13th International Conference on
RELIABLE SOFTWARE TECHNOLOGIES
ADA-EUROPE 2008

VENICE 16 - 20 JUNE 2008

13th INTERNATIONAL CONFERENCE ON RELIABLE SOFTWARE TECHNOLOGIES

VENICE, ITALY, 16-20 JUNE 2008

Association for
Computing Machinery

ADVANCE PROGRAM

http://www.ada-europe.org/conference2008.html

PRELIMINARY PROGRAM

The 13th International Conference on Reliable Software Technologies – Ada-Europe 2008 will take place in Venice, Italy, on 16-20 June 2008. The conference has established itself as an international forum for providers, practitioners and researchers into reliable software technologies. Following tradition, the conference will span a full week, with at its centre from Tuesday to Thursday a three-day technical program accompanied by vendor exhibitions, and at either end on Monday and Friday a string of parallel tutorials.

Venice, the first venue of the conference series in Italy, is a marvel that words won't explain. You really want to wander its alleys and enjoy the experience of its floating on the water. We are truly fortunate at being able to host the conference at a 10-minute walk from piazza San Marco, the most renowned centre of Ve-netian urban architecture, which still bears the signs of amazingly thriving cultural and commercial life when the Venetian republic was the gateway of Europe to the Far East. The conference centre, built on a fully-refurbished and modernly equipped restoration of a XVI-century convent, is located at the "Zattere" overlooking the Giudecca island, on the South-South-East angle of Venice, just behind the Accademia, which holds treasures of art.

Venice has the third busiest airport in Italy, directly connected to all capital cities in Europe, and to some major cities in the USA and Asia. The airport location offers a majestic view of the lagoon on many landing and take-off routes. Venice is connected to the airport via both water and land transport.

OVERVIEW OF THE WEEK

	Morning	Late Morning	Early Afternoon	Afternoon
Monday 16 June Tutorials	Jean-Pierre Rosen *AADL: Architecture Analysis and Design Language*			
	John Barnes *The Best of Ada 2005*		Matthew Heaney *Object-Oriented Programming in Ada 2005*	
	Tullio Vardanega, Juan Antonio de la Puente *Preserving Model-Asserted Properties at Run Time for High-Integrity Systems*		William Bail *Technical Basis of Model Driven Engineering*	
Tuesday 17 June Sessions & Exhibition	**Keynote Talk** Alberto Sangiovanni-Vincentelli *Embedded Software Design: Art or Science?*	**Embedded Systems**	**Formal Verification**	**Applications of Petri Nets**
			Vendor Session	**Vendor Session**
Wednesday 18 June Sessions & Exhibition	**Keynote Talk** Robert Dewar *Lost in Translation*	**Industrial Presentations**	**Industrial Presentations**	**Industrial Presentations**
			Ada and Education	**Ada and Education**
Tuesday 19 June Sessions & Exhibition	**Keynote Talk** Christian Queinnec *Three Ways to Improve SOA Reliability*	**Language Technologies**	**Model-Driven Engineering**	**Real-Time Systems**
			Concurrency	
Friday 20 June Tutorials	Cristina Vicente-Chicote, Diego Alonso-Cáceres *A Practical Introduction to Model-Driven Software Development using Eclipse*			
	Benjamin M. Brosgol *Languages for Safety-Critical Software: Issues and Assessment*		Ricky Sward *Service-Oriented Architecture Concepts and Implementations*	
	William Bail *Verification Techniques for Dependable Systems*		Frank Singhoff *Real-Time Scheduling Analysis of Ada Applications*	

The information in this document is still preliminary – please refer to the conference web site for the latest details.

INVITED SPEAKERS

Three eminent keynote speakers have been selected to open each day of the core conference program:

- **Alberto Sangiovanni-Vincentelli** (University of California at Berkeley, USA), a most authoritative member of the embedded systems community, will deliver a talk entitled: "*Embedded Software Design: Art or Science?*"
- **Robert Dewar** (New York University, USA), a worldwide expert in programming technologies, will discuss where programming languages are expected to go next in a talk evocatively entitled: "*Lost in Translation*"
- **Christian Queinnec** (LIP6, Université Pierre et Marie Curie, Paris), a leading researcher in reliable software technologies, will explore the inner heart of the Service-Oriented Architecture in a talk entitled: "*Three Ways to Improve SOA Reliability*".

Embedded Software Design: Art or Science?

Alberto Sangiovanni-Vincentelli, University of California at Berkeley, CA, USA
(Tuesday 17, 9:30 - 10:30)

In the present technology environment and industrial structure for embedded systems, software is taking the lion's share of the implementation budgets and cost. In cell phones, more than 1 million lines of code is standard today, while in automobiles the estimated number of lines by 2010 is in the order of hundreds of millions. The number of lines of source code of embedded software required for avionics systems is also growing exponentially. However, as this happens, the complexity explosion of the software component causes serious concerns for the final quality of the products and the productivity of the engineering teams. In transportation, the productivity of embedded software writers using the traditional methods of software development ranges in the few tens of lines per day. The reasons for such a low productivity are in the time needed for verification of the system and long redesign cycles that come from the need of developing full system prototypes for the lack of appropriate virtual engineering methods and tools for embedded software.

