17th International Conference on
RELIABLE SOFTWARE TECHNOLOGIES

ADA-EUROPE 2012

11-15 June 2012, Stockholm, Sweden

FINAL PROGRAM

http://www.ada-europe.org/conference2012

ACM SIGAda, SIGBED, SIGPLAN

PRESENTATION

In 2012, the 17th International Conference on Reliable Software Technologies takes place in Stockholm, Sweden, from 11 to 15 of June. The conference program includes three keynote talks, two panels, a three-day technical program of refereed papers, three sessions with industrial presentations, an industrial exhibition and two days of tutorials. The conference offers an international forum for researchers, developers and users of reliable software technologies. Presentations and discussions cover applied and theoretical work currently conducted to support the development and maintenance of software systems. Stockholm, one of the most beautiful capitals in the world, is built on 14 islands around one of Europe's largest and best-preserved mediaeval city centers, located by the Baltic Sea coast. Stockholm is also Scandinavia's financial center with the largest gross regional product and highest presence of international companies. In 2010, Stockholm was the first city to receive the European Green Capital award, an initiative of the European Commission, and it is ranked fourth in the "Cities of opportunity" analysis, ranking first in intellectual capital and innovation health, safety and security demographics and livability.

Ada-Europe 2012 will build on the success of the 2011 event, in Edinburgh, UK, which attracted over 130 delegates coming from Belgium, Brazil, Canada, Denmark, Egypt, Finland, France, Germany, Israel, Italy, Norway, Poland, Portugal, Russia, Slovakia, South Africa, Spain, Sweden, Switzerland, the Netherlands, UK and USA, representing more than 20 universities and 50 companies.

Ada-Europe 2012 provides a unique opportunity for dialogue and collaboration between academics and industrial practitioners interested in reliable software.

OVERVIEW OF THE WEEK

	Morning	Late Morning	After Lunch	Afternoon
Monday June 11th Tutorials	M. Aldea *Advanced Ada Support for Real-Time Programming*		J. de la Puente, J. Zamorano *Developing High Integrity Systems with GNAT GPL and the Ravenscar Profile*	
	I. Broster, A. Coombes *How to Optimize Reliable Software*		B. Brosgol *DO-178C: The Next Avionics Software Safety Standard*	
	J.-P. Rosen *Designing and Checking Coding Standards for Ada*		T. Taft *Experimenting with ParaSail*	
Tuesday June 12th Sessions & Exhibition	Keynote Talk: Bertrand Meyer *Life with Contracts*	Paper Session *Application Frameworks*	Panel *What is Language Technology in Our Time?*	Paper Session *Use of Ada*
				Vendor Session
Wednesday June 13th Sessions & Exhibition	Keynote Talk: Göran Backlund *What is the Mission of a Software Developer?*	Paper Session *Modeling*	Panel *Reliable Software: a Perspective from Industry*	Industrial Presentations *Use of Ada*
		Vendor Session		
Thursday June 14th Sessions & Exhibition	Keynote Talk: Jean-Loup Terraillon *Multicore Processors - the Next Generation Computer for ESA Space Missions*	Industrial Presentations *Space Applications*	Paper Session *Testing & Validation*	Paper Session *Real-Time Systems*
			Industrial Presentations *Avionics Applications*	
Friday June 15th Tutorials	F. Piron *Basics of Oracle Database Programming with Ada: Introduction to the Konada.Db Library*		F. Piron *Oracle Database GUI-programming on MS Windows*	
	T. Jennings *Benefits of Using SPARK for High-Assurance Software*		T. Jennings *The Use of Proof and Generics in SPARK*	
	B. Sandén *Design of Multitask Software: the Entity-Life Modeling Approach*			

INVITED SPEAKERS

Life with Contracts

Bertrand Meyer, ETH Zurich, Switzerland

(Tuesday 12th, 9:30 – 10:30)

The native integration of Design by Contract techniques into a programming language has far-reaching consequences on most aspects of software construction, from project management to analysis, design, implementation, testing and maintenance. This keynote will present some results of a long-running experience of using contracts as a core practice of development. The talk will also include a presentation of new developments in applying contracts to verification and concurrency.

