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Murat Yilmaz · Paul Clarke ·
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Systems, Software and Services Process Improvement

28th European Conference, EuroSPI 2021
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Proceedings

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Preface

This volume comprises the proceedings of the 28th Systems, Software and Services Process Improvement (EuroSPI) Conference, held during September 1–3, 2021 in Krems, Austria.

Conferences have so far been held in Dublin (Ireland) in 1994, in Vienna (Austria) in 1995, in Budapest (Hungary) in 1997, in Gothenburg (Sweden) in 1998, in Pori (Finland) in 1999, in Copenhagen (Denmark) in 2000, in Limerick (Ireland) in 2001, in Nuremberg (Germany) in 2002, in Graz (Austria) in 2003, in Trondheim (Norway) in 2004, in Budapest (Hungary) in 2005, in Joensuu (Finland) in 2006, in Potsdam (Germany) in 2007, in Dublin (Ireland) in 2008, in Alcala (Spain) in 2009, in Grenoble (France) in 2010, in Roskilde (Denmark) in 2011, in Vienna (Austria) in 2012, in Dundalk (Ireland) in 2013, in Luxembourg in 2014, in Ankara (Turkey) 2015, in Graz (Austria) in 2016, in Ostrava (Czech Republic) in 2017, in Bilboa (Spain) in 2018, in Edinburgh (UK) in 2019, in Düsseldorf (Germany) in 2020, and in Krems (Austria) in 2021.

EuroSPI is an initiative with the following major goals <http://www.eurospi.net>:

- Establishing an annual EuroSPI conference supported by software process improvement networks from different EU countries.
- Establishing a social media strategy with groups in LinkedIn, Facebook, Twitter and online statements, speeches, and keynotes on YouTube, and a set of proceedings and recommended books.
- Establishing an effective team of national representatives (from each EU- country), which should grow step by step to include more countries of Europe.
- Establishing a European Qualification Framework for a pool of professions working with SPI and management. This is supported by European certificates and examination systems.

EuroSPI has a cooperation agreement with the EU Blueprint for Automotive project DRIVES (2018–2021), where leading automotive organizations discuss and present skills for the Europe 2030 strategy in the automotive sector.

EuroSPI also has a cooperation agreement with the EU Blueprint for Battery Systems ALBATTIS (2020–2023), where leading industrial organizations discuss and present skills for the creation of battery production in Europe for cars, ships, planes, industry plants, etc.

In addition, EuroSPI has established the SPI Manifesto (SPI = Systems, Software and Services Process Improvement), a set of social media groups including a selection of presentations and keynotes freely available on YouTube, and access to job role-based qualification through the European Certification and Qualification Association (www.ecqa.org).

From 2013 onwards, new communities (cybersecurity, Internet of Things, Agile) joined EuroSPI² and the meaning of the letter S was extended to System, Software,

Service, Safety, and Security and the meaning of the letter I was extended to Improvement, Innovation, and Infrastructure (Internet of Things).

In memory of our dear friend and long term EuroSPI Conference Series Editor, Prof. Rory O'Connor of Dublin City University and Lero – the Science Foundation Ireland Research Centre for Software, the committee has in collaboration with ISCN, ASQ, and Lero, established the Rory O'Connor Award for Research Excellence. On an annual basis, the individual presenting the highest quality work to the conference audience, especially in areas of major importance to our field, is awarded this honor.

A typical characterization of EuroSPI is reflected in a statement made by a company: "... the biggest value of EuroSPI lies in its function as a European knowledge and experience exchange mechanism for SPI and innovation."

Since its beginning in 1994 in Dublin, the EuroSPI initiative has outlined that there is not a single silver bullet with which to solve SPI issues, but that you need to understand a combination of different SPI methods and approaches to achieve concrete benefits. Therefore, each proceedings volume covers a variety of different topics, and at the conference we discuss potential synergies and the combined use of such methods and approaches.

These proceedings contain 15 selected research papers and 36 industry contributions under nine core themes:

- I: SPI and Emerging Software and Systems Engineering Paradigms
- II: SPI and Team Skills and Diversity
- III: SPI and Recent Innovations
- IV: SPI and Agile
- V: SPI and Standards and Safety and Security Norms
- VI: SPI and Good and Bad Practices
- VII: SPI and Digitalization of Industry, Infrastructure, and E-Mobility
- VIII: SPI and Good/Bad SPI Practices in Improvement
- IX: Virtual Reality (VR)

Of the core research contributions, only the highest quality research submissions were accepted. Theme I presents two papers related to SPI and emerging software and system engineering paradigms. Theme II presents a single paper related to team skills and diversity. Theme III presents two papers exploring SPI and recent innovations, while Theme IV contains two papers focused on Agile software development and SPI. Theme V includes two further papers concerned with standards and safety in software development, with Theme VI presenting four contributions on the topic of good and bad SPI practices. Theme VII contains a single paper on cybersecurity, and Theme VIII presents a further paper focused on digitalization, infrastructure, and e-mobility.

Industry contributions are presented separately to the core research contributions in these proceedings. Theme I presents five papers related to SPI and emerging software and system engineering paradigms. Theme II presents three papers exploring SPI and recent innovations, while Theme III contains three papers focused on Agile software development and SPI. Theme IV includes four additional industrial workshop contributions concerned with standards and safety in software development, with Theme V presenting two further contributions on the topic of good and bad SPI practices. Theme VI contains six papers on cybersecurity, and Theme VII presents eight further

contributions focused on digitalization, infrastructure, and e-mobility. Finally, Theme VIII contains five industry contributions focused on virtual reality.

To encourage synergy between best academic and industrial practices, the various core research and industrial contributions to this conference are presented side by side at the conference under the nine key themes identified for this EuroSPI edition.

September 2021

Murat Yilmaz
Paul Clarke
Richard Messnarz
Michael Reiner

Recommended Further Reading

In [1] the proceedings of three EuroSPI conferences were integrated into a single book, which was edited by 30 experts in Europe. The proceedings of EuroSPI 2005 to 2020 inclusive have been published by Springer in [2–17], respectively.

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EuroSPI established an international committee of selected well-known experts in SPI who are willing to be mentioned in the program and to review a set of papers each year. The list below represents the Research and Industry Program Committee members. EuroSPI also has a separate Industrial Program Committee responsible for the industry/experience contributions.

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