRS or strongly support its requirements and recommendations:

1. Miscellaneous

Intelligent Transportation Systems Society (ITSS)

- [1] *ITSS White Paper Intelligent Train*
- [2] *ITSS Standard Interface Specification V1-1*

Abbreviations and Symbols

ECM	Entity in Charge of Maintenance
EU	European Union
GCU	General Contract of Use for Wagons
ID	Identification
IM	Infrastructure Manager
IoT	Internet of Things
IRS	International Railway Solution
IT	Information Technology
ITSS	Technischer Innovationskreis Schienengüterverkehr (TIS) Standard Specification
RFID	Radio Frequency Identification
RSRD	Rolling Stock Data Register V2
RU	Railway Undertaking
SLA	Service Level Agreement
TAF-TSI	Technical Specification for Interoperability, Telematics Application for Freight
TIS	Technischer Innovationskreis Schienengüterverkehr (TIS)
UIC	International Union of Railways
UTC	Universal Time Coordinates