

Editorial Board

Simone Diniz Junqueira Barbosa

*Pontifical Catholic University of Rio de Janeiro (PUC-Rio),
Rio de Janeiro, Brazil*

Phoebe Chen

La Trobe University, Melbourne, Australia

Alfredo Cuzzocrea

ICAR-CNR and University of Calabria, Italy

Xiaoyong Du

Renmin University of China, Beijing, China

Joaquim Filipe

Polytechnic Institute of Setúbal, Portugal

Orhun Kara

TÜBİTAK BİLGEM and Middle East Technical University, Turkey

Igor Kotenko

*St. Petersburg Institute for Informatics and Automation
of the Russian Academy of Sciences, Russia*

Krishna M. Sivalingam

Indian Institute of Technology Madras, India

Dominik Ślęzak

University of Warsaw and Infobright, Poland

Takashi Washio

Osaka University, Japan

Xiaokang Yang

Shanghai Jiao Tong University, China

Tanja Woronowicz Terry Rout
Rory V. O'Connor Alec Dorling (Eds.)

Software Process Improvement and Capability Determination

13th International Conference, SPICE 2013
Bremen, Germany, June 4-6, 2013
Proceedings

Volume Editors

Tanja Woronowicz
University of Bremen, Germany
E-mail: worono@tzi.de

Terry Rout
Griffith University, Brisbane, QLD, Australia
E-mail: t.rout@griffith.edu.au

Rory V. O'Connor
Dublin City University, Ireland
E-mail: roconnor@computing.dcu.ie

Alec Dorling
InterSPICE Ltd, Cambridge, UK
E-mail: alec.dorling@interspice.uk.com

ISSN 1865-0929

e-ISSN 1865-0937

ISBN 978-3-642-38832-3

e-ISBN 978-3-642-38833-0

DOI 10.1007/978-3-642-38833-0

Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: Applied for

CR Subject Classification (1998): K.6, D.2, J.1, J.3, C.2, K.4

© Springer-Verlag Berlin Heidelberg 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

On behalf of the SPICE Organizing Committee we are proud to present the proceedings of the 13th International Conference on Software Process Improvement and Capability dEtermination (SPICE 2013), held in Bremen, Germany, during June 4–6, 2013.

The SPICE Project was formed in 1993 to support the development of an international standard for software process assessment. The work of the project has eventually led to the finalization of ISO/IEC 15504 – Process Assessment, and its complete publication represented a climax for the work of the project. As part of its charter to provide ongoing publicity and transition support for the emerging standard, the project organized a number of SPICE Workshops and Seminars, with invited speakers drawn from project participants.

These have now evolved to a sustaining set of international conferences with broad participation from academia and industry with a common interest in model-based process improvement. This was the 13th in the series of conferences organized by the SPICE User Group to increase knowledge and understanding of the International Standard and of the technique of process assessment.

The conference program featured invited keynote talks, research papers, and industry experience reports on the most relevant topics related to software process assessment and improvement. The technical research papers were selected for presentation following peer review by members of the Program Committee. In addition, a number of tutorials were hosted.

SPICE conferences have a long history of attracting attendees from industry and academia. This confirms that the conference covers topics that are upto date, important, and interesting. SPICE 2013 offered a unique forum for industry and academic professionals to discuss their needs and ideas in the area of process assessment and improvement, and related aspects of quality management.

On behalf of the SPICE 2013 conference Organizing Committee, we would like to thank all participants. Firstly all the authors, whose quality work is the essence of the conference, and the members of the Program Committee, who helped us with their expertise and diligence in reviewing all of the submissions. As we all know, organizing a conference requires the effort of many individuals. We wish to thank also all the members of our Organizing Committee, whose work and commitment were invaluable.

June 2013

Tanja Woronowicz
Terry Rout
Rory V. O'Connor
Alec Dorling

Organization

General Chair

Alec Dorling InterSPICE, UK

Program Chair

Terry Rout Griffith University, Australia

Local Organizing Chair

Tanja Woronowicz University of Bremen, Germany

Industry Chair

Matthias Brucke Clustermanager Automotive Northwest e.V.,
Germany

Michael Hoffmann Aviabelt Bremen e.V., Germany

Proceedings Chair

Rory V. O'Connor Lero, Dublin City University, Ireland

Tutorial Chair

Timo Varkoi Spinet Oy, Finland

Social Networking Chair

Ravindra Joshi Morphius Consulting, India

Publicity Chair

Carol Dekkers Quality Plus Technologies, USA

Program Committee

Beatrix Barafort, Luxembourg	Giuseppe Lami, Italy
Matthias Brucke, Germany	Marion Lepmets, Luxembourg
Luigi Buglione, Italy	Catriona Mackie, UK
Aileen Cater-Steel, Australia	Antonia Mas, Spain
Melanie Cheong, Australia	Tom McBride, Australia
Gerhard Chroust, Austria	Fergal McCaffery, Ireland
Paul Clarke, Ireland	Takeshige Miyoshi, Japan
Francois Coallier, Canada	Martin Möhrle, Germany
Antonio Coletta, Italy	Risto Nevalainen, Finland
Fabrizio Fabbrini, Italy	Rory O'Connor, Ireland
Mario Fusani, Italy	Hanna Oktaba, Mexico
Dennis Goldenson, USA	Mark Paulk, USA
Christiane Gresse von Wangenheim, Brazil	Patricia Rodriguez Dapena, Spain
Victoria Hailey, Canada	Clenio Salviano, Brazil
John Horch, USA	Jean-Martin Simon, France
Linda Ibrahim, USA	Fritz Stallinger, Austria
Ravindra Joshi, India	Robert Treffny, Germany
Ho-Won Jung, South Korea	Timo Varkoi, Finland
Rainer Koschke, Germany	

