

Reliability Engineering & System Safety

Journal Special Issue:

"Reliability and Safety Certification of Software-Intensive Systems"



Software is pervasive in our society: its scope is widening more and more in many critical domains such as avionics, space, railway, automotive, nuclear, medical, and air traffic control. As a consequence, it is of utmost importance to assure the society at large that deployment of a given software-intensive system does not contribute to pose an unacceptable risk of harm. As a result, new domain-specific standards have been introduced, such as the ISO 26262 for the automotive domain, the IEC 62304 as well as the ISO 14971 for the medical domain. In the avionic domain, the DO-178C and its companion supplements embrace methodological advances. DO-333, for instance, is a supplement of DO-178C that offers guidance for the adoption of formal methods in the software lifecycle. The goal of all these standards is to guide manufacturers and suppliers to provide evidence to justify claims of reliability and safety.

Despite the introduction of new and updated standards, the certification of software-intensive systems is still challenging, due to several technical limitations in software development and verification that affect our ability to achieve sufficient confidence: suffices to think of the limited use in industry of even the most basic formal techniques for software verification. These issues are today exacerbated by the *increasing complexity of software* (in terms of amount, depth, interactions, coupling, and criticality of functions implemented by the software) and the *emergence of new technologies, development practices, applications, and threats*. Moreover, assessing the safety of modern systems often requires significant effort and costs, leading to *conflicts of interest* between the public (as represented by certification and legal authorities), whose aim is to ensure reliability and safety, and commercial manufacturers, who strive for minimizing legal responsibility and for reducing costs.

This [special issue on the reliability and safety certification of software-intensive systems](#), which will be published by the *Reliability Engineering & System Safety (RESS)* journal, aims at addressing the limitations mentioned above. We invite researchers from academia and industry, practitioners, companies, domain experts,

and regulatory authorities to contribute to this special issue, by presenting novel and scalable solutions for the certification of modern software-intensive systems.

The special issue will feature original, high-quality work covering both theoretical and experimental research on methods, formalisms, techniques, tools and processes for supporting certification. It will focus on research work with compelling results from the application of novel solutions on **real-world case studies in critical domains**, and on industrial experiences with certification standards. This special issue will fit with the **aims and scope of the RESS journal**, which strives for impactful research on reliability and safety that balances academic material and practical applications, and will address a broad segment of RESS' authors and readers, given the strong relevance of software certification challenges.

The special issue will be open to **original, unpublished submissions** not previously presented at other venues. All papers will undergo a **peer-review process** to assure the quality and the originality of the research. The papers will be reviewed on the basis of the novelty of the proposed contributions, the technical and methodological rigor, and the practical impact and relevance of case studies and results for both the research and the industrial communities. Moreover, we invite **extended versions** of papers appeared in conferences and workshops related to the topics of this special issue, including the **workshop series on Software Certification (WoSoCer)** and the **IEEE International Symposium on Software Reliability Engineering (ISSRE)**.

Topics of interest

The special issue will feature novel research contributions on methodologies, techniques and tools for software certification. Topics of interest include, but are not limited to:

- **Qualitative and quantitative evaluation** of software for the certification of system safety and reliability;
- Certification of software for **emerging technological trends**, including dynamic, autonomic, large-scale, and distributed systems;
- Certification of **third-party components, software reuse and open-source software**;
- **Reuse of certification artifacts** across different systems and different reliability and safety standards;
- **Product-oriented certification and assurance cases**;
- Certification and best practices of **software development processes** in safety-critical domains;
- **Economics** of certification and standards;
- Open issues, practical experiences and empirical studies on **real-world case studies**.
- **Cross-fertilization** between reliability, safety and security, security-related standards and security certification.

Important dates

January 24, 2016: Paper submission deadline

March 31, 2016: Notification of decisions in the first round of reviews

May 15, 2016: Submission deadline for revised papers

June 30, 2016: Final notification of decisions

Summer 2016: Expected publication date (subject to the editorial calendar of the RESS journal)

Submissions

Authors are kindly invited to submit their articles via the journal's online submission and reviewing system, which is accessible at <http://ees.elsevier.com/ress/>. Authors should select "**SI:Software Certification**" as the "article type" during submission.

RESS journal Editor-in-Chief

- **Carlos Guedes Soares**, University of Lisbon, Portugal

Guest Editors

- **Barbara Gallina**, Mälardalen University, Sweden
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