



# 18<sup>th</sup> International Conference on Reliable Software Technologies

## Ada-Europe 2013

June 10-14, 2013, Berlin, Germany



## PRELIMINARY PROGRAM



The 18<sup>th</sup> International Conference on Reliable Software Technologies - Ada-Europe 2013 will take place in Berlin, Germany, from June 10 to 14, 2013. The conference will offer an outstanding technical programme, invited talks, an exhibition from Tuesday to Thursday, and a series of tutorials on Monday and Friday.

The conference will provide an international forum for researchers, developers and users of reliable software technologies all over the world. Presentations and discussions cover applied and theoretical work currently conducted to support the development and maintenance of reliable software systems.



ACM SIGAda, SIGBED, SIGPLAN

[www.ada-europe2013.org](http://www.ada-europe2013.org)



The conference is supported and sponsored by Ada-Europe, Ada Deutschland e.V., Gesellschaft für Informatik e.V., Karlsruhe Institute of Technology, DFG, and organized in cooperation with ACM SIGAda, SIGBED, SIGPLAN



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## Conference Program at a Glance

### Schedule

Date / Time	Morning	Afternoon		Late afternoon / Evening
Saturday, June 08 until Monday, June 10	ISO/IEC JTC 1/WG23			
Monday, June 10	Tutorial 1 - 3	Tutorial 4 - 6		Get Together
Tuesday, June 11	Registration Keynote 1 Session Multicore and Distributed Systems	Session Industrial Experience 1 Special Session: Ada 2012	Session Ada and Spark Products (Vendor Session)	Ada Europe General Assembly Welcome Party
Wednesday, June 12	Keynote 2 Session Dependability	Products (Vendor Session) Session Industrial Experience 2		Conference Dinner at the Botanical Garden
Thursday, June 13	Keynote 3 Panel: How to Use the Heap in Real-Time Systems	Session Real-Time Systems Closing Session		
Friday, June 14	Tutorial 7 - 9	Tutorial 7, 10 - 11		
Friday, June 14 until Sunday, June 16	ISO/IEC JTC 1/WG 9 ISO/IEC JTC 1/WG 9/ARG			

### Working Groups (by invitation only)

Saturday, June 08, 2013, Room t.b.a.	
09.00 – 19.00	ISO/IEC JTC 1/WG23
Sunday, June 09, 2013, Room t.b.a.	
09.00 – 19.00	ISO/IEC JTC 1/WG23
Monday, June 10, 2013, Room t.b.a.	
09.00 – 19.00	ISO/IEC JTC 1/WG23

Friday, June 14, 2013, Room t.b.a.	
09.00 – 14.00	ISO/IEC JTC 1/WG 9
14.00 – 19.00	ISO/IEC JTC 1/WG 9/ARG
Saturday, June 15, 2013, Room t.b.a.	
09.00 – 19.00	ISO/IEC JTC 1/WG 9/ARG
Sunday, 16.06.2013, Room t.b.a.	
09.00 - 15.00	ISO/IEC JTC 1/WG 9/ARG

### Social Events

#### Monday, June 10, 2013

**18.00 Get Together (Tutorials and Conference Participants)**

#### Tuesday, June 11, 2013

**19.00 Welcome Party**

#### Wednesday, June 12, 2013

**19.00 Conference Dinner at the Botanical Garden**



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## Keynotes

**Bruce Powel Douglass, Chief Evangelist IBM Rational:**

**Model-based Ada Development for DO-178B/C and the Application of Agile Methods.**

**Jack G. Ganssle, The Ganssle Group:**

**The Way Ahead in Software Engineering: Replacing Artists With Disciplined Grownups.**

**Giorgio C. Buttazzo, Scuola Superiore Sant'Anna of Pisa, Italy:**

**Research Challenges in Exploiting Multi-Core Platforms for Real-Time Applications**

## Tutorials

**Monday, June 10, 2013, Room announced locally**

08.00	Registration		
09.00	<b>Tutorial 1:</b> <i>T. Taft, AdaCore, USA:</i> <b>Multicore programming using divide-and-conquer and work stealing</b>	<b>Tutorial 2:</b> <i>J.-P. Rosen, Adalog, France:</i> <b>Designing and checking coding standards for Ada</b>	<b>Tutorial 3:</b> <i>W.G.Bail, The MITRE Corporation, USA:</i> <b>Effective requirements development practices and their role in effective design</b>
13.30	<b>Tutorial 4:</b> <i>K. Nilsen, Atego Systems, Inc., USA:</i> <b>Understanding dynamic memory management in safety critical Java</b>	<b>Tutorial 5:</b> <i>J.-P. Rosen, Adalog, France:</i> <b>Developing code analysis applications with ASIS</b>	<b>Tutorial 6:</b> <i>W.G.Bail, The MITRE Corporation, USA:</i> <b>Verification and validation techniques for dependable systems</b>

**Friday, June 14, 2013**

09.00	<b>Tutorial 7:</b> <i>B. Sanden, Colorado Technical University, USA:</i> <b>Design of multitask software: The entity-life modeling approach</b>	<b>Tutorial 8:</b> <i>I. Broster, Rapita Systems, UK:</i> <b>Testing real-time software</b>	<b>Tutorial 9:</b> <i>R. Sward, The MITRE Corporation, USA:</i> <b>Service-oriented architecture and enterprise service bus tutorial</b>
13.30	<i>Continuing Tutorial 7:</i> <i>B. Sanden:</i> <b>Design of multitask software: The entity-life modeling approach</b>	<b>Tutorial 10:</b> <i>J. de la Puente, Universidad Politécnica de Madrid, Spain:</i> <b>Developing high-integrity systems with GNAT GPL and the Ravenscar profile</b>	<b>Tutorial 11:</b> <i>D. Sauvage, AdaLabs Ltd, Republic of Mauritius:</i> <b>Maximize your application potential</b>

## Internet Access

WiFi is available and free of charge.



