Constituent Certification – RBC

ERTMS Integration, Validation and Certification Processes

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Constituent Certification – RBC
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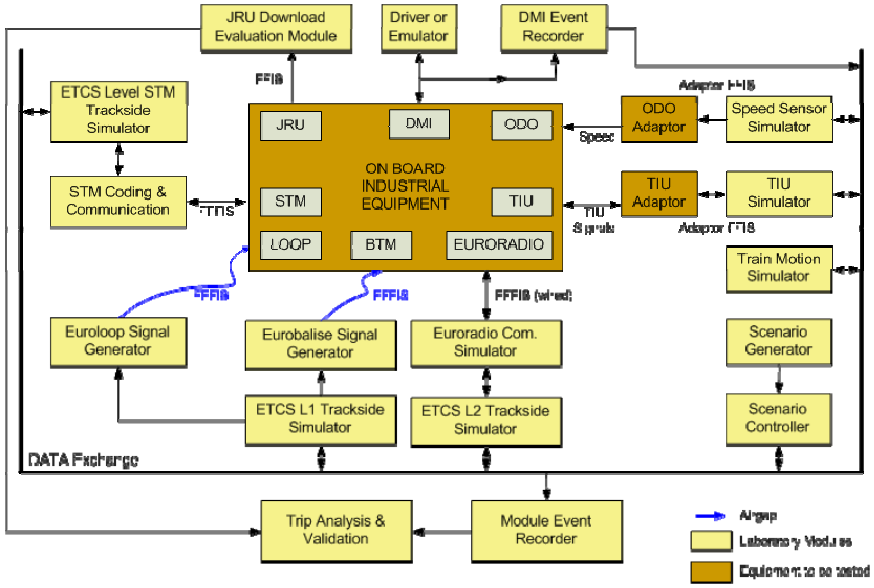
EVC Interoperability Certification

Common validation process in operation today

- EVC system boundaries well known
- Marginal impact of national operational rules and project specific features on EVC functions → “Generic EVC”



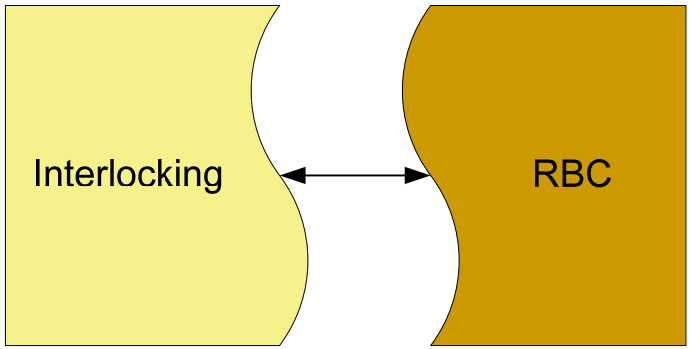
- Common testing environment well defined by Subset-094
- Common testing procedure well defined by Subset-076
- Reference labs fully compliant to Subset-094 available today

RBC Interoperability Certification

Common Validation Process not possible today

- The RBC is one of the central components of ERTMS / ETCS
- Nevertheless the RBC interoperability specification is incomplete
- RBC system boundaries to interlocking have no common definition
- No common RBC testing interface is specified (yet)
- No common interoperability tests are specified (yet)
- National operational rules define RBC functionality
- Project specific features affect RBC functions

- No common European "Generic RBC Core"



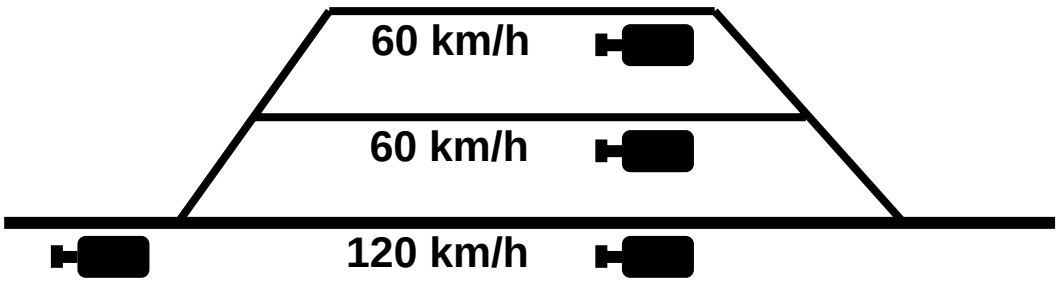
RBC Testing today
Individual Project Specific Tests

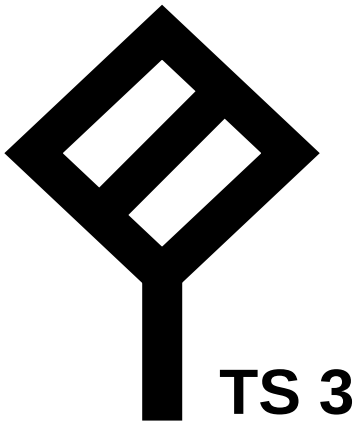
- RailSiTe® is able to integrate industrial RBCs and RBC simulations

- High efforts integrating the RBC into the laboratory
  - Sharing the track topology data RBC / laboratory
  - Providing a suitable interlocking reflecting the operational rules
  - Providing all necessary interfaces (hardware / software)
- Create sufficient test cases and test scenarios with respect to the required test coverage (reuse of test cases, tools and methods)
- Provide sufficient test “partners” (simulated / industrial)
  - Interlocking
  - Neighbor RBCs
  - EVCs

What makes RBC Testing so complex?

- RBC and Interlocking represent national operation rules
- Functionalities are dependant on track topology and engineering rules
- Behavior depends on fallback strategy
  (e.g. ETCS Level 1 or legacy systems)
- Complexity increases with the number of train routes





Need for common RBC Interoperability Tests
Current Situation

- The initial operation of ETCS Level 2 often causes problems
- Project specific tests of all EVC / RBC combinations are complex
- Field testing of GSM-R and RBC are often dependant
- Test coverage of all features are not always guaranteed
- No common approach for all projects
- Current tests are focused more on usability than on conformity

- RBC tests are not comparative and cause (repeatedly) high effort today

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

Thank you for your attention!

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