The lack of an overall understanding of the interplay of the sub-systems and of the difficulties encountered in integrating very complex parts causes system integration to become a nightmare in the system industry.

There is a need for standards in the software and hardware domains that will allow plug-and-play of subsystems and their implementation. The ability to integrate subsystems will then become a commodity item, available to all OEMs. The competitive advantage of an OEM will increasingly reside on novel and compelling functionalities.

To deal with system-level problems, the issue to address is not developing new tools, albeit they are essential to advance the state of the art in design, rather it is the understanding of the principles of system design, the necessary change to design methodologies and the dynamics of the supply chain.

Major productivity gains are needed and better verification and validation is a necessity as the safety and reliability requirements of embedded systems become more stringent and the complexity of chips is hitting an all-time high. Several approaches have emerged in the design community to improve the situation but a broad industry support for these approaches is still missing.

A new design science must be developed to address the challenges listed above where the physical is married to the abstract, where the world of analog signals is coupled with the one of digital processors, where ubiquitous sensing and actuation make our entire environment safer and more responsive to our needs.

Presenter

Alberto Sangiovanni Vincentelli holds the Edgar L. and Harold H. Buttner Chair of Electrical Engineering and Computer Sciences at the University of California at Berkeley. He has been on the Faculty since 1976. He obtained an electrical engineering and computer science degree ("Dottore in Ingegneria") summa cum laude from the Politecnico di Milano, Milano, Italy in 1971. In 1980-1981, he spent a year as a Visiting Scientist at the Mathematical Sciences Department of the IBM T.J. Watson Research Center. In 1987, he was Visiting Professor at MIT. He has since held numerous visiting professor positions at Italian Universities, including Politecnico di Torino, Università di Roma La Sapienza, Università di Roma Tor Vergata, Università di Pavia, Università di Pisa, Scuola Superiore di Studi Universitari Sant'Anna.

Lost in Translation

**Robert Dewar,
Courant Institute, New
York University, USA**
(Wednesday 18, 9:00 - 10:00)

Programming languages are about translating our thoughts and designs into a language that the computer can understand. This talk gives a historical perspective of where we have been in the last forty years, where we might go in the future, and how Ada fits in. Just how well can we do in this translation effort?.

There are so many trends in programming languages and so many languages appearing all the time, that it is hard to keep track of where we are going. Will functional languages emerge in the near future? Will very high level languages finally break through? Will the trend be to simpler or more complex languages?

Just how much can languages help in the goal of building safe and reliable systems? What is the future for Ada and for other languages?

In this talk, we will see that as in so many areas of our lives, history plays an important role, and so we will look back to the past as well as looking forward to the future in trying to answer these questions.

Presenter

Robert Dewar has been involved with Ada for over 25 years and, as co-director of both the Ada-Ed projects and the GNAT project, led the team that developed the first validated Ada compiler at NYU. Robert was one of the authors of the requirements document for the Ada 95 revision, and served as a distinguished reviewer for both Ada 83 and Ada 95, and has lead the first implementation of the new Ada 2005 standard. He has co-authored several renowned compilers including the SPITBOL (SNOBOL) compiler, the Realia COBOL compiler for the PC (now marketed by Computer Associates), and the Alsys Ada compiler. He has also written several real time operating systems for Honeywell Inc. Among his many publications, Robert is a principal author (with Professor Edmond Schonberg) of GNAT, the GNU Ada Compiler. He is president and CEO of AdaCore, which supports and enhances the GNAT Pro technology for the entire Ada community today. A talented public speaker, he is frequently invited to share his thoughts in public on computer systems and on free-open-source software.

Three Ways to Improve SOA Reliability

**Christian Queinnec,
LIP6, Université Pierre et
Marie Curie, Paris,
France**
(Thursday 19, 9:00 - 10:00)

Three topics will be presented that improve the reliability of SOA software: annotation, XML typing and energetic programming.

Annotation allow programmers to adjoin information to software concepts (variable, function, class, etc.). This information may then be exploited by various tools such as compilers, deployers or even be dynamically inquired at run time. First pioneered by Lisp2 as generalized property-lists, annotations now appear in C# as well as in Java and SPARK.

XML typing aims to statically verify, at compile-time, that the produced XML is valid for all possible execution paths. This is done by weaving the XML schema in the type system. Xduce is a programming language that illustrates this new trend.

Controlling the resources (the energy) consumed by tasks is the third addressed topic. This effective control may be used to confine computations performed by foreign or untrusted code or to obtain the maximal information for a given initial energy. This work was a joint work with Luc Moreau from University of Southampton.

Presenter

Christian Queinnec holds a PhD from UPMC (1978). He is currently a professor at UPMC (Université Pierre et Marie Curie) and a member of LIP6 (MoVE team). His research interests include programming languages semantics, interpretation and compilation as well as programming the Web.

TUTORIALS

The conference schedule includes 2 full days of tutorials running on 3 parallel tracks on Monday and Friday. The program this year features 10 tutorials, 2 of which full-day and the others half-day, all delivered by recognized domain experts addressing a variety of topics within the general scope of the conference.