[www.Ada-Europe2013.org](http://www.Ada-Europe2013.org)



## Conference Sessions

### Tuesday, June 11, 2013, Conference Room

08.00 Registration open

09.00 Opening Session

09.15 -  
10.15

#### Invited Talk

**Bruce Powel Douglass, Chief Evangelist IBM Rational:  
Model-based Ada Development for DO-178B/C and the Application of  
Agile Methods.**

Bruce Powel Douglass is the Chief Evangelist for IBM Rational® with over 30 years specializing in the development of real-time and embedded systems and software. He is the author of the IBM Rational Harmony™ for Embedded Real-Time Development (Harmony/ERT) process. Bruce developed the IBM Rational Rhapsody® DoDAF profile that currently ships with the product as well as a Safety Analysis Profile that allows engineers to include Fault Tree Analysis (FTA) diagrams, Fault Means and Effect Analysis (FMEA), and hazard analysis in their models.



#### Coffee Break

#### Session Multicore and Distributed Systems (Chair: N.N.)

10.45 - Hector Perez and J. Javier Gutiérrez (Universidad de Cantabria, Spain):  
11.20 Experience with the integration of distribution middleware into partitioned systems

12.20 - Stephen Michell, Brad Moore and Luis Miguel Pinho (Maurya Software Inc, General Dynamics, Canada,  
11.55 Polytechnic Institute of Porto, Portugal):  
Tasklettes, a Fine Grained Parallelism for Ada on Multicores

11.55 - J. Reinier van Kampenhout and Robert Hilbrich (Fraunhofer FOKUS, Germany):  
12.30 Model-Based Deployment of Mission-Critical Spacecraft Applications on Multicore Processors

#### Lunch

#### Session Industrial Experience 1 (Chair: N.N.)

14.00 - Jacob Sparre Andersen, Kim Rostgaard Christensen and Thomas Løcke (AdaHeads K/S, Denmark):  
14.30 Alice in Adaland

14.30 - Daniel Bigelow (Bigelow Informatics, Switzerland):  
15.00 A pragmatic application of the GNAT Project Manager facility to large system development

#### 15.00 - Special Session: Ada 2012

16.00 Introducing Ada 2012 (Tucker Taft)

#### Coffee Break

#### Session Ada and Spark (Chair: N.N.) Main Room

#### Products (Vendor Session) Second Room

16.45 - Carl Brandon and Peter Chapin (Vermont Technical College,  
17.20 USA):  
A SPARK/Ada CubeSat Control Program

(to be announced)


17.20 - Thomas Quinot and Eric Botcazou (AdaCore, France):  
17.55 Lady Ada Mediates Peace Treaty in Endianness War

18.00 Ada Europe General Assembly

19.00 Welcome Party

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## Wednesday, June 12, 2013

09.00 - 10.00	<p style="text-align: center;"><b>Invited Talk</b></p> <p><b>Jack G. Ganssle, The Ganssle Group: The Way Ahead in Software Engineering: Replacing Artists With Disciplined Grownups.</b></p> <p>Jack Ganssle has written over 700 articles and six books about embedded systems, as well as a book about his sailing fiascos. He started developing embedded systems in the early 1970s using the 8008. He's developed or managed over 100 embedded products, from deep-sea navigation gear to the White House security system. He was a member of NASA's Super Problem Resolution Team, a group of outside experts formed to advise NASA in the wake of Space Shuttle Columbia's demise, and serves on the boards of several high-tech companies.</p>	
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Coffee Break

### Session Dependability (Chair N.N.)

10.45 - 11.20	Barry Fagin and Martin Carlisle (US Air Force Academy, USA): Provably Secure DNS: A Case Study in Reliable Software
11.20 - 11.55	Irene Bicchierai, Giacomo Bucci, Carlo Nocentini and Enrico Vicario (Università di Firenze, Italy): Using ontologies in the integration of functional, structural, and process perspectives in the development of safety critical systems
11.55 - 12.30	Xiaozhen Xue and Akbar Siami Namin (Texas Tech University, USA): Measuring the Odds of Statements Being Faulty

Lunch

14.00 - 15.45	<b>Products (Vendor Session)</b>
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Coffee Break

### Session Industrial Experience 2 (Chair: N.N.)

16.30 - 17.00	Mark Lorenzen (Terma A/S, Denmark): Benefits Gained from Using Ada on the ASIM Project
17.00 - 17.30	David Dhenaux and David Sauvage (SmartSide, France, AdaLabs Ltd., Mauritius): Feedback on improving a Smart Metering product performance and scalability using multi core and distribution while preserving its correctness
17.30 - 18.00	Alexander Senier (secunet Security Networks AG, Germany): Designing, Implementing and Formally Verifying a High-Assurance Workstation

19.00	<b>Conference Dinner at the Botanical Garden</b>
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## Thursday, June 13, 2013

