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Issue

Safe4RAIL2

Safe architecture for Robust distributed Application Integration in roLling stock

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Message from Coordinator

Let me welcome you to the fifth and final issue of the Safe4RAIL-2 newsletter. In this issue we will show how the devices of the different technologies of Safe4RAIL-2 have been integrated in the Urban and Regional demonstrators of CONNECTA-2. After this integration, the devices have been used by CONNECTA-2 partners for doing tests on the demonstrators.

This final period of the project has also been very intense in terms of dissemination. Several podcasts have been recorded by Safe4RAIL-2 partners, and interviews with experts in 5G technology have also been carried out, where each expert has provided his/her viewpoint on the potential of 5G technology for railways. Additionally, a final project video has been recorded together with CONNECTA-2 partners, providing a summary of the different technical achievements and showing the cooperation between both projects. The joint Final Conference between Safe4RAIL-2 and CONNECTA-2 has also taken place in this period, which turned out as a fruitful event where several demonstrators of the project results were shown. In case you missed this online event, you can still view it on our project website.

In the next few weeks several public deliverables with final results will also be released. However, this will not be the end of the activities of Safe4RAIL-2. Many of the current technologies will continue their development in Safe4RAIL-3, which is the follow-up project of Safe4RAIL-2 that started at the end of 2020 and is already cooperating with its complementary project CONNECTA-3. Stay tuned to these projects for more updates.

Finally, I would like to thank all of you for following this newsletter and for your interest in the activities of Safe4RAIL-2. It has been a really difficult period for everyone due to the pandemic situation, but thanks to the implication and resilience of the project partners we have been able to bring the project to a successful ending. I hope the sanitary situation gets better soon and the on-going vaccination brings a safer and brighter future for everyone.

Kind regards.

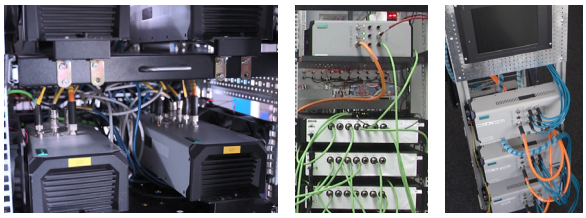
Aitor Arriola, IKERLAN
Safe4RAIL-2 Coordinator

Safe4RAIL-2 Results in CONNECTA-2 Demonstrators

In this final period of the project the different devices developed by Safe4RAIL-2 have been integrated in CONNECTA-2 Urban and Regional demonstrators. After that, Safe4RAIL-2 partners have provided support to the tests performed in these demonstrators.

Drive-by-Data devices:

TTTech has developed the TSN IP core and associated software for fast and easy integration onto FPGA – enabling open, standard deterministic switching functionality for the rail sector in the Safe4RAIL-2 project. The TSN IP has been integrated in MOXA's and WESTERMO's switches (i.e. ETBN and consist switches). Additionally, TTTech developed a PCIe card to enable the TSN feature for end devices (i.e. CCU).

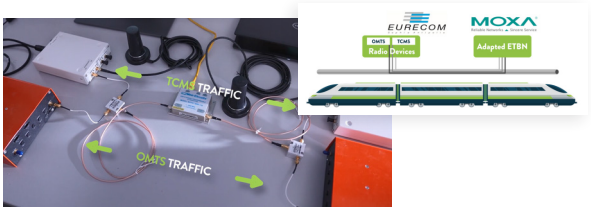


Drive-by-Data devices integrated in CONNECTA-2 Urban (left) and Regional Demonstrators (center and right)

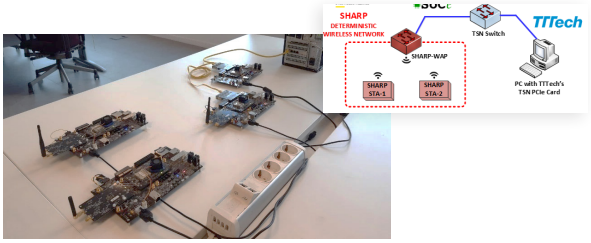
Wireless devices:

The wireless devices developed by EURECOM for the Wireless Train Backbone (WLTB) have been integrated in the Urban Demonstrator, together with the Adapted-ETBN of MOXA. These devices have been used to carry TCMS traffic in the train backbone, and have been integrated in a wireless test setup with variable attenuation to test the performance of the wireless link in different attenuation conditions.

