

Advances in Intelligent Systems and Computing

Volume 582

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The series “Advances in Intelligent Systems and Computing” contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

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Advances in Dependability Engineering of Complex Systems

Proceedings of the Twelfth International
Conference on Dependability and Complex
Systems DepCoS-RELCOMEX,
July 2–6, 2017, Brunów, Poland

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Preface

This volume presents proceedings of the Twelfth International Conference on Dependability and Complex Systems DepCoS-RELCOMEX which took place in the Brunów Palace in Poland from 2nd to 6th July 2017.

The volume appears in the series “Advances in Intelligent Systems and Computing” (AISC) published by Springer Nature, one of the largest and most prestigious scientific publishers, in the series which is one of the fastest growing book series in their programme. The AISC is meant to include various high-quality and timely publications, primarily conference proceedings of relevant conference, congresses and symposia but also monographs, on the theory, applications and implementations of broadly perceived modern intelligent systems and intelligent computing, in their modern understanding, i.e. including tools and techniques of artificial intelligence (AI), computational intelligence (CI)—which includes neural networks, fuzzy systems, evolutionary computing, as well as hybrid approaches that synergistically combine these areas—but also topics such as multiagent systems, social intelligence, ambient intelligence, Web intelligence, computational neuroscience, artificial life, virtual worlds and societies, cognitive science and systems, perception and vision, DNA and immune-based systems, self-organizing and adaptive systems, e-learning and teaching, human-centred and human-centric computing, autonomous robotics, knowledge-based paradigms, learning paradigms, machine ethics, intelligent data analysis, various issues related to “big data”, security and trust management, to just mention a few. These areas are at the forefront of science and technology, and have been found useful and powerful in a wide variety of disciplines such as engineering, natural sciences, computer, computation and information sciences, ICT, economics, business, e-commerce, environment, health care, life science and social sciences. The AISC book series is submitted for indexing in ISI Conference Proceedings Citation Index (now run by Clarivate), EI Compendex, DBLP, SCOPUS, Google Scholar and SpringerLink, and many other indexing services around the world.

DepCoS-RELCOMEX is an annual conference series organized since 2006 at the Faculty of Electronics, Wrocław University of Science and Technology, formerly by Institute of Computer Engineering, Control and Robotics (CECR) and

now by Department of Computer Engineering. Its idea came from the heritage of the other two cycles of events: RELCOMEX (1977–89) and Microcomputer School (1985–95) which were organized by the Institute of Engineering Cybernetics (the previous name of CECR) under the leadership of Prof. Wojciech Zamojski, still the DepCoS chairman, so this year we can celebrate the 40th anniversary of its origins. In this volume of “Advances in Intelligent Systems and Computing”, we would like to present results of studies on selected problems of complex systems and their dependability. Effects of the previous DepCoS events were published (in chronological order) by IEEE Computer Society (2006–09), by Wrocław University of Technology Publishing House (2010–12) and presently by Springer in “Advances in Intelligent Systems and Computing” volumes no. 97 (2011), 170 (2012), 224 (2013), 286 (2014), 365 (2015) and 479 (2016).

Dependability is the contemporary answer to new challenges in reliability evaluation of complex systems. Dependability approach in theory and engineering of complex systems (not only computer systems and networks) is based on multidisciplinary attitude to system theory, technology and maintenance of the systems working in real (and very often unfriendly) environments. Dependability concentrates on efficient realization of tasks, services and jobs by a system considered as a unity of technical, information and human assets, in contrast to “classical” reliability which is more restrained to analysis of technical resources (components and structures built from them). Such a transformation has shaped natural evolution in topical range of subsequent DepCoS conferences which can be seen over the recent years. This edition additionally hosted the 7th CrISS-DESSERT Workshop devoted particularly to the challenges and solutions in analysis and assurance of critical infrastructure and computer (software and programmable logic-based) system safety and cybersecurity.