09.00 - 10.00	<p style="text-align: center;"><b>Invited Talk</b></p> <p><b>Giorgio C. Buttazzo, Scuola Superiore Sant'Anna of Pisa, Italy: Research Challenges in Exploiting Multi-Core Platforms for Real-Time Applications</b></p> <p>Giorgio Buttazzo is Full Professor of Computer Engineering at the Scuola Superiore Sant'Anna of Pisa. He is Editor-in-Chief of the Journal of Real-Time Systems (Springer) and Associate Editor of the IEEE Transactions on Industrial Informatics. He is Chair of the IEEE Technical Committee on Real-Time Systems and IEEE Fellow "for contributions to dynamic scheduling algorithms in real-time systems". He has authored 6 books on real-time systems and over 200 papers in the field of real-time systems, robotics, and neural networks.</p>	
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Coffee Break





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<b>Panel: How to Use the Heap in Real-Time Systems (Chair: N.N.)</b>	
10.45 -	Panelists:
12.30	S. Tucker Taft (AdaCore, USA): On Region-Based Storage Management for Parallel Programming Tom Grosman (Atego Systems, Inc., USA): Extending the Java Type System to Enforce Disciplined Use of Scope-Allocated Objects James Hunt (aicas GmbH, Germany): On Dynamic Memory Management in Real-Time, Safety-Critical System
<b>Lunch</b>	
<b>Real-Time Systems (Chair: N.N.)</b>	
14.00 –	Emilio Salazar, Alejandro Alonso, Miguel A. de Miguel and Juan A. de La Puente (Universidad Politécnica de Madrid, Spain):
14.35	A Model-based Framework for Developing Real-Time Safety Ada Systems
14.35 -	Andrea Baldovin, Enrico Mezzetti and Tullio Vardanega (University of Padua, Italy):
15.10	Towards a Time-Composable Operating System
15.10 –	Ismael Lafoz, Esteban Asensio, Andrew Coombes and Julian Navas (GMV Aerospace and Defence, Spain, Airbus Military - EADS, Spain, Rapita Systems Ltd., U.K.):
15.45	Worst-Case Execution Time Analysis Approach for Safety-Critical Airborne Software
<b>Coffee Break</b>	
<b>Closing Session</b>	
16.30 -	Best Paper Award
17.00	Best Presentation Award

## Exhibition

The exhibition will span the three days of the main conference. Vendors and providers of software products and services should contact the Exhibition Chair Peter Dencker at [peter.dencker\(@\)etas.com](mailto:peter.dencker(@)etas.com) for further information.



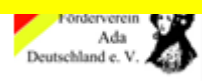
## Sponsors

Organized by Ada Deutschland e.V. and its scientific counterpart, the special interest group Ada of the Gesellschaft für Informatik (GI), the conference was sponsored by Ada-Europe, the European federation of national Ada societies, in cooperation with GI, ACM SIGAda, SIGBED, and SIGPLAN.

We gratefully acknowledge additional sponsorship by DFG, the German Research Foundation, and by AdaCore and Ellidiss.



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## Tutorials

### Tutorial 1

**T. Taft, AdaCore, USA: Multicore programming using divide-and-conquer and work stealing**



This half-day tutorial will introduce the attendee to some of the issues of parallel programming for multicore systems.

We will discuss various models used for creating and then managing efficiently large numbers of "picothreads." The tutorial will first cover the basic technique of "divide and conquer" as it applies to splitting up computations into large numbers of separate sub-computations. We will provide examples using Intel's Cilk+ language, as well as using Go, Rust, and ParaSail, three new parallel programming languages.

The tutorial will then go on to investigate the "work-stealing" scheduling mechanism used by the Cilk+ run-time, Intel's Threaded Basic Blocks library, as well as the ParaSail virtual machine. Work-stealing is an efficient way to handle the large number of very small "picothreads" created in abundance by these parallel programming technologies. We will also discuss the issues of managing storage to provide safety and separation between concurrent tasks, including per-task heaps, unique pointers, and region-based storage management. We will include a short discussion of heterogeneous parallel programming, using auxiliary chips such as Graphics Processing Units (GPUs) as general purpose processors (GPGPU).

Intended audience: Intermediate to Advanced knowledge of programming, with some understanding of multi-threaded/multi-tasking issues, including race conditions and synchronization.

Reason for attending: Attendees will learn the various paradigms for creating algorithms that will take advantage of the growing number of multicore processors, while avoiding the overhead of excessive synchronization overhead. Attendees will also learn the theory and practice of "work stealing," a multicore scheduling approach which is being adopted in numerous multicore languages and frameworks, as well as the various tradeoffs associated with different multicore storage management approaches.

### Tutorial 2

**J.-P. Rosen, Adalog, France: Designing and checking coding standards for Ada**



Most companies have developed coding standards (often because having one is a requirement for certification), but few have conducted a real analysis of the value, consistency, and efficiency of the coding standard.

This tutorial presents the challenges of establishing a coding standard, not just for the sake of having one, but with the goal of actually improving the quality of software. This implies not only having "good" rules, but also having rules that are understood, accepted, and adhered to by the programming team.

The issues of automatically checking the rules is also fundamental: experience shows that no manual checking can cover the programming rules to a satisfactory extent. The tutorial presents the tools available, and criteria for choosing such a tool.

Reasons for attending:

Understand the value of coding standards, learn how to choose your own coding rules, in a way that's both useful and efficient, consider the difficulties and pitfalls of introducing coding standard to the development teams, and how to overcome them.