A hybrid wired/wireless TSN demonstrator suitable for the Wireless Consist Network (WLCN) has also been done by IKERLAN, integrating its proprietary wireless SHARP solution with a TSN IP developed by SoC-e and proving its interoperability with the TSN IP developed by TTTech.



Wireless Train Backbone demonstrator



Wireless TSN Demonstrator

HVAC subsystem integrated in FDF and simulation environments:

The HVAC subsystem of LIEBHERR, attached to a chamber that reproduces the conditions of a train HVAC zone, has been integrated for remote operation in the Urban Demonstrator of CONNECTA-2, allowing the performance of Hardware-in-the-Loop (HIL) tests.

The same HVAC code used in this development has also been integrated in the Regional Demonstrator, on top of the AUTOSAR Adaptive Platform-based FDF developed by ETAS, based on RTA-VRTE.

LIEBHERR's HVAC Subsystem with chamber

Safe4RAIL-2/CONNECTA-2 Final Conference

Together with its complementary action CONNECTA-2, Safe4RAIL-2 organized a final online event, which took place on 30th June 2021.

The conference offered a great opportunity to receive an insight into Next-Generation Train Control Monitoring System (NG-TCMS) solutions. Participants could establish a proactive and instructive dialogue with both projects' partners and participate in the demonstrations, showing key technology test cases.

To kick-off the event a representative from Deutsche Bahn gave a keynote about the "Influence of Connecta-2 in OCORA" (Open Command, Control and Signalling On-board Reference Architecture). Afterwards, the coordinators of Safe4RAIL-2 and CONNECTA-2 provided an introduction of the Next Generation Train Control and Monitoring System. Before starting with the demonstrations, introductions in the two test cases were given. The first test case was about "Remote Hardware-in-the-Loop", and the second one was about "TSN Network & OPC UA". In dedicated sessions, Astrit Ademaj and Rene Smodic from TTTech and Vitali Schneider from Siemens showcased the demonstration and provided insights in the hidden part of the TSN Network, while Miguel Angel Sicilia showed the Remote Hardware-in-the-Loop demonstrator in a parallel session. After the demonstrations we focused on the lessons learned and provided a brief outlook on the way forward. To conclude the conference, the project officer of both projects, Gorazd Marinic, presented future Shift2Rail activities.

The Final Conference welcomed participants from railway undertakings, technology suppliers and manufacturers, safety experts, and authorities as well as academic participants in the domain of train control monitoring systems. The event was a great success, attracting 118 participants from all over Europe and Asia.

Public Deliverables Submitted

Since April 2021, the following public deliverables have been released on our project **website**:

D1.3 – "Drive-by-Data Demonstrator Support Report"

Report on the on and off-site support to the two demonstrators and the technical validation of the performance of the components and the networked system.

D2.3 - "LTE Equipment under Challenging Wireless Scenarios"

includes a detailed study of the impact of challenging conditions on the LTE D2D link for the wireless train backbone.

D2.4 - "Advanced Wireless Technologies and Applications for Wireless TCMS"

detailing the architecture and system supporting the integration of the Wireless TCMS with the Wireless Train Backbone Communications, including a common specification supporting each individual system requirement and architecture.

D2.6 – "Wireless Consist Network Report"

A State-of-the-Art review of wireless technologies for WLCN and a harmonized architecture for the future wireless consist network supporting the integration of various wireless technologies.

D3.4 – "Conclusions on integration of subsystems into FDF and SF"

This report includes conclusions on the integration of a TCMS application into FDF and SF. A methodology for development of TCMS applications on FDF and for integration into SF are provided.

D4.3 – "Final report on Dissemination & Communication activities"

This report includes a record of activities related to dissemination that have been undertaken in the 2nd project period.

Past Dissemination Activities

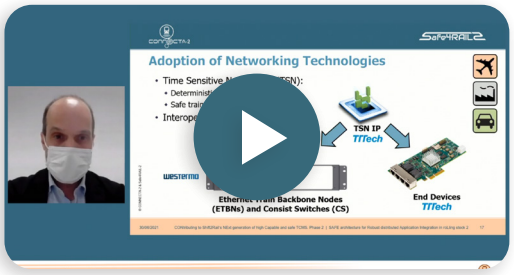
Expert interview video series

“5G reveals Wireless Options for Improving Safety and Reliability of Trains in Europe”

Final Dissemination Video

Safe4RAIL-2 and Connecta-2 Final Conference

30th June, online



Podcast Series

with project partners about achievements, results and challenges within the Safe4RAIL-2 project

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