Presenter

Bertrand Meyer is Professor of Software Engineering at ETH Zurich and ITMO (Saint Petersburg), as well as Chief Architect of Eiffel Software. He is the author of a number of books including the recent "Touch of Class" (Springer), a first introduction to programming using Eiffel and Design by Contract from the start. He has received a number of awards (ACM Software System Award, Harlan Mills prize, Dahl-Nygaard prize) and is currently starting a 5-year Advanced Investigator Grant from the ERC on "Concurrency Made Easy".

What is the Mission of a Software Developer?

Göran Backlund, Combitech, Sweden

(Wednesday 13th, 9:30 – 10:30)

Software is becoming increasingly important in society. In many industry products an ever growing proportion of the product value is based on our ability to develop software. But, are we developing software effectively and efficiently? Unfortunately, software development projects have no good track record in terms of time and budget. Why? Software products are complex, and are getting even more complex, but to a large extent we still rely on specifications written in natural language, and with a notion that we can fully specify beforehand a still non-existent product. If we take a usability perspective – with the end user in focus from the start – development takes another route. Also, many challenges in software development are seldom of technical nature – it is the people interaction issues that are the real challenges – understanding requirements, understanding written specs, understanding each other. What is the task really about? With a broader view on human knowledge in an engineering environment we can find new tools for learning to manage the challenges better.

Presenter

Göran Backlund received his MSc 1983, and after two short employments he joined Saab Military Aircraft in 1986, and the Gripen fighter program. He worked for Saab for 12 years, as a system analyst, manager and project manager. Meanwhile he led the work of defining a model based approach to systems and software development. In the year 2000 he presented a licentiate thesis on the subject: "The effect of modeling requirements in the early phases of buyer/supplier relations". In 1998 Göran joined Combitech, the consultancy service subsidiary of Saab. Since then he has been working as a senior consultant, manager and business developer. In 2006 he successfully defended his PhD thesis "On tacit skills in engineering" where he accounted for the results of the engineer development programs that Combitech has developed the last decade, together with the Royal Institute of Technology.

Multicore Processors - the Next Generation Computer for ESA Space Missions

Jean-Loup Terraillon, ESTEC/ESA, Netherlands

(Thursday 14th, 9:30 – 10:30)

The advent of multi-core on embedded processors boosts computational power for space applications reducing power consumption, thermal unbalancing, as well as storage volume and harness. Following the space industries' needs, ESA pursued the road of

multi-core architectures: they enable the execution of more complex control algorithms and open the door to a higher degree of autonomy on-board, but they also shake the foundations of the traditionally used programming models, introducing the notions of real parallelism, more intense resource contention and synchronization.

Presenter
Jean-Loup Terraillon is an aeronautical engineer with special interest in avionics and software. In the French aeronautic industry, he has developed on-board software for head-up displays of aircraft's cockpit, and has been responsible for the software engineering team with focus on automatic code generation from models. Moving in ESA in 1992, he was first a data handling engineer in charge of on-board software R&D and support to projects like EnviSat and MSG. He is now the Head of the Software Engineering Section at the European Space Agency's Technology Center, ESTEC, Noordwijk, The Netherlands.

PANELS
(WALLENBERGAREN ROOM)

What is Language Technology in Our Time?

Moderator: *Tullio Vardanega* (University of Padua)

Panelists: *Bertrand Meyer* (Chief Architect of Eiffel Software); *Franco Gasperoni* (co-founder of AdaCore); *Erhard Ploedereder* (Educator, Researcher in Software Engineering at University of Stuttgart); *José Maria Martínez* (Software Engineering Manager at Cassidian)

(Tuesday 12th, 14:30 – 16:00)

For a language that had its trademark in safety and robustness, discipline and control, in the last 20 years, Ada has steadily extended its wealth of features and capabilities to a considerable extent, yet within the bounds of its original mission. However, perhaps because the industrial systems written in Ada are unlike to evolve just to catch up on new features, the pace of advancement in the Ada language risks being faster than that of the users. Traditional education and training – though obviously useful and even necessary – is not going to bridge the gap, because Ada is often not in the software engineering curriculum and the industrial economics leave little room for training. Arguably, it should be the language to reach out to prospective users, more than the reverse. But this may need more than a programming language in the traditional sense of the classic <editor, compiler, debugger> tuple.