AADL: Architecture Analysis and Design Language

Jean-Pierre Rosen,
Adalog, France
(T1: Monday 16 June, full day)

This tutorial describes AADL, the Architecture Analysis and Design Language. Version 1 of AADL is already an SAE standard, and the design committee is preparing version 2. The AADL language has been defined to provide a consistent and concise notation, both textual and graphical, to be used to develop models of complex, real-time, critical systems such as those used in automotive, avionics, medical, robotic, and space-based systems. With a number of tools available, both free and proprietary, AADL is an effective solution for system design.

The tutorial provides an introduction to the AADL language from a textual and graphical perspective, with an emphasis on the principles that are behind the language itself, in order to understand the goals and usage of AADL. Attendees will understand the benefits of using a system design language and can assess whether AADL is appropriate to their needs.

Presenter

J-P Rosen is a professional teacher, teaching Ada (since 1979), 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.

Adalog offers regularly on-site and off-site training sessions in AADL. Adalog's parent company, Axlog, has been involved in the development of AADL for a long time, with experts who are member of the AADL design team, and the development of AADL tools. This tutorial has been designed in cooperation with AADL experts from Axlog.

Why attend this tutorial?

To discover the general issues of system design. To understand how a successive refinements process, as supported by AADL, helps mastering the complexity of hardware/software codesign. To learn how to describe a complete system with AADL. To discover existing tools for design and modeling of systems with AADL. To prepare for the upcoming version 2 of AADL.

The Best of Ada 2005

John Barnes,
John Barnes Informatics, UK
(T2: Monday 16 June, morning)

There have been three versions of Ada: Ada 83, Ada 95 and now Ada 2005. Ada 95 was a huge leap forward from Ada 83. Ada 2005 is not such a giant leap forward but aims rather to round off Ada 95 to provide the community with a language suited for the demanding applications of the 21st century.

It has been said that the best bits of Ada 2005 are Ada 95 and the best bits of Ada 95 are Ada 83. John will explain the main themes of Ada as a whole and outline the key new features of Ada 2005. There are new features in the OO model with the introduction of interfaces and in the real-time area with more control over timing and scheduling plus much more in the predefined library. But there are other improvements as well in areas such as visibility control, exceptions and generics. And of course also downward closures so that Ada is at last as good as Algol 60 in that area. This tutorial will concentrate on aspects of Ada 2005 other than the OO model which is covered by tutorial T3.

Presenter

John has been involved in programming language design for more years than he cares to remember. He was a member of the original Ada design team and has since continued his involvement by being the UK representative for ISO standardization of Ada.

John is the author of a well known textbook on Ada. This was originally entitled Programming in Ada and now some 7 versions later is entitled Programming in Ada 2005. He is also the author of High Integrity Software which addresses the use of Spark for even more reliable programming.

He graduated from Cambridge with a degree in Mathematics and originally worked in the chemical industry on aspects of process control.

Why attend this tutorial?

To learn about the best that the Ada language offers and which makes it unique in the programming landscape, from one who has been involved in the very design of Ada from its onset until its latest evolution.

Object-Oriented Programming in Ada 2005
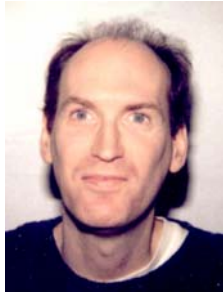
**Matthew Heaney,
On2 Technologies, USA**
(T3: Monday 16 June, afternoon)

This tutorial discusses OOP in Ada 2005. In addition to discussing classic features such as tagged types, class-wide programming, and access discriminants, the tutorial will include information about new procedure-call syntax, interface types, anonymous access types and anonymous subprogram parameters, extended return statements, limited-with and private-with package dependencies, and limited aggregates. The tutorial will also present idioms for implementing a type, constructing and destroying instances, designing subsystems, and for integrating concurrency into the object model.

Presenter
The author has presented many tutorials on the topic of object-oriented programming, design patterns, system design, and container libraries. He was also the designer of the Ada 2005 standard container library, which was based on work he had done to port the C++ STL to Ada.

Why attend this tutorial?
Attendees will appreciate the myriad features for crafting abstractions in Ada 2005, with emphasis on interface types and package design idioms.

Preserving Model-Asserted Properties at Run Time for High-Integrity Systems

Tullio Vardanega, University of Padua, Italy

Juan Antonio de la Puente, Technical University of Madrid, Spain

(T4: Monday 16 June, morning)

The tutorial will describe a novel approach to warranting the preservation of real-time properties of systems in a correctness-by-construction setting. The back end of the approach is based on a set of code patterns that rely on the Ada Ravenscar profile for tasking plus some additional real-time mechanisms introduced in Ada 2005. The generation of the chosen code patterns for ensuring temporal execution behavior and for deadline and execution-time monitoring will be described in detail and illustrated with a real-life case-study. The use of tools, including a tailored version of GNAT running on ORK+, a specialized real-time kernel, together with static timing analysis tools, will also be described and exemplified on the case study.

Presenters
Tullio Vardanega, an associate professor at the University of Padua, is an expert in the development of real-time embedded systems, processes and methods for the engineering of software-intensive high-integrity systems. Before joining the University of Padua, he was with the European Space Agency for over a decade. He has recently been appointed President of Ada-Europe.
Juan Antonio de la Puente is a full Professor at the Technical University of Madrid (UPM). He has been teaching Ada and Real-Time systems for more than 20 years. He leads the Real-Time Systems Group at UPM, and has been the technical manager in a number of national and international research projects, including ORK, a specialized real-time kernel for high-integrity systems. He is a Vice-President of Ada-Spain.