The Programme Committee of the 12th International DepCoS-RELCOMEX Conference, its organizers and the editors of these proceedings would like to gratefully acknowledge participation of all reviewers who helped to refine contents of this volume and evaluated conference submissions. Our thanks go to, in alphabetic order, Andrzej Białas, Ilona Bluemke, Eugene Brezhniev, Dariusz Caban, Frank Coolen, Manuel Gil Perez, Zbigniew Huzar, Igor Kabashkin, Vyacheslav Kharchenko, Leszek Kotulski, Alexey Lastovetsky, Jan Magott, István Majzik, Jacek Mazurkiewicz, Marek Młyńczak, Yiannis Papadopoulos, Oksana Pomorova, Krzysztof Sacha, Rafał Scherer, Mirosław Siergiejczyk, Janusz Sosnowski, Jarosław Sugier, Victor Toporkov, Tomasz Walkowiak, Irina Yatskiv, Wojciech Zamojski and Włodzimierz Zuberek.

Thanking all the authors who have chosen DepCoS as the publication platform for their research, we would like to express our hope that their papers will help in further developments in design and analysis of engineering aspects of complex systems, being a valuable source material for scientists, researchers, practitioners and students who work in these areas.

The Editors

Twelfth International Conference on Dependability and Complex Systems DepCoS-RELCOMEX

organized by
Department of Computer Engineering,
Wrocław University of Science and Technology
Brunów Palace, Poland, 2–6 July 2017

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Seventh CrISS-DESSERT Workshop

Critical Infrastructure Security and Safety (CrISS) -
Dependable Systems, Services & Technologies (DESSERT)

The CrISS-DESSERT Workshop evolved from the conference *Dependable Systems, Services & Technologies* DESSERT 2006–2016 (www.dessertcon.com). The 6th CrISS-DESSERT took place in Chernivtsi, Ukraine, 21–22 May 2016. In 2017, the 7th CrISS-DESSERT Workshop was held in the frameworks of the 12th Conference on Dependability and Complex Systems DepCoS-RELCOMEX.

The mission of the Workshop was to discuss challenges and solutions related to analysis and assurance of critical infrastructure and computer (software and programmable logic-based) system safety and cybersecurity. In particular, its focus was chosen in order to address:

- interplay and interdependencies of system of systems (telecommunication, smart grid, intelligent transportation system, etc.) and the current problems in providing its safety, security, reliability, quality of services, etc.;
- roles played by IT (SW, HW, FPGA)-based systems as the mandatory part of each infrastructure, thus turning distinct infrastructures into a complex cyber-physical system (system of systems) with emergent and cooperative behaviour, uncertainties, etc.;
- resource-effective IT-based approaches to safe and sustainable development.

The CrISS Workshop examined modelling, development, integration, verification, diagnostics and maintenance of computer and communications systems and infrastructures for safety-, mission- and business-critical applications.

Main Topics

The main topics on the workshop agenda included the following:

- Formal methods for critical IT infrastructures and systems development and verification
- Vulnerability analysis and intrusion-tolerant systems
- Evolving infrastructures and self-systems

- Dependability and resilience of Web-, cloud- and IoT-based IT infrastructures
- Safety of human-machine interfaces and systems including cooperative HMI&S
- Functional/system safety perspective of intelligent transport systems (ITS)
- Information & data modelling in ITS context
- IT infrastructures for pre- and post-accident monitoring of critical objects
- Safety- and assurance-case methodologies, techniques and tools
- Smart grid safety, reliability and security
- Power saving in IT infrastructures, data centres and computing clusters

Workshop Panel Discussion

Infrastructure and industrial systems safety and security: challenges, monitoring and assurance case-based solutions.

Workshop Chair

Vyacheslav Kharchenko	National Aerospace University KhAI, Centre for Safety Infrastructure Oriented Research and Analysis, Ukraine
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Co-chairs

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