It may be libraries, patterns, frameworks, tutorials, and many other elements that one way or another seem to belong in the general concern of language technology in our time, and make the fortune of far less solid languages. Prompted by these considerations, in this panel we ask ourselves the following questions:

- What is "language technology" in our time?
- Has the view changed over time? If so, what were the drivers of the change?
- How should Ada respond to those changes?
- Does the response depend on the application domain or is it independent of it? In what way should Ada learn from the outside?

Reliable Software, a Perspective from Industry

Moderator: *Jørgen Bundgaard* (Ada in Denmark)

Panelists: *Ana Rodríguez* (GMV)*; Steen Palm* (Terma A/S)*; Rick Sward* (MITRE)

(Wednesday 13th, 14:30 – 16:00)

The invited panelists will discuss what they see as the most pressing and challenging industrial needs in the way of software technology to facilitate the production of reliable software, such as:

- Quality and safety standards
- Life-cycle models
- Processes, methods, techniques
- Languages, and tools

TUTORIALS

Morning tutorial sessions will start at 9:00 and end at 12:30. Afternoon sessions will start at 14:00 and end at 17:30. There will be coffee breaks at 10:30 - 11:00 and at 15:30 - 16:00. Registration desk opens at 8:30.

T1: Advanced Ada Support for Real-Time Programming

Mario Aldea Rivas,
Universidad de Cantabria, Spain
(Monday June 11th, morning, Venus room)

The support of Ada for real-time programming has experienced a large improvement in the last years. Functionalities such as hierarchical scheduling based on priority bands, new dispatching policies, execution time clocks and timers, timing events, etc. are in the standard from Ada 2005 but they have not received the relevance that they deserve due to the lack of free software implementations.

Most of these relatively new services are starting to be available on some platforms. In particular, in this tutorial we will use the MaRTE OS/GNAT platform. The tutorial will give a practical introduction to most of these relatively underused real-time services. Along with the description of every service we will provide some examples in the form of typical use patterns.

Level
Intermediate. Target audience: Practitioners of real-time systems interested in learning about the newest Ada real-time support and how to use it in its applications. Previous knowledge of general Ada programming is assumed.

Reasons for attending
Attendees will increase their knowledge about the great support of Ada for real-time programming and they will be able to take advantage of it in their applications.

Presenter
Mario Aldea Rivas is an Associate Professor in the Department of Mathematics, Statistics and Computer Science at the Universidad de Cantabria. He works in software engineering for real-time systems, and particularly in flexible scheduling, real-time operating systems, and real-time languages. He has been involved in several industrial projects using Ada to build real-time controllers for robots. Mario is the developer of MaRTE OS an operating system that has served as platform to provide support for the most advanced Ada real-time services.

T2: Developing High-Integrity Systems with GNAT GPL and the Ravenscar Profile

Juan A. de la Puente and
Juan Zamorano,
Universidad Politécnica de Madrid, Spain
(Monday June 11th, afternoon, Venus room)

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 toolchain 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 the 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) for the last 10 years 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 the 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.

T3: How to Optimize Reliable Software

Ian Broster and Andrew Coombes, Rapita Systems Ltd, UK
(Monday June 11th, morning, Merkurius room)

Software timing is important in reliable systems, but what can we do when it's wrong? There are many common misconceptions and pitfalls in approaches to solving timing problems, which consume effort and resources while failing to address the underlying issues. In this tutorial, we explain an effective process that avoids these pitfalls. This process identifies code that contributes the most to the overall worst-case execution time, asks "what if" questions about the outcome of optimization, and targets optimization effort where it will have the maximum benefit for the minimum cost.

The tutorial closes with a summary of the results of case study, applying this process to a large Ada project. There will be an opportunity for hands-on work, including a competition and prize for the best optimization.

Level
Intermediate. This tutorial is aimed at general embedded engineers and managers who have the desire to develop reliable embedded software.
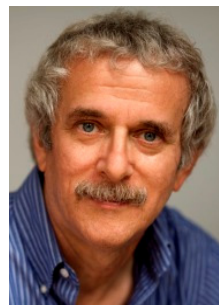
Reasons for attending
This tutorial will benefit embedded software developers and managers who need to engineer reliable, embedded software. The presentation covers two key aspects of real-time systems performance: (1) how to gain a clear, detailed, and accurate understanding of the execution time behavior of embedded software, (2) how to target optimization effort precisely where it will have the maximum benefit in improving system timing behavior (eliminating timing failures and creating headroom for new functionality) for the minimum cost.