Why attend this tutorial?
Attendees will learn how to make model-level real-time properties stay true at run time with the adoption and enforcement of appropriate coding patterns.

Technical Basis of Model Driven Engineering

**William Bail,
The MITRE Corporation, USA**
(T5: Monday 16 June, afternoon)

Model Driven Engineering (MDE) is an approach to software development that has matured significantly over the past few years, and as a consequence has become much more widely used throughout industry. It is referred to in many ways, including Model Driven Architecture®). Some practitioners are claiming significant gains in productivity and product quality, while others cite more modest benefits. This tutorial examines MDE, looking at the mechanics of its process, revealing its constituent elements, and describing how it automates portions of the development process. It analyzes the parts of the process where the productivity and quality gains are realized, and also takes a critical look at the various claims that are being made about its benefits. The tutorial provides an objective assessment of the maturity of MDE, and objectively assesses the potential benefits of this technology. The tutorial doesn't describe specific tools but rather describes the underlying technical basis.

Presenter

Dr. Bail received a BS in Mathematics from Carnegie Institute of Technology, and an MS and Ph.D. in Computer Science from the University of Maryland. Since 1990, Dr. Bail has worked for The MITRE Corporation in McLean VA as a Computer Scientist in the Software Engineering and Computing (SWEC) Department. MITRE is a not-for profit corporation chartered to provide systems engineering services to the U.S. Government agencies, primarily the DoD, the FAA, and the IRS. Within MITRE, the SWEC supports customer programs, consulting on various aspects of software-intensive development, ranging from requirements elicitation and management, to design techniques and practice, and to testing. The SWEC particularly focuses on transitioning emerging technologies into practice. Dr. Bail's technical areas of focus include dependable software design and assessment, error handling policies, techniques for software specification development, design methodologies, metric definition and application, and verification and validation. At MITRE, Dr. Bail is currently supporting the U.S. Navy, focusing on the practice of software engineering as applied to large real-time systems. Prior to 1990, Dr. Bail worked at Intermetrics Inc. in Bethesda MD.

Since 1989 he has served as an Adjunct Professor at the University of Maryland University College where he develops instructional materials and teaches courses in software engineering, in topics such as Software Requirements, Verification and Validation, Software Design, Software Engineering, Fault Tolerant Software, and others. Previously, Dr. Bail taught part-time at The University of Maryland from 1983-1986 in the Computer Science Department for undergraduate courses in discrete mathematics, computer architecture, and programming language theory.

Dr. Bail has presented tutorials on Cleanroom Software Engineering, Semi-Formal Development Techniques, Statistical Testing, and Requirements Engineering for Dependable Systems at various conferences.

Why attend this tutorial?

This tutorial will provide the attendee with the basic understanding of the technical underpinnings of MDE, and thereby provide a basis for selection of this technique for candidate software development projects. The tutorial will also provide an assessment of the level of maturity of the technology, and provide a perspective regarding where additional research is needed. Understanding the underlying principles, and the relative strengths and weaknesses of MDE, is essential to making informed decisions and selecting (or not selecting) MDE as a development strategy.

A Practical Introduction to Model-Driven Software Development using Eclipse

Cristina Vicente-Chicote

Diego Alonso-Cáceres, Universidad Politécnica de Cartagena, Spain

(T6: Friday 20 June, full day)

Attendees will gain a general overview of the Model-Driven Engineering (MDE) approach to software development, and with a practical introduction to MDE tools currently available for the Eclipse platform.

Presenters

Cristina Vicente-Chicote received a MSc degree in Computer Science by the Universidad de Murcia in 1997 and her PhD in Telecommunication Engineering from the Universidad Politécnica de Cartagena in 2005, where she currently is a Lecturer. Her current research interests include MDE, Domain-Specific Language Design, Component-Based Software Development, and Software Product Lines.

Diego Alonso Cáceres received a M.S. degree in Electrical Engineering by the Universidad Politécnica de Valencia in 2001. He is now a lecturer at the Universidad Politécnica de Cartagena where he is finishing his Ph.D. His research interests focus on the application of MDE to the development of component-based reactive systems with real-time constraints.

Why attend this tutorial?

Model-Driven Software Development is one of the most innovative and promising technologies available nowadays in Software Engineering. There is increasingly interest in MDE/MDA technologies in both the research community and the industry. MDE/MDA are not only for large projects or large enterprises: also small projects can benefit from the many advantages of these approaches, namely: (1) the higher abstraction level provided by models, which eases information exchange among designers; (2) easier verification by domain experts; (3) automated source code generation, which makes designers nearly forget about the coding step. After the tutorial, attendees will be able to build their own meta-models and their own graphical model editors. They will also be able to automatically generate code from their graphical models. Well worth spending a day on this tutorial! *This tutorial is practical, so please bring your own laptop when you plan to attend.*

Languages for Safety-Critical Software: Issues and Assessment

**Benjamin M. Brosgol,
AdaCore, USA**
(T7: Friday 20 June, morning)

Safety-critical systems (whose anomalous behavior could have catastrophic consequences such as loss of human life) are becoming increasingly prevalent. Standards such as DO-178B, originally developed for the certification of commercial avionics, are attracting attention in other communities. The requirement to comply with such standards imposes constraints on quality assurance, traceability, etc., much beyond what is typical for COTS.

