

Main Project Information

Safe4RAIL targets to provide the baseline for a fundamentally simplified embedded computing and networked Train Control Monitoring System (TCMS) platform for modular integration and certification for distributed hard real-time controls, safety signals and functions up to the highest Safety Integrity Level (SIL).

Safe4RAIL will reinforce European competitiveness by offering fundamentally simplified electronic and train control and monitoring architectures required for the optimization of railway systems. The outcomes refer to the reduction of the number of on-board computing devices, improved reliability, shortening the integration and (re-)commissioning times and thus life-cycle cost reduction, as well as the ability to implement the SIL4 functions in TCMS.

The project Safe4RAIL aims to create safety concepts for mixed-critical Ethernet-based networking as well as a mixed-critically application framework, including the brake-by-wire concept.

The project will provide recommendations for standardization and certification of next generation TCMS embedded platform.

In this Issue

- Main Project Information
- Message from the Coordinator
- Consortium
- Technical Approach
- Technical Meetings in Berlin and Siegen
- Ongoing Activities
- Safe4RAIL Public Deliverables submitted
- Complementary Project CONNECTA

Message from the Coordinator

The intention of this newsletter is to open a new communication channel in order to provide news on the project progress and to discuss ongoing topics relevant to **Safe4RAIL** for internal and external project partners, stakeholders and all other interested bodies. For more detailed information about and around the project we warmly invite you to have a regular look on our **project website**, which is kept up-to-date with the latest project related news. The project has successfully started with the kick-off meeting in October 2016 and since then the project has been in its initial stages of formation. The overall **system architecture** and the **requirements** of **Safe4RAIL** and of its management services is being discussed and defined as well as the first steps in the **Safe4RAIL** project have been taken.



Consortium

Safe4RAIL is driven by a cross-industry consortium, with automotive, aerospace, and railway industry experts with proven leadership in advanced networking technologies and design of deterministic embedded computing and networking platforms, modules and components for advanced integrated architectures and by-wire systems.

Key Data:

Start Date:	1 st of October, 2016
End Date:	30 th of September, 2018
Duration:	24 months
Project Reference:	730830
Project Costs:	€ 6,681,211.25
Project Funding:	€ 6,681,211.25
Complementary Project:	CONNECTA (Ref: 730539)

Consortium:

Project Coordinator:

Contact Person at Technikon:

Project Website:

11 partners (6 countries)

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Technical Approach

The **Safe4RAIL** project is planned to run for 24 months. It is organized into six work packages (WP).

WP1 Networking for Drive-By-Data focuses on the creation of a solid foundation and concepts for a “Drive-by-Data” train network architecture required for integrated modular architectures and next-generation TCMS.

WP2 Functional Distribution Architecture aims at providing the “Functional Distribution” architecture concept for a mixed criticality embedded platform, offering an execution environment for multiple TCMS application functions with a virtual bus inside the end-system.

WP3 Virtual Placement in the market develops a distributed simulation and validation framework concept for integrated modular architectures in railway systems, which allows SIL (software in the loop) & HIL (hardware in the loop) testing along with the coupling of simulators and physical systems at different sites.

WP4 Brake by Wire covers Safety concept for a specific highly critical application (brake by wire, emergency braking function) on the novel architecture and demonstrates the achievements of the other objectives. **WP5 Dissemination, Communication and Exploitation** encompasses activities that ensure the uptake of the results by the stakeholders with respect to the objectives.

WP6 Project-, Risk-, and Cooperation- Management ensures a successful project lifetime with respect to risk and innovation management.

Technical Meetings in Berlin and Siegen

The aim of our technical project meetings is to review the current status as well as discuss upcoming deliverables and milestones of the project.

The outcome of the discussion in our Berlin meeting (picture) was dedicated to the successful achievement of milestone MS1 (SOTA analysis and requirements definition are available) and MS2 (SOTA analysis and requirements definition are finalized, first concept designs are available). The workshop in our Siegen meeting resulted among others into well-defined tasks in order to pave the way for our milestones MS3 (communication strategy and exploitation plan available, structure fostered) and MS4 (intermediate concept designs are presented), which are due month 12 of the project period.