Biography: JP Rosen is a professional teacher, teaching Ada (since 1979, it was preliminary Ada!), methods, and software engineering. He runs Adalog, a company specialized in providing training, consultancy, and services in all areas connected to the Ada language and software engineering. He is chairman of AFNOR's (French standardization body) Ada group, AFNOR's spokesperson at WG9, member of the Vulnerabilities group of WG9, and chairman of Ada-France.

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## Tutorial 3

**W.G.Bail, The MITRE Corporation, USA: Effective requirements development practices and their role in effective design**



Requirements form the basis for all modern system development. They establish the stakeholders expectations for the system to be developed/delivered, and they evolve into the “as-built” specifications for the system after it is completed. Requirements fall into natural categories, and must be managed consistent with their category, including defining a verification approach. During construction, requirements naturally evolve, but this evolution must be carefully controlled to avoid unexpected perturbations to the development plan.

This tutorial discusses the technical basis of requirements, addresses shortcomings in current practices, and provides guidance for enhanced practices that address historic the shortcomings.

## Tutorial 4

**T. Grosman; K. Nilsen, Atego Systems, Inc., USA: Understanding dynamic memory management in safety critical Java**



In spite of the high-level abstraction benefits of automatic tracing garbage collection, current prevailing sentiment within the safety certification community is that a simpler memory model is required for the most rigorous levels of software safety certification. Thus, the draft JSR-302 specification for safety critical Java relies on scope-based memory allocation rather than tracing garbage collection. For each thread, the associated scopes are organized as a stack of memory allocation regions. To eliminate the possibility of dangling pointers, objects residing in outer-nested scopes are never allowed to refer to objects residing in inner-nested scopes. The scoped memory model for JSR-302 is a simplification of the RTSJ model. JSR-302 enforces a strict hierarchy of scopes and distinguishes private scopes, which can be seen only by one thread, from mission scopes, which can be accessed by all the threads that comprise a mission, including threads running within inner-nested sub-missions. The hierarchical memory structure allows implementations to guarantee the absence of memory fragmentation for scope management, unlike the Real-Time Specification for Java from which the JSR-302 specification was derived.

In the absence of block structure, it is more difficult in Java to safely manage references to scope-allocated objects than in Ada. Enforcing that outer-nested objects do not refer to inner-nested objects requires, in general, a run-time check at reference assignment time. The run-time check will throw a run-time exception if the assignment is deemed inappropriate. The safety certification evidence for a given safety-critical Java program must therefore include an argument for every reference assignment that it will not cause the program to abort with a run-time exception. Furthermore, the certification evidence must prove that sufficient memory is available to reliably execute each safety-critical task in the system.

This tutorial provides an overview of dynamic memory management in Safety Critical Java and describes two annotation systems that have been designed to support static (compile-time) enforcement of memory safety properties. The first annotation system is described in an appendix to the draft JSR-302 standard. This relatively simple annotation system, which is not considered normative, serves to demonstrate that memory safety can be statically proven without requiring extensive annotations throughout existing library code. The second annotation system is the system implemented in Perc Pico. This annotation system, which is much richer than the draft JSR-302 annotation, has been in experimental use for over five years. During that time, tens of thousands of lines of experimental application code have been developed, with the experience motivating a variety of refinements to the original design. Both annotation approaches allow static verification to prove that illegal reference assignment exceptions will not be thrown at run time.



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## Tutorial 5

**J.-P. Rosen, Adalog, France: Developing code analysis applications with ASIS**



ASIS (Ada Semantic Interface Specification) is an ISO Standard (ISO/IEC 15291:1999) that defines an API for analysing Ada programs. In practice, an ASIS implementation is often (but not always) tight to a compiler. It can be seen as a way to browse the decorated abstract syntax tree of the program.

Ada is a sophisticated language. Simple-minded tool that do not account for visibility rules, type and overloading resolution, etc. are unable to do any serious work. The benefit of using ASIS is that it frees the developer of an Ada tool from rewriting half of an Ada compiler.

This tutorial is intended for those who want to write a tool that processes Ada code, or are just interested in learning how the various tools that are based on ASIS work. No knowledge of compilation techniques is required, the necessary elements are presented as part of the tutorial. Finally, the ASIS standard, which has not changed since Ada95, is currently undergoing an upgrade to Ada 2012. The tutorial concludes with the current evolution of the proposal for the upcoming standard.

Expected audience experience: casual Ada experience.

Reasons for attending:

- Understand how language analysis tools work.

- Learn how to develop you own analysis tool.

- Participate in open source projects using ASIS.

Biography: see Tutorial 2

## Tutorial 6

**W.G.Bail, The MITRE Corporation, USA: Verification and validation techniques for dependable systems**



The practice of verification and validation (V&V) is a key and essential ingredient in of any software development effort. While often thought of as being just testing, V&V actually consists of a variety of practices, including reviews, inspections, and audits. An effective selection and application of appropriate V&V practices can increase product quality and dependability as well as assist in meeting cost and schedule goals.

In this tutorial we examine the nature of V&V as applied to software, and present techniques that have been shown to effective. We also discuss their individual strengths and weaknesses, and provide advice on how to select the appropriate practices based on the nature of the system under development.

## Tutorial 7

**B. Sanden, Colorado Technical University, USA: Design of multitask software: The entity-life modelling approach**



The tutorial introduces entity-life modeling (ELM). It is a design approach for multitask, reactive software, that is software that responds to events in the environment as they occur. It is not a multi-step method but rather a pattern-based extension of object orientation into the time dimension: The central idea is that the task architecture should reflect concurrency that exists in the problem.