Presenters
Dr Ian Broster is a founder and Director of Rapita Systems Ltd, a company specializing in software timing analysis. He is an experienced, lively lecturer who has given numerous training courses, lectures and presentations on this and other topics. He has been involved with Ada for several years. He earned his PhD at the Real-Time Systems Research Group of University of York.

Dr Andrew Coombes runs the Marketing and Engineering Services groups at Rapita Systems Ltd. For the last 13 years he has been involved in the development and commercialization of software tools for embedded, real-time applications. Prior to this, he worked in a consultancy and for the BAE Systems DCSC (Dependable Computing Systems Centre). He received his DPhil in Computer Science at the High-Integrity Systems Engineering Group at the University of York. He has run training courses and given presentations at many international conferences.

T4: DO-178C: The Next Avionics Software Safety Standard

Ben Brosgol, AdaCore, USA
(Monday June 11th, afternoon, Merkurius room)

The DO-178B (ED-12B) avionics software safety standard has recently been revised, to take into account nearly 20 years of experience and to provide specific guidance on several development approaches and technologies that are seeing increasing usage both in general and for avionics systems in particular. The revised standard, known as RTCA DO-178C (or EUROCAE ED-12C), was completed in December 2011. It comprises a Core

document as well as several supplements: Software Tool Qualification Considerations, Model-Based Development and Verification, Object-Oriented Technology and Related Techniques, and Formal Methods.

This tutorial will cover the Core document, with a focus on the objectives and activities associated with the software verification process. It will also summarize the various supplements, explain the new guidance concerning the usage of Object-Oriented Technology, and briefly describe how security considerations are being addressed.

Level

Intermediate. Some experience with software development processes in general and Object-Oriented technology in particular is assumed. No previous experience with DO-178B, or with avionics application programming, is required.

Reasons for attending

Attendees will learn essential information about DO-178C including:

- The differences between process-based and goal-based safety standards
- The activities and evidence required to demonstrate safety certification
- The role of testing in software verification
- The approaches to MC/DC, including a variation ("masking MC/DC") explicitly permitted in DO-178C
- The significance of the Liskov Substitution Principle in verifying Object-Oriented software
- The new approach to tool qualification
- How security issues are being taken into account

Presenter

Dr. Benjamin Brosgol is a senior member of the technical staff of AdaCore. He has been involved with programming language design and implementation for more than 30 years, concentrating on languages and technologies for high-integrity systems. Dr. Brosgol has presented papers and tutorials on safety and security certification on numerous occasions including Ada-Europe, ACM SIGAda, ESC (Embedded Systems Conference), ICSE (IEEE/ACM International Conference on Software Engineering), and SSTC (Systems & Software Technology Conference). Dr. Brosgol holds a BA in Mathematics from Amherst College, and MS and PhD degrees in Applied Mathematics from Harvard University.

T5: Designing and Checking Coding Standards for Ada

Jean-Pierre Rosen, Adalog, France
(Monday June 11th, morning, Mars room)

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 issue 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.

Level

Intermediate. Expected audience experience: No special requirement.

Reasons for attending

- Understand the value of coding standards
- Learn how to choose you 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.

Presenter

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 spokeperson at WG9, member of the Vulnerabilities group of WG9, and chairman of Ada-France.