Local Organizing Committee

Michael Boronowsky	University of Bremen, Germany
Matthias Brucke	Clustermanager Automotive Nordwest e.V., Germany
Martin Möhrle	University of Bremen, Germany
David Wewetzer	University of Bremen, Germany
Tanja Woronowicz	University of Bremen, Germany
Marta Michael-Zamorano	University of Bremen, Germany

Acknowledgments

The local organizers acknowledge the support of the Chair for TZI at the University of Bremen, Prof. Dr. Rainer Malaka; the Senator for Economic Affairs and Ports of the Free Hanseatic City of Bremen, Mr. Martin Günthner; and the Senator for Education and Science of the Free Hanseatic City of Bremen, Prof. Dr. Eva Quante-Brandt.

The conference organizers wish to acknowledge the assistance and support of the SPICE User Group, SPICE 2013 Program Committee, and reviewers in contributing to a successful conference.



Table of Contents

Process Quality

Safety as a Process Quality Characteristic	1
<i>Timo Varkoi</i>	
Derivation of Green Metrics for Software	13
<i>Giuseppe Lami, Luigi Buglione, and Fabrizio Fabbrini</i>	

Medical Device Software Processes

A Process Assessment Model for Security Assurance of Networked Medical Devices	25
<i>Anita Finnegan, Fergal McCaffery, and Gerry Coleman</i>	
The Approach to the Development of an Assessment Method for IEC 80001-1	37
<i>Silvana Togneri MacMahon, Fergal McCaffery, and Frank Keenan</i>	
The Development and Current Status of Medi SPICE	49
<i>Valentine Casey and Fergal McCaffery</i>	

Design and Use of Process Models

An Approach to Development of an Application Dependent SPICE Conformant Process Capability Model	61
<i>Michael Boronowsky, Antanas Mitasiunas, Jonas Ragaisis, and Tanja Woronowicz</i>	
An Improvement of Process Reference Model Design and Validation Using Business Process Management	73
<i>Olivier Mangin, Nicolas Mayer, Béatrix Barafort, Patrick Heymans, and Eric Dubois</i>	
Comparing SPiCE for Space (S4S) and CMMI-DEV: Identifying Sources of Risk from Improvement Models	84
<i>Ricardo Eito-Brun</i>	

Studies of Software Development

Assessing Software Product Management Capability: An Industry Validation Case Study	95
<i>Fritz Stallinger, Robert Neumann, and Robert Schossleitner</i>	

Using ISO/IEC 12207 to Analyze Open Source Software Development Processes: An E-Learning Case Study 107
Aarthy Krishnamurthy and Rory V. O'Connor

A Case Study on the Need to Consider Personality Types for Software Team Formation 120
Çağrı Murat Karapınar and Onur Demirörs

Agile Development

Assessment of Agile Maturity Models: A Multiple Case Study 130
Ozden Ozcan-Top and Onur Demirörs

Agile Software Development in System Engineering Conditions 142
Ernest Wallmüller and Fred Kaminski

TestSPICE and Agile Testing – Synergy or Confusion 154
Tomas Schweigert, Detlef Vohwinkel, Monique Blaschke, and Mohsen Ekssir-Monfared

IT Service Management

Can ‘Soft’ Organisational Problems Be Solved by ‘Hard’ Process Reference Models? 165
David Tuffley

Exploring the Impact of IT Service Management Process Improvement Initiatives: A Case Study Approach 176
Marko Jäntti, Terry Rout, Lian Wen, Sanna Heikkinen, and Aileen Cater-Steel

Software-Mediated Process Assessment in IT Service Management 188
Aileen Cater-Steel, Wui-Gee Tan, Mark Toleman, Terry Rout, and Anup Shrestha

Assessment for Diagnosis

Balancing Agility and Discipline in a Medical Device Software Organisation 199
Martin McHugh, Fergal McCaffery, Brian Fitzgerald, Klaas-Jan Stol, Valentine Casey, and Garret Coady

Investigation of Traceability within a Medical Device Organization 211
Gilbert Regan, Fergal McCaffery, Kevin McDaid, and Derek Flood

Usage of Multiple Process Assessment Models 223
Stasys Peldzius and Saulius Ragaisis

Short Papers

Implementing innoSPICE in Support of Political European Innovation Strategies	235
<i>Tanja Woronowicz, Michael Boronowsky, and David Wewetzer</i>	
Industrial Experience Report: BiSL as Driver for Innovating Business Information Management in the Dutch Police Organization(s)	239
<i>Frank van Outvorst and Lex Scholten</i>	
Lessons from a Pilot Implementation of ISO/IEC 29110 in a Group of Very Small Irish Companies	243
<i>Rory V. O'Connor and Marty Sanders</i>	
Critical Design Decisions in the Development of the Standard for Process Assessment	247
<i>Terence P. Rout</i>	
Developing the Enterprise SPICE Strategy Using Enterprise SPICE	252
<i>Linda Ibrahim</i>	
Scorecard Based Project Performance Management	256
<i>Bharathi V. and Udaya Shastry</i>	
Parameterized Generation of Process Variants and Project-Specific Operating Procedures from Business Process Models	261
<i>Jennifer Schöffler, Anne Kramer, and Norbert Kastner</i>	
Author Index	267