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The tutorial follows the presenter's book *Design of multithreaded software: The entity-life modeling approach* (IEEE Computer Society/Wiley 2011) but uses Ada terminology. ELM was originally developed with Ada tasking in mind but works with Real-time Java as well. The tutorial is illustrated with multiple Ada examples.

Level: Intended for architects, designers, and programmers of real-time and interactive software as well as software-engineering academics and students interested in concurrency. If tasking is considered an "advanced" aspect of Ada, the level of the tutorial is advanced. It assumes general knowledge of tasking or threading.

Reasons for attending: Understand and eventually learn the ELM way of designing reactive, multitask software.

Bibliography: Dr. Bo Sanden began his career as a software developer in industry and had the opportunity to study and design multithreaded software. 1986-87 he was a Visiting Associate Professor in the pioneering software-engineering program at the Wang Institute, Tyngsboro, MA. As an Associate Professor at George Mason University, Fairfax, VA 1987-1996, he helped create a master's program in software systems engineering. Since 1996 he is a Professor of Computer Science at Colorado Technical University in Colorado Springs, where he has taught at the undergraduate and master's levels and now exclusively teaches and directs student research in the Doctor of Computer Science program. Dr. Sanden is the inventor of entity-life modeling and the author of "Design of multithreaded software: The entity-life modeling approach." He gave this tutorial at Ada Europe 2012 in Stockholm, June 2012, and at the ACM conference on High Integrity Language, HILT'12, in Boston, December 2012.

## Tutorial 8

### I. Broster, Rapita Systems, UK: Testing Real-Time Software



How do you verify that your software really does what you think, all the time, in time? This tutorial will cover fundamentals of testing real-time software, focusing on issues that hit embedded and real-time systems such as software timing, performance, and structural code coverage on-target. We analyse the differences between on-target and on-host testing and understand the challenges of working in embedded systems. Different ways of getting access to an embedded computer are discussed; including the impact that measuring has on the software under test (the "probe effect").

We look specifically at timing issues, measuring and analysing worst case execution time, and other performance metrics, and spend a little time understanding optimization issues. Structural code coverage measurements including MC/DC are explained and their benefit and relevance to reliable software testing. The relevant objectives of DO-178B and a new automotive standard ISO26262 are discussed. Finally, we will cover other software verification issues that arise such as verifying complex constraints and sequences.

This tutorial includes interactive sessions, and there is an element of practical work in Ada and other languages: Testing on-host and on target, Problems of testing real-time software, Working on embedded targets, The probe effect, Timing issues, Performance metrics, Worst case execution time - techniques, theory and practice, Optimization issues, Structural code coverage, MC/DC coverage, DO178B/C and ISO26262, Verifying sequences and other constraints.

About the Presenter: Dr Ian Broster is a founder and Director of Rapita Systems Ltd, a company specializing in on-target software verification. He is an experienced, lively lecturer who has given numerous training courses, lectures and presentations on this and other topics. His previous Ada Europe tutorials receive consistently excellent feedback. He has been involved with Ada since 1995 and earned his PhD at the Real-Time Systems Research Group of University of York.

## Sponsorship



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## Tutorial 9

**R. Sward, The MITRE Corporation, USA; J. Boleng, The Software Engineering Institute, Pittsburgh, USA: Service-Oriented Architecture concepts and implementations**



This tutorial explains how to implement a Service-Oriented Architecture (SOA) for reliable systems using an Enterprise Service Bus (ESB) and the Ada Web Server (AWS). The first part of the tutorial describes terms of Service-Oriented Architectures (SOA) including service, service registry, service provider, service consumer, Service Oriented Architecture Protocol (SOAP), REST, and Web Service Description Language (WSDL). This tutorial also presents principles of SOA including loose coupling, encapsulation, composability of web services, and statelessness of web services. The tutorial also covers the benefits of SOA and organizations that are supporting SOA infrastructure. The second part of the tutorial covers the Enterprise Service Bus (ESB) including definitions, capabilities, benefits and drawbacks. The tutorial discusses the difference between SOA and an ESB, as well as some of the commercially available ESB solutions on the market. The Mule ESB is explored in more detail and several examples are given. In the third part, the tutorial covers the Ada Web Server (AWS) built using the Ada programming language. The tutorial covers the capabilities of AWS and explains how to build and install AWS. The tutorial explains how to build an AWS server and include the server in an Ada application. The tutorial demonstrates how to build a call back function in AWS and build a response to a SOAP message. Finally, the tutorial explains how to connect an AWS server to an ESB endpoint. AWS is a key component to building a SOA for a reliable system. This capability allows the developer to expose services in a high-integrity system using the Ada and SPARK programming languages.

## Tutorial 10

**Juan A. de la Puente and Juan Zamorano, Universidad Politécnica de Madrid, Spain: Developing high-integrity systems with GNAT GPL and the Ravenscar profile**



The tutorial will summarize the main aspects of the Ravenscar profile, as well as some other basic real-time facilities available in Ada 2012. Programming patterns for analyzable real-time systems will be described, together with software development techniques for high-integrity systems. The use of the GNAT GPL for the LEGO MINDSTORMS NXT tool chain will be described in the context of a comprehensive example. A LEGO MINDSTORMS NXT robot will be used as a platform for the use of cross-development and debugging tools.