One of the major decisions affecting the development of safety-critical software is the choice of programming language(s). Specific language features, either by their presence of absence, may make certification easier or harder. Full general-purpose languages are almost always too complex, and restricted subsets are required. This tutorial first summarizes DO-178B as an example of a safety-critical standard and identifies how it relates to language feature usage, with a special focus on Object Oriented Programming. It then compares several languages in current use or under consideration for safety-critical systems: C (and also C++), Ada, and Java; and assesses them with respect to their suitability to be constrained for use for such purposes. It specifically examines the MISRA C subset, SPARK, and the in-progress effort to develop a safety-critical profile of the Real-Time Specification for Java.

Presenter

Dr. Benjamin Brosgol is a senior member of AdaCore's technical staff in the US. He has over 30 years of experience in the computer software industry, with a focus on programming languages (Ada and Java in particular), software development methods, and real-time / high-integrity systems. He was a primary member of the Real-Time for Java Expert Group (JSR-001 under Sun Microsystems' Java Community Process) and a co-author of the resulting Real-Time Specification for Java ("RTSJ"). He is a member of the Expert Groups for RTSJ Enhancements (JSR-282) and Safety-Critical Java Technology (JSR-302).

Dr Brosgol is an internationally-recognized expert on Ada. He participated in both the initial language design and the Ada 95 revision, and he is a past chairman of the ACM's Special Interest Group on Ada (SIGAda). He has published numerous papers on Ada, has delivered presentations and tutorials at many Ada-Europe and SIGAda conferences, and has been conducting professional Ada courses for over 20 years. Dr. Brosgol has a B.A. in Mathematics (with honors) from Amherst College, and holds a Ph.D. in Applied Mathematics from Harvard University.

Why attend this tutorial?

Attendees will learn: (i) How the requirements for safety certification affect the software development process in general and language feature selection in particular; (ii) How several major languages (C, C++, Ada, Java) compare with respect to support for safety-certified systems, in particular their ability to support safety-critical subsets; (iii) How Object Technology relates to the requirements for safety certification; (iv) How the requirements for safety and security compare.

Service-Oriented Architecture Concepts and Implementations

**Ricky Sward,
The MITRE Corporation,
USA**
(T8: Friday 20 June, afternoon)

This tutorial covers the principles of Service-Oriented Architectures (SOA) including loose coupling, encapsulation, reusability, com-posibility, etc. The attendee will learn about the Ada Web Server (AWS) and how SOA interfaces, session management, etc. are implemented using AWS. The tutorial will also cover the fundamentals of the Enterprise Service Bus (ESB), a key enabling component of the SOA. Attendees will learn about ESB endpoints, data routing, automatic translations, etc. They will also learn how to connect Ada web services to an ESB, to expose those services, and to use AWS with the ESB through in-class exercises.

Presenter

Dr. Ricky E. "Ranger" Sward is a Lead Information Systems Engineer for the MITRE Corporation in Colorado Springs, CO, USA. He currently supports the Electronic Systems Center (ESC) 850th ELSG/NGS, Space System Program Office (SPO). In his role as the software technical lead for the past year, he has supported the Agile Development Branch during development of Space Command and Control systems. This branch is leading the way in Service-Oriented Architecture (SOA) design and implementation using the latest Enterprise Service Bus (ESB) technology. Ranger retired from the US Air Force in August 2006 after a 21 year career as a Communications and Computer officer. He taught at the US Air Force Academy for 10 years where he taught courses such as Software Engineering and Unmanned Aircraft Systems.

He has a B.S. and an M.S. in Computer Science, as well as a Ph.D. in Computer Engineering.

Why attend this tutorial?
Attendees interested in the notions and principles of the Service-Oriented Architecture (SOA) will have an enlightening experience into this novel software engineering paradigm. Attendees that have heard about the latest "silver bullet" will learn about the Enterprise Service Bus (ESB), its capabilities and limitations, and its benefits to implementing the SOA principles. Developers of high integrity, safety critical systems will learn how to connect web services written in Ada or Spark to an ESB and expose them as web services.

Verification Techniques for Dependable Systems

William Bail,
The MITRE Corporation,
USA
(T9: Friday 20 June, morning)

The practice of verification and validation (V&V) is a key aspect of any software development effort, and is tightly intertwined with the construction of the software. In this tutorial we examine the nature of V&V as applied to software systems with high expectations of dependability, and present techniques that have been shown to increase quality and dependability. We emphasize that V&V is more than just a "testing" activity, and includes practices that include testing as well as other valuable techniques, such as reviews, inspections, and audits. We describe these practices, point out their individual strengths and weaknesses, and provide advice on how to select the appropriate practices based on the nature of the system under development. A key aspect of this selection process is correlating the techniques to the different types of requirements, recognizing that the requirements define the desired attributes of the system. We describe some challenges in applying V&V, and describe how to approach these challenges to improve the results. We also contrast "normal" V&V with "Independent V&V", as often used for large software development efforts.

