Industrial Equipment Connection in Labs – RBC
ERTMS Integration, Validation and Certification Processes

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Industrial Equipment Connection in Labs – RBC

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Need for common RBC Interoperability Tests

Potential Approaches

- RBCs must be tested for interoperability to speed up the rollout of ETCS Level 2

- A common core of the RBC for interoperability must be completely specified

- Behavior variations caused by differences of the national operational rules must be limited

- There must be a common test specification for interoperability

- **Common test interfaces would reduce effort for independent tests**
RBCs in RailSiTe® Laboratory today

RailSiTe’s modular architecture today allows the use of predefined Euroradio messages as well as dynamic RBCs.

RailSiTe is prepared to integrate industrial RBCs.

The integrated RBC software simulator is driven by proprietary interfaces developed by DLR:

- Laboratory database for track topology
- Common interlocking interface for BEST (Funkwerk) or generic interlocking simulator
- ISDN interface for RBC ↔ RBC and EVC ↔ RBC communication
- ISDN switch box hardware and/or radio network software simulator for phone call routing (also from/to public ISDN network)
RBC Test Interfaces
Suggestions for common Test Interfaces

- Adaptation of the RailSiTe’s RBC interfaces for industrial RBCs is possible

- For exhaustive test campaigns a common test interface specification is needed to reduce the integration effort and to provide comparable results

- The interfaces are:
  - Track Data → RBC
  - Interlocking ↔ RBC
  - EVCs ↔ RBC
  - RBC ↔ RBC
RBC Test Interfaces
Track Topology Data

- RBC and laboratory must share the same track layout for testing. These includes: tracks, switches, block sections, signals, eurobalises, euroloops, etc.

- Industrial RBCs have proprietary data sources for the track information or use predefined messages selected by given train routes.

- Possible solutions for the track layout data interchange:
  - Development of data converter tools for each product/supplier
  - Usage of a standard file format for testing (e.g. railML)
  - Definition of a common standard track layout for testing
RBC Test Interfaces
Interlocking, EVCs, RBCs

- Interlocking
  - Changing train routes, switch positions, signal aspects
  - Change of train running numbers (both directions)
  - Track occupation state
  - Hardware: ISDN?

- EVCs
  - Euroradio messages
  - Hardware: ISDN S\textsubscript{2M}, GSM-R

- RBCs
  - Subset-039 (FIS, Application Level)
  - Hardware: ISDN S\textsubscript{2M}
Conclusion

- Industrial RBC integration into labs is difficult and expensive today
- Intensive RBC interoperability testing is needed
- Common testing interfaces for RBCs are required
- Common data format for test track layout is needed
Thank you for your attention!

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