Level: Intermediate. The tutorial is aimed at project managers, systems engineers, and developers of critical software systems.

Reasons for attending: Attendants will learn the main concepts and techniques needed to develop high-integrity real-time systems on a representative platform for robotic applications. A LEGO MINDSTORMS NXT will be used for a comprehensive example of software development using GNAT GPL for LEGO MINDSTORMS NXT.

Presenters: Juan Antonio de la Puente is a professor at Universidad Politécnica de Madrid (UPM). He has been teaching Ada and Real-Time systems for more than 20 years. As the head of the real-time systems group at UPM, he has led the development and evolution of the Open Ravenscar real-time Kernel (ORK), and the work in UPM on GNAT GPL for LEGO MINDSTORMS NXT that includes the porting to Linux/GNU hosts as well as integrating tools for developing real-time embedded software.

Juan Zamorano is an assistant professor at Universidad Politécnica de Madrid (UPM), with more than 20 years' experience in teaching real-time systems and computer architecture. He is the technical manager of the ORK project, and is responsible for ORK maintenance at UPM and the work in UPM on GNAT GPL for LEGO MINDSTORMS NXT, that includes the porting to Linux/GNU hosts as well as integrating tools for developing real-time embedded software.



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## Tutorial 11

**D. Sauvage, AdaLabs Ltd, Republic of Mauritius: Maximize your application potential**



Ada is well known for its rich semantic for multicore and distributed systems. But do all Ada applications use those strengths at the right place? Use of Ada tasking and distributed semantics is powerful, but this can also introduce some issues concerning test strategies, dynamic architecture strategies and type constraints. The participant will learn how to easily maximize the use of multicore and distributed systems on their applications.

Description of the topic: Learn how to use multicore and distributed systems in your application. For example test strategies (monotask profile), dynamic architecture strategies (e.g. alternating per components tasking strategy i.e. 'vertical tasking strategy' and/or per data-flow tasking strategy i.e. 'horizontal tasking strategy'), type constraints for DSA (limited types ...).

Outline of the presentation: An overview of multicore and distributed systems, Ada capacities and corresponding existing tools. Then, the participant will be able to use a framework called Rachis in real-life project examples. Rachis will host user-components and will allow efficient use of multicore and distribution (DSA).

Examples/Tutorials will include maximize multicore use on your application components, create a multicore distributed version of your application (without any code change), customizing multicore and distributed systems policies.

Level of the tutorial: Introductory and Intermediate

Recommended audience: software engineer

Reasons for attending: This tutorial gives key knowledge and experience to software engineers willing to maximize the use of multicore and distributed systems for their applications.

Presenter lecturing expertise: David Sauvage graduated from ESME Sudria (French engineering school) in 2004. He started as a software engineer at Thales, where he discovered Ada. Working on tactical data link product lines, he then became an agile software architect. In 2010, he formed AdaLabs Ltd (<http://adalabs.com>), a company specialized in Ada based technologies and services, located in the Republic of Mauritius. David build his expertise on multicore and distributed systems by enhancing multicore and distributed systems on existing industrial software product lines, and designing distributed test environments.

## Conference Location

### Berlin

The conference will take place in Berlin, city of many charms. The most difficult activity for tourists is the search for a piece of the Berlin Wall. It has all but disappeared in the vibrant capital of Germany.

Berlin has over 170 museums, making the city one of the world's prime locations for first-rate historical art collections, cultural exhibitions, and museums of science and technology. The theatres of performing arts offer programs from opera to musicals, from drama to comedy, from classics to ultra-modern. For a calendar and up-to-date information on events browse under <http://www.berlin.de>

### Hotel

The conference site is the Seminaris Conference Hotel. The hotel represents a modern life style and aims to suit the demands of visitors to conferences, business meetings, and cultural programs in Berlin and its surroundings. Each of the 186 first-class rooms are air-conditioned, with bath or shower/WC, TV, minibar, large desk, safe, phone, and high-speed internet access. Named the Dahlem Cube, the conference center in the shape of a glass cube with its 2600 sqm of conference space is a masterpiece of modern architecture by Helmut Jahn, Chicago. The hotel is located in the suburb Dahlem at Takustraße 39, 14195 Berlin, and connected to the center of Berlin by subway transportation of about 30 minutes. Details are found under <http://www.seminaris.de/berlin>.



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## Banquet at the Botanic Garden

The conference dinner will take place at the Botanic Garden of the Freie Universität Berlin. The pleasure and kitchen garden of the Berlin palace had become too small by 1679 and so the Great Elector Friedrich decided to enlarge his herb garden in the suburbs and to create a model agricultural garden. In 1718 Friedrich Wilhelm I gave it away to the Prussian Academy of Sciences. Today with 22,000 different species of plants on 43 hectares our Botanic Garden has become one of the largest and most diverse botanical gardens in the world. The Botanic Garden is in walking distance to the hotel.