Presenter
(See the author's info at Tutorial T5 on page 6.)

Why attend this tutorial?
Attendees will acquire the basic understanding of different V&V techniques, and advice on how to select and apply them based on the system to be developed. This information will assist in planning for complex systems development by providing a framework of verification steps that will balance cost efficiency with the need to demonstrate that systems are able to deliver their required high levels of dependability.

Real-Time Scheduling Analysis of Ada Applications

Frank Singhoff,
University of Brest, France
(T10: Friday 20 June, afternoon)

This tutorial will span two parts. First, we define what a real-time system is and then we present the theoretical results of the real-time scheduling theory. The basic task models and schedulers are explained. The tutorial focuses on fixed-priority scheduler and its feasibility tests (e.g., rate monotonic and how to compute worst-case response times) which is the most useful scheduler with current applications. A dynamic priority scheduler is also presented (EDF). At the end of this first part, attendees should understand what a feasibility test is and how it can help them to predict performances of their real time applications. A short introduction on shared resource support will be also presented (e.g., priority inversion; PIP/PCP). This part will be concluded by a demonstration of a simulation and analysis tool implementing the explained algebraic methods. Second, we show how real-time scheduling features are taken into account in Ada international standards such as ISO/IEC Ada 1995/2005 (e.g., Ravenscar) and the POSIX 1003 Ada binding. In this part, we show the relationships between the real time scheduling theory and the implementation of real time schedulers into practical systems. Some Ada program examples are also presented and explained.

Presenter
Frank Singhoff is an associate professor at the LISyC, University of Brest, France. His main contribution to the Ada community is Cheddar, an Ada framework designed to perform scheduling analysis of real time applications. Frank Singhoff received his degree in Computer Science from the Conservatoire National des Arts et Métiers of Paris in 1996. He then got his PhD in Computer Science from ENST/Paris in 1999.

Why attend this tutorial?
Real-time scheduling theory was first proposed in 1974, but stayed mostly unused by software designers. Many practitioners have no background on real-time scheduling. The tutorial will help them understand the basis of that theory and apply it with Ada technologies. It will explain how to model and how to analyze with real-time scheduling theory, and finally how to implement with Ada 2005 a real-time application.

CONFERENCE SCHEDULE (PRELIMINARY)

Time	Tuesday 17 June	Wednesday 18 June	Thursday 19 June
9:00 – 9:30	*Welcome and Opening Address*		
9:30 – 10:00	Keynote Talk **Embedded Software Design: Art or Science?** Alberto Sangiovanni-Vincentelli University of California at Berkeley, USA	Keynote Talk **Lost in Translation** *Robert Dewar* New York University, USA	Keynote Talk **Three Ways to Improve SOA Reliability** *Christian Queinnec* Université Pierre et Marie Curie, Paris, France
10:00 – 10:30			
10:30 – 11:00	Coffee & Exhibition	Coffee & Exhibition	Coffee & Exhibition
11:00 – 11:30			
11:30 – 12:30	**Embedded Systems** A new Approach to Memory Partitioning in On-board Spacecraft Software, *S. Urueña, J.A. Pulido, J. López, J. Zamorano, J.A. de la Puente* Design and Development of Component-based Embedded Systems for Automotive Applications, *M. Di Natale*	**Industrial Presentations** A Discussion on the U.S. Federal Aviation Administration's Use of and Experiences with Ada, Including the Current Modernization Efforts, *J. O'Leary, A. Srivastava* Experiences Developing the Flight Services Component of the ERAM System, *H. Ausden* Challenges in Implementing a Ravenscar Runtime in an ARINC 653 Partition, *J.-P. Fauche, T. Grossman* Binary Data Comparison Automation, *M. Mark*	**Language Technologies** A Comparison of the Object-Oriented Features of Ada 2005 and Java, *B. Brosgol* A Framework for CFG-based Static Program Analysis of Ada Programs, *R. Fechete, G. Kienesberger, J. Blieberger* A Type Safe Database Interface, *F. Villoing, E. Briot*
12: 30 – 14:00	Lunch & Exhibition	Lunch & Exhibition	Lunch & Exhibition

CONFERENCE SCHEDULE (PRELIMINARY)