Ongoing Activities

After the successful project kick-off each partner has enthusiastically looked into their tasks within the particular WPs and started progress towards the objectives. The first set of eight deliverables has been submitted and the first two milestones were achieved. The following are some of the main achievements so far:

WP1: The activities related to the State of the Art (SOTA) on communication technology were completed in line with the planned milestone at the end of M3 (Dec 2016). Additionally, the requirements definition phase for Drive-by-Data started and a first set of requirements has been proposed.

WP2: A complete SOTA of functional distribution frameworks could be achieved. The deadline for the final submission in M3, Dec 2016, was met as planned and the resulting D2.1 deliverable was successfully released. Furthermore, a comparative analysis of the high-level SOTA requirements with the most representative solutions was being redacted.

WP3: The state of the art analysis and the definition of the high-level requirements could be completed and the design of the Distributed Simulation framework (DSF) is in progress.

WP4: D4.1 “Requirements definition for Brake by Wire” was released.

WP5: D5.1 “Internal and External IT Communication Infrastructure and Project Website”, as well as the project announcement letter and the Guides/IT-manuals for project-internal communication infrastructure were released.

WP6: The legal coordination in the organization of grant agreement, consortium agreement and collaboration agreement was successfully concluded and all legal activities in this respect have been completed. Furthermore, regular conference calls to discuss technical issues take place.

Safe4RAIL public deliverables submitted [M01-M06]

D1.1: State of the Art document on Drive-by-Data provides an overview of state-of-the-art in relevant technologies for deterministic high-bandwidth networking and reveals different use cases in transportation industries.

D1.2: Initial System Integration Requirements Document for Next-Gen TCMS constitutes an initial set of system, functional and non-functional requirements related to system integration for the design of next-generation TCMS. WP1 approach to requirement collection is presented.

D1.3: Initial Drive-by-Data Draft Concept Design provides an initial set of concept considerations which will be used in the further work. It is a starting point for discussions on Drive-By-Data concepts and solutions.

D2.1: Report on state-of-the-art of “functional distribution architecture” frameworks and solutions describes the state-of-the-art of functional distribution architecture frameworks including existing solutions from automotive, avionics and railway domains.

D3.1: Report on state-of-the-art analysis and initial requirements for distributed simulation framework gives a description of the SOTA of distributed simulation frameworks including existing solutions from other domains. In addition, the deliverable contains the initial requirements for the concept of the S4R simulation and validation framework.

D4.1: Requirements definition for Brake by Wire contains the collection of information necessary for the definition of requirements (SOTA). A first iteration of brake system and electronic control and communication requirements is provided, as well as standard and technologies applied in other transport sector and suitable for use (or as reference) for railway “brake by wire” systems.

D5.1: Internal and external IT communication infrastructure and project website briefly describes the website and its functionality. Further it describes the tools provided within the IT infrastructure to facilitate cooperation and coordination.

D6.1: Project Quality Plan is the project handbook and constitutes a set of project templates, explanations on the project management process, review process, quality checks, meeting organisation, which is communicated to all partners

Complementary Project CONNECTA

Under the Shift2RAIL programme, Safe4RAIL works closely together with the CONNECTA project in specific topics. These topics are:

- Drive-by-Data – Mixed-criticality Deterministic Ethernet
- Functional Distribution Architecture – Mixed-criticality Application Framework
- Virtual Placement in the market – Simulation and Testing Environment
- Brake-by-Wire – Electronic Emergency Brake Control Concept

The CONNECTA project clusters the expertise and knowhow of major European railway OEMs, brake system suppliers and operators, whereas Safe4RAIL brings in supplier expertise and safety knowhow on the four core topics addressed. The technical teams involved are working closely together to converge and propose joint concepts in a series of virtual and face-to-face workshops during the course of both projects.

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