## Conference Chairs and Committees

### Conference and Program Co-Chairs

Hubert B. Keller, Karlsruhe Institute of Technology, Germany  
Erhard Plödereder, University of Stuttgart, Germany

### Other Chairs

Jürgen Mottok, Regensburg University of Applied Sciences, Germany (Tutorial Chair)  
Jørgen Bundgaard, Ada in Denmark & Rambøll Danmark, Denmark (Industrial Chair)  
Peter Dencker, ETAS GmbH, Germany (Exhibition Chair)  
Dirk Craeynest, Ada-Belgium & KU Leuven, Belgium (Publicity Chair)  
Herbert Klenk, EADS, Germany (Proceedings Chair)  
Raúl Rojas, FU Berlin, Germany (Local Chair)  
Christine Harms, ccHa, Germany (Local Organizer)

### Programm Committee

Ted Baker, US National Science Foundation, USA • Johann Blieberger, Technische Universität Wien, Austria • Bernd Burgstaller, Yonsei University, Korea • Alan Burns, University of York, UK • Dirk Craeynest, Ada-Belgium & KU Leuven, Belgium • Juan A. de la Puente, Universidad Politécnica de Madrid, Spain • Franco Gasperoni, AdaCore, France • Michael González Harbour, Universidad de Cantabria, Spain • Xavier Grave, Centre National de la Recherche, France • Christoph Grein, Ada Germany, Germany • J. Javier Gutiérrez, Universidad de Cantabria, Spain • Peter Hermann, University of Stuttgart, Germany • Jérôme Hugues, ISAE Toulouse, France • Hubert Keller, Karlsruhe Institute of Technology, Germany • Pascal Leroy, Google, Switzerland • Albert Llemosí, Universitat de les Illes Balears, Spain • Kristina Lundqvist, Mälardalen University, Sweden • Franco Mazzanti, ISTI-CNR Pisa, Italy • John McCormick, University of Northern Iowa, USA • Stephen Michell, Maurya Software, Canada • Luís Miguel Pinho, CISTER Research Centre/ISEP, Portugal • Erhard Plödereder, University of Stuttgart, Germany • Jürgen Mottok, Regensburg University of Applied Sciences, Germany • Manfred Nagl, RWTH Aachen University, Germany • Laurent Pautet, Telecom ParisTech, France • Jorge Real, Universitat Politècnica de València, Spain • Jean-Pierre Rosen, Adalog, France • José Ruiz, AdaCore, France • Ed Schonberg, AdaCore, USA • Tucker Taft, AdaCore, USA • Theodor Tempelmeier, Univ. of Applied Sciences Rosenheim, Germany • Elena Troubitsyna, Åbo Akademi University, Finland • Tullio Vardanega, Università di Padova, Italy • Juan Zamorano, Universidad Politécnica de Madrid, Spain

### Industrial Committee

Jørgen Bundgaard, Rambøll Danmark, Denmark • Jacob Sparre Andersen, JSA, Denmark • Jamie Ayre, AdaCore, France • Ian Broster, Rapita Systems, UK • Rod Chapman, Altran Praxis Ltd, UK • Dirk Craeynest, Ada-Belgium & KU Leuven, Belgium • Peter Dencker, ETAS, Germany • Michael Friess, AdaCore, France • Ismael Lafoz, Airbus Military, Spain • Ahlan Marriott, White-Elephant GmbH, Switzerland • Steen Ulrik Palm, Terma, Denmark • Paolo Panaroni, Intecs, Italy • Paul Parkinson, Wind River, UK • Ana Isabel Rodríguez, GMV, Spain • Jean-Pierre Rosen, Adalog, France • Alok Srivastava, TASC Inc, USA • Claus Stellwag, Elektrobit AG, Germany • Jean-Loup Terrailon, European Space Agency, The Netherlands • Rod White, MBDA, UK





# 18<sup>th</sup> International Conference on Reliable Software Technologies Ada-Europe 2013

## Conference Fees and Registration

Working Group, Tutorial or Conference Registration as well as Accommodation Request can only be made online. The early registration is possible until April, 30<sup>th</sup> and online registration is possible until June, 2<sup>nd</sup>.

### Conference Registration

The registration fee for the three days of the technical program (June 11-13) includes one copy of the proceedings, coffee breaks, lunches, dinners and welcome reception on Tuesday 11 June evening, and the banquet on Wednesday 12 June evening. The registration fee for a single day of the technical program includes one copy of the proceedings, two coffee breaks, and the lunch on the day of the registration.

Conference		Early registration by April, 30th	Late/on-site registration after April, 30th	Day registration
<b>Member</b> of Ada-Europe, ACM SIG (Ada, BED, PLAN), Ada Germany	Academia	580 €	730 €	365 €
	Non academia	640 €		
Non-member	Academia	640 €	790 €	395 €
	Non academia	700 €		
Student (1)		470 €	640 €	n.a.

(1) Student discount: A limited number of student registrations at the reduced rate will be accepted. Interested students should apply to the Conference Chair including a copy of the student ID card. For presenters of papers, student rebates will not be given unless another author is registered at a regular conference fee. Applications will only be considered upon reception of the grant application email and the student status confirmation.

### Tutorial Registration

The fee is per tutorial, including tutorial notes and coffee breaks. Lunches are only included when registered for a full day tutorial or two half day tutorials on the same day. Without conference registration an additional amount of 30,00 EUR for tutorial registration will be charged.

Tutorial	Early registration by April, 30th	Late/on-site registration after April, 30th
Half day	130 €	145 €
Full day or two half days on the same day	260 €	290 €

### Accommodation

Please book your accommodation at the conference hotel by using the online conference registration form only. The hotel is non-smoking. WiFi and Wellness area are free of charge. Parking fee is 12,00 Euro per day. Check-in: 3 p.m., check-out 11.00 a.m.

Hotel Seminaris	Double room (single use)	Double room (two persons)
Cost per night	99 €	134 €
Weekend rate (Fri-Sun)	86 €	106 €

A block of rooms at reduced prices has been reserved at the hotel until April, 30th. After that date rooms cannot be guaranteed. Attendees are asked to stay at the conference hotel and make hotel reservations only on the conference registration page.