	Tuesday 17 June		Wednesday 18 June		Thursday 19 June	
14:00 - 15:30	**Formal Verification**	**Vendor Session**	**Industrial Presentations**	**Ada and Education**	**Model-Driven Engineering**	**Concurrency**
	On the Timed Automata-based Verification of Ravenscar Systems, *I. Ober, N. Halbwachs*		Industrial Feedback on the Separation of Functional and Real-Time Constraints, and Object Orientation for Embedded Applications, *M. Le Coroller, G. Garcia*	A Rational Approach to Software Engineering Education or: Java Considered Harmful, *E. Schonberg, R. Dewar*	StateML+: From Graphical State Machine Models to Thread-Safe Ada Code, *D. Alonso, C. Vicente-Chicote, J.A. Pastor, B. Alvarez*	Increasing Confidence in Concurrent Software Through Architectural Analysis, *R.G. Pettit*
	Operational Semantics of Ada Ravenscar, *I. Hamid, E. Najm*	TBA	Advanced Real-Time Analysis in ASSERT – Application on Satellite Central Flight Software, *D. Thomas, J.-P. Blanquart, M. Panunzio*	Ada and Software Engineering Education: One Professor's Experiences, *J.W. McCormick*	Experience in the Integration of Heterogeneous Models in the Model-driven Engineering of High-Integrity Systems, *M. Bordin, T. Tsiodras, M. Perrotin*	Fast Scheduling of Distributable Real-Time Threads with Assured End-to-End Timeliness, *S. Fahmy, B. Ravindran, D. Jensen*
	Practical, Fast and Simple Concurrent FIFO Queues Using Single Word Synchronization Primitives, *C. Evéquoz*		Porting Naval Command & Control Systems to Ada 2005, *J. Cousins* Distributed Status Monitoring and Control using Remote Buffers and Ada 2005, *B. Moore*	Is Ada Education Important?, *J.-P. Rosen*	A Systematic Approach to Automatically Generate Multiple Semantically Equivalent Program Versions, *S.H.K. Narayanan, M. Kandemir*	RCanalyser: A Flexible Framework for the Detection of Data Races in Parallel Programs, *A. Raza, G. Vogel*
15:30 - 16:30	**Coffee & Exhibition**		**Coffee & Exhibition**		**Coffee & Exhibition**	
16:30 - 18:00	**Applications of Petri Nets**	**Vendor Session**	**Industrial Presentations**	**Ada and Education**	**Real-Time Systems**	
	A Modelling Approach with Coloured Petri Nets, *C. Choppy, L. Petrucci, G. Reggio*		A Comparison of Industrial Coding Rules, *J.-P. Rosen*	Use of Ada in a Student CubeSat Project, *C. Brandon*	Can We Increase Usability of Real-Time Scheduling Theory? The Cheddar Project, *F. Singhoff, A. Plantec, P. Dissaux*	
	A Tailored V-Model Exploiting the Theory of Preemptive Time Petri Nets, *L. Carnevali, L. Grassi, E. Vicario*	TBA	Growing a Tree that Lives Forever: Automatic Storage Management and Persistence of Complex Data Structures, *S.T. Taft*	Panel Discussion	An Ada 2005 Technology for Distributed and Real-Time Component-based Applications, *P. Lopez-Martinez, J.M. Drake, P. Pacheco, J.L. Medina*	
	Concurrent Program Metrics Drawn by QUASAR Numbers, *C. Kaiser, C. Pajault, J.-F. Pradat-Peyre*		Exceptionally Safe, *A. Charlet, C. Comar, F. Gasperoni*	Genesis. Automation, via Generation, via ASIS, of Tests of Ada Software, *M.A. Alves, N. Almeida*	Real Time Distribution Middleware from the Ada Perspective, *H. Pérez, J. Gutiérrez, D. Sangorrín, M. González Harbour*	
18:00 - 19:00	**Ada-Europe General Assembly**					
From 19:00	**Welcome Reception**		**Excursion, Banquet and Best-Paper Award**		**Closing Address and Best-Presentation Award**	

TUTORIAL SCHEDULE

Monday 16 June	T1	Full day	**Jean-Pierre Rosen** *AADL: Architecture Analysis and Design Language*
	T2	Morning	**John Barnes** *The Best of Ada 2005*
	T3	Afternoon	**Matthew Heaney** *Object-Oriented Programming in Ada 2005*
	T4	Morning	**Tullio Vardanega, Juan Antonio de la Puente** *Preserving Model-Asserted Properties at Run Time for High-Integrity Systems*
	T5	Afternoon	**William Bail** *Technical Basis of Model Driven Engineering*
Friday 20 June	T6	Full day	**Cristina Vicente-Chicote, Diego Alonso-Cáceres** *A Practical Introduction to Model-Driven Software Development using Eclipse*
	T7	Morning	**Benjamin Brosgol** *Languages for Safety-Critical Software: Issues and Assessment*
	T8	Afternoon	**Ricky Sward** *Service-Oriented Architecture Concepts and Implementations*
	T9	Morning	**William Bail** *Verification Techniques for Dependable Systems*
	T10	Afternoon	**Frank Singhoff** *Real-Time Scheduling Analysis of Ada Applications*

Morning tutorial sessions will start at 9:30 and end at 13:00. Afternoon sessions will start at 14:30 and end at 18:00. Coffee breaks will be at 11:00 - 11:30 and at 16:00 - 16:30.

EXHIBITION

The exhibition will open at the morning break on Tuesday and run continuously until the end of the afternoon break on Thursday. It takes place in the cloister of the conference centre just next to the meeting halls. The coffee breaks are held in the exhibition area. The breaks on Tuesday to Thursday span one hour so as to allow the attendees comfortable time to visit the exhibition.

Companies that already booked their exhibition space include: AdaCore; Aonix; Ellidiss Software; Praxis High Integrity Systems; Rapita Systems; Telelogic. Others have shown interest. Exhibitors will also deliver a presentation in the vendor session.

SOCIAL PROGRAM

Reception
The social program of the conference will open with a welcome reception at Palazzo Loredan-Franchetti, a three-storied patrician villa on the Grand Canal, which hosts the historic premise of the regional institute for science, literature and art. The reception will be accompanied by musical entertainment offered by distinguished members of the conference community.

