

Preface

The RSSRail conference series began in 2016, in Paris, and this year the conference was held in Pistoia, Italy, hosted by DITECFER, the Tuscany-based railway technological district, which formally associates more than 40 enterprises and research bodies, and acts as a reference for many more companies that work in the railway domain.

The RSSRail conference aims to bring together researchers and engineers interested in building critical railway applications and systems, as a working conference in which research advances are discussed and evaluated by both researchers and engineers, focusing on their potential to be deployed in industrial settings.

This is the first international conference focusing on the reliability, safety, and security of railway systems. The conference is devoted to critical problems faced by the modern railway: how to deliver reliable service to passengers and to freight operators, while maintaining very high levels of safety. While it is true that these are problems that the railway sector has faced for almost 200 years, new factors and new trends demand new solutions. One of the biggest challenges stems from ever-increasing automation, driven by requirements for increased capacity and greater efficiency that are further compounded by increased integration of the railway network with other transport systems. The outcome is incorporation of ever more digital systems, with increasing complexity. This, together with the increased openness and interconnection of the railway systems, brings an ever-greater need for effective cyber security, guarding against malicious threats that could compromise both safety and operational performance.

Advanced techniques and tools are needed for modelling, analysis, verification, and validation that can cope with the new more complex systems; these techniques must support rather than impede the development process and must address and ensure:

- Required functionality
- Safety and integrity
- System security
- Adherence to standards

Our aim is to hold a conference that contributes to a range of key objectives. We feel that there is a pressing need to bring together researchers and developers working on railway system reliability, security, and safety to discuss how these requirements can be met in an integrated way. It is also vital to ensure that all advances in research (both in academia and industry) are driven by real industrial needs. This can help ensure that such advances are followed by industrial deployment. Another particularly important objective is to integrate research advances into the current development processes, and make them usable and scalable. Finally, a key goal is to develop advanced methods and tools that will ensure that the systems meet the requirements imposed by the standards and in building the arguments.

We hope that this conference will successfully contribute to all of these objectives.

RSSRail 2017 attracted 34 submissions from 12 countries. In all, 16 papers were accepted after a rigorous review process with every paper receiving at least three reviews. These include 11 technical papers, three industrial experience reports, and two PhD students papers. The papers confirm a wide interest in developing and applying in practice formal modelling and verification techniques as the most cost-effective way to guarantee the safety of today's very complex railway system. Besides these continued research area, two important topics clearly emerge from the accepted papers: the challenges posed to the safety and security of railway systems by the increasing reliance on advanced communication means, and the industrial interest in the expansion of automation and advanced signalling from the sector of main line railways to light rail and urban transit.

Three prominent researchers working on railway engineering, Jens Braband, from Siemens AG, Rail Automation and Honorary Professor of the Technical University of Braunschweig, Germany, Michael Leuschel, from Heinrich Heine Universität, Düsseldorf, Germany, and Aryldo Ar. Russo, from CERTIFER, France, kindly agreed to deliver keynote talks.

We would like to thank the Program Committee members and the additional reviewers for all their efforts. We warmly thank DITECFER, as well as all the industrial sponsors¹, for their help in making it possible to organize this event in Pistoia. We would like to acknowledge the help of Newcastle University staff: Joan Atkinson, Tom Anderson, Wayne Smith, and Dee Carr. We are grateful to Alfred Hofmann from Springer for supporting the publication of these proceedings in the LNCS series. But, most of all, our thanks go to all the contributors and the attendees of the conference for consolidating the success that this conference has experienced since its first edition.

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¹ AdaCore, ALSTOM, Altran, Ansaldo STS, ANSYS, ClearSy, ECM, Italcertifer, Sirti, Systereel, VectorCast.

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