**VDE**

VDI/VDE-Gesellschaft  
Mess- und Automatisierungstechnik



[www.Ada-Europe2013.org](http://www.Ada-Europe2013.org)



# 18<sup>th</sup> International Conference on Reliable Software Technologies Ada-Europe 201313

## PARTICIPANT REGISTRATION FORM

18TH INTERNATIONAL CONFERENCE ON RELIABLE  
SOFTWARE TECHNOLOGIES – ADA-EUROPE 2013, 10-14 JUNE  
2013, BERLIN, GERMANY

**Participant** Ms  Mr  Title: \_\_\_\_\_

First name: \_\_\_\_\_ Last name: \_\_\_\_\_

Affiliation/Organization: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Zip/Postal code: \_\_\_\_\_ City: \_\_\_\_\_

Country: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Special requirements (e.g. diet): \_\_\_\_\_

**Permission** to release personal data for conference purposes  
(participants list etc.)

Name, Institution, Town, Email Yes  No

Name, Institution only Yes

Please indicate whether you agree to receive information about other  
related conferences by the organizing institutions: Yes  No

### Membership

Reduced registration fee

Member Ada-Europe, ACM SIG (Ada, BED, PLAN), Ada Germany

Academia

VIPs (use only by instruction of the conference organizers)

Membership number (if any): \_\_\_\_\_

Additional Comments: \_\_\_\_\_

### Registration Type

Early (until April, 30th)

Late or on site (after April, 30th)

**Registration Fees** (see table on previous page or web site)

### Conference registration fee

Three days registration: \_\_\_\_\_ EUR

Individual days (Tue  Wed  Thu ): \_\_\_\_\_ EUR

### Tutorial registration

(please indicate the tutorials for which you want to register):

Monday, 10 June, morning T1  T2  T3

Monday, 10 June, afternoon T4  T5  T6

Friday, 14 June, morning T7  T8  T9

Friday, 14 June, afternoon T10  T11

Tutorial registration fee: \_\_\_\_\_ EUR

*Without conference registration add 30,00 EUR for Tutorial  
registration*

### Working Groups (members only)

ISO WG23 (Saturday, 8.6. – Monday, 10.6.) 195 Euro

ISO WG9 (Friday, 14.6.) 0 Euro

ISO WG9/ARG (Friday, 14.6. – Sunday, 16.6.) 185 EUR

WG registration fee: \_\_\_\_\_ EUR

*Without conference registration add 30,00 EUR for WG  
registration*



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## Extra packages

Extra tickets for banquet (@ 120 EUR each): \_\_\_\_\_ EUR  
Extra proceedings (@ 30 EUR each): \_\_\_\_\_ EUR

## Accommodation at Seminaris Hotel

Arrival Date: \_\_\_\_\_ Departure Date: \_\_\_\_\_

Single  Double Occupancy

### Name of accompanying person:

First Name \_\_\_\_\_ Last Name \_\_\_\_\_

Extra tickets for lunches and dinners may be obtained at the conference registration desk.

Dietary Restrictions: \_\_\_\_\_

Special Requests: \_\_\_\_\_

Accommodation total cost: \_\_\_\_\_ EUR

**Total Payment Due** \_\_\_\_\_ EUR

## Terms and Conditions

Your registration or accommodation request will be confirmed only after the payment has been processed by an invoice and will be valid after receiving your payment in time. Substitutions will be accepted. Receipts will be handed out at the conference. Cancellation must be always confirmed in writing, please include all your banking information. Refund of fees, with deduction of € 30.00 for administrative duties, will be made for cancellations received before 30 April 2013. Refund of fees, with deduction of 50% of the total amount, will be made for cancellations received before 25 May 2013. After that date, no refunds will be possible. Refunds will be processed and paid after the Conference. For latest information, see <http://www.ada-europe2013.org/>. For additional information, contact the conference secretariat Christine Harms under: [registration@ada-europe2013.org](mailto:registration@ada-europe2013.org)

## Payment method

**By credit card** Visa  Mastercard  Diners

Card Number: \_\_\_\_\_ Expiry date: \_\_\_\_\_

Cardholder Name: \_\_\_\_\_ CVC <sup>(1)</sup>: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I hereby authorize my account to be debited directly for the sum of: \_\_\_\_\_ €

If payment is made by credit card, please send a printed registration with your credit card account separately by Fax to 0049 2641 90 35 80.

(1) The Card Validation Code is the final 3 digits of the number printed in the signature strip on the reverse of your card.

**By bank transfer**<sup>(2)</sup>, to account number (IBAN)

International Bank details:

Account Name: Christine Harms,

Bank Name: Volksbank RheinAhrEifel eG.,

Address: Hauptstr. 119, 53474 Bad Neuenahr-Ahrweiler,  
Germany,

BIC: GENODED1BNA,

IBAN: DE 07 5776 1591 0399 4063 00

Please mention your name, your company and „AE2013“ and in case of an invoice its number.

(2) Please make checks or bank transfers in Euro. Payments in other currencies will not be accepted.

**Förderverein Ada Deutschland e.V.,  
Erasmusstr. 3, 76139 Karlsruhe  
[www.ada-deutschland.de](http://www.ada-deutschland.de)**



[www.Ada-Europe2013.org](http://www.Ada-Europe2013.org)