Conference Banquet
The conference banquet will take place on the island of Torcello, the farthest island of the lagoon, just past picturesque Burano. The Torcello island which used to be vastly populated at the time of the Venetian republic has lost almost all of its population but kept its beauty and its natural, cultural and historical attraction. Participants will ride on a private boat along the Grand Canal to the renowned "Osteria del Diavolo" restaurant at Torcello. The journey will be accompanied by appetizers, musical entertainment, and the spectacular scenery of the lagoon itself viewed first at sunset and then in the fullness of night on the return leg.

Additional tickets for the welcome reception on Tuesday 17 and for the excursion and banquet on Wednesday 18 can be purchased on site at the registration desk.

REGISTRATION AND ACCOMMODATION

Conference Registration

The registration fee for the three days of the technical program (June 17-19) includes one copy of the proceedings, coffee breaks, lunches, welcome reception on Tuesday 17 June evening, excursion and banquet on Wednesday 18 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.

	Member of Ada-Europe or ACM SIGAda		Non-member		Student[*]
	Academia	**Non academia**	**Academia**	**Non academia**	
Early registration (payment by 31 May)	480 €	550 €	560 €	630 €	400 €
Late/on-site registration (payment after 31 May)	640 €		720 €		500 €
Day registration (single day)	275 €		315 €		200 €

[*] **Student discount**

Please check the Registration page at http://www.ada-europe.org/conference2008.html for the eligibility conditions to student discounts.

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.

	Half day	**Full day or two half days on the same day**
Early registration (payment by 31 May)	130 €	260 €
Late/on-site registration (payment after 31 May)	145 €	290 €

No registration request will be confirmed until the payment has been processed. Substitutions will be accepted. To save on administrative costs and postage, receipts will be handed out at the conference. Cancellation must be always confirmed in writing: don't forget to include all your banking information. Refund of fees, with deduction of €25.00 for administrative duties, will be made for cancellations received before 31 May 2008. After that date, no refunds will be possible. Refunds will be processed and paid after the Conference.

For latest information, see http://www.ada-europe.org/conference2008.html. For additional information, contact the Local Chair: **Sabrina De Poli**, tel: +39-049-651699, fax: +39-049-651320, e-mail: **ae08@sistemacongressi.com**.

Accommodation

The conference venue also runs a lodge at very convenient prices. Please book your accommodation as soon as possible. Venice is a tourist attraction at all times, especially during Spring and Summer. Check out the on-line Registration page for this and other accommodation options in the vicinity of the conference centre.

Participant Registration Form

13th International Conference on
Reliable Software Technologies – Ada-Europe 2008

16-20 June 2008, Venice, Italy

http://www.ada-europe.org/conference2008.html

Please use block capitals

Participant   Ms [ ] Mr [ ] Title: _____

First name: _____   Last name: _____

Affiliation/Organization: _____

Address: _____

_____

City: _____   State: _____

Country: _____   Zip/Postal code: _____

Phone: _____   Fax: _____   Email: _____

Special requirements (e.g. diet): _____

There are a number of "in cooperation" conferences in this area (such as ACM SIGAda). Please indicate whether you agree to receive information about those other conferences: _____ [ ] Yes [ ] No

Reduced registration fee
[ ] Member Ada-Europe; national organization / direct / etc. _____
[ ] Academia _____
[ ] Member ACM; membership number _____
Additional Comments: _____

Registration Type: Early (payment by 31 May) [ ]   Late or on site (payment after 31 May) [ ]

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, 16 June   T1 [ ]   T2 [ ]   T3 [ ]   T4 [ ]   T5 [ ]

    Friday, 20 June   T6 [ ]   T7 [ ]   T8 [ ]   T9 [ ]   T10 [ ]

    Tutorial registration fee: _____ EUR

Extra tickets for welcome reception (@ 50 EUR each):   _____ EUR
Extra tickets for excursion and banquet (@ 120 EUR each):   _____ EUR
Extra tickets for lunch (@ 30 EUR each):   _____ EUR
Extra proceedings (@ 30 EUR each):   _____ EUR

Total Payment Due: _____ EUR

Payment method

[ ]   **By credit card** Visa [ ] Mastercard [ ]

    Card Number: _____ Expiry date: _____
    Cardholder Name: _____ CVC [1]: _____
    Signature: _____ Date: _____

[ ]   **By bank transfer**[2]**,** to account number (IBAN) IT86R0622512107074004700028S of *Sistema Congressi Srl*.
    The account is from the bank: *Cassa di Risparmio di Padova e Rovigo, Agenzia n. 7, Padova, Italy*.
    (Please attach a copy of the bank draft to this form.)

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

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

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FURTHER INFORMATION

The conference web site at http://www.ada-europe.org/conference2008.html gives full and up to date details of the program. The web site also provides details of the venue, including travel advice, instructions to reserve hotel accommodation in the conference venue, maps and a list of hotels close by.

Exhibiting and Sponsoring details are also on the web site; a sliding scale of sponsorship provides a range of benefits. All levels include display of your logo on the conference web site and in the program. The lowest level of support is very affordable.

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The organizers are grateful to the exhibitors and sponsors of the conference (preliminary list)

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