Conference Schedule

	Tuesday 12th	Wednesday 13th		Thursday 14th
	Registration desk opens at 08:30			
9:00 – 9:30	**Welcome & Opening** Chair: Rei Stråhle (Wallenbergaren room)			
9:30 - 10:30	Keynote Talk: **Life with Contracts** *Bertrand Meyer, ETH Zurich, Switzerland* Chair: Luís Miguel Pinho (Wallenbergaren room)	Keynote Talk: **What is the Mission of a Software Developer?** *Göran Backlund, Combitech, Sweden* Chair: Jørgen Bundgaard (Wallenbergaren room)		Keynote Talk: **Multicore Processors – the Next Generation Computer for ESA Space Missions** *Jean-Loup Terraillon, ESTEC/ESA, Netherlands* Chair: Tullio Vardanega (Wallenbergaren room)
10:30 - 11:30	**Coffee & Exhibition**	**Coffee & Exhibition**		**Coffee, Exhibition & Ada in Motion**
	Application Frameworks Chair: Juan António de la Puente (Wallenbergaren room)	**Modeling** Chair: Albert Llemosi (Wallenbergaren room)	**Vendor Session II** Chair: Ahlan Marriott (Solen room)	**Industrial Presentations: Space Applications** Chair: Jacob Sparre Andersen (Wallenbergaren room)
11:30 - 12:00	Ada Ravenscar Code Archetypes for Component-Based Development *Marco Panunzio, Tullio Vardanega*	Handling Synchronization Requirements under Separation of Concerns in Model-Driven Component-Based Development *Patricia López Martínez, Tullio Vardanega*	Altran-Praxis	ATV Flight Application Software Command Checker (FCC) *Jørgen Bundgaard*
12:00 - 12:30	An Integrated Framework for Multiprocessor, Multimoded Real-Time Applications *Sergio Sáez, Jorge Real, Alfons Crespo*	An Approach to Model Checking Ada Programs *José Faria, João Martins, Jorge Sousa Pinto*	Vector Software	Use of Model Driven Code Generation on the ASIM Project *Steen Palm*
12:30 - 13:00	Integrating Middleware for Timely Reconfiguration of Distributed Soft Real-Time Systems with Ada DSA *Marisol García Valls, Felipe Ibáñez Vázquez*	Formal Modelling for Ada Implementations: Tasking Event-B, Andrew *Edmunds, Abdolbaghi Rezazadeh, Michael Butler*	AdaCore	Including Hardware/Software Co-design in the ASSERT Model Driven Engineering Process *Francisco Ferrero, Elena Alaña, Ana I. Rodríguez, Juan Zamorano, Juan A. de La Puente*
13:00 - 14:30	**Lunch & Exhibition**	**Lunch & Exhibition**		**Lunch & Exhibition**

	Tuesday 12th		Wednesday 13th	Thursday 14th	
	Panel		**Panel**	**Testing & Validation** Chair: Jean-Pierre Rosen (Wallenbergaren room)	**IP: Avionics Applications** Chair: Dirk Craeynest (Solen room)
14:30 - 15:00	What is Language Technology in Our Time? *Moderator and Chair:* *Tullio Vardanega* *Panelists:* *Franco Gasperoni, José Maria Martínez,* *Bertrand Meyer, Erhard Ploedereder*		Reliable Software, a Perspective from Industry *Moderator and Chair:* *Jørgen Bundgaard* *Panelists:* *Steen Palm; Ana Rodríguez;* *Rick Sward*	Augmenting Formal Development with Use Case Reasoning *Alexei Iliasov*	Tool Support for Verification of Software Timing and Stack Usage for a DO-178B Level A System *Felipe Kamei, Daniela Carta, Ian Broster, Will Lunniss*
15:00 - 15:30				Formal Goal-Oriented Development of Resilient MAS in Event-B *Inna Pereverzeva, Elena Troubitsyna, Linas Laibinis*	Combining Ada Generics and Code Generation to Implement a Software Product Line *Richard Bridges, Frank Dordowsky, Holger Tschöpe*
15:30 - 16:00				Choices, Choices: Comparing between CHOC'LATE and the Classification-Tree Methodology *Pak-Lok Poon, Tsong Yueh Chen, T.H. Tse*	
16:00 - 16:30				**Coffee, Exhibition & Ada in Motion**	
16:30 - 17:00	**Coffee & Exhibition**		**Coffee & Exhibition**	**Real-Time Systems** Chair: Jorge Real (Wallenbergaren room)	
	Use of Ada Chair: John McCormick (Wallenbergaren room)	**Vendor Session I** Chair: Ahlan Marriott (Solen room)	**Industrial Presentations: Use of Ada** Chair: Erik Wedin (Wallenbergaren room)	Improving the Performance of Execution Time Control by Using a Hardware Time Management Unit *Kristoffer Nyborg Gregertsen, Amund Skavhaug*	
17:00 – 17:30	Source Code as the Key Artifact in Requirement-Based Development: the Case of Ada 2012 *José F. Ruiz, Cyrille Comar, Yannick Moy*	Rapita Systems	Using an Ada/Firmware Co-design to Emulate an Obsolete Processor *Rod White*	Implementing and Verifying EDF Preemption-Level Resource Control *Mark Fairburn, Alan Burns*	
17:30 – 18:00	Teaching 'Concepts of Programming Languages' with Ada *Theodor Tempelmeier*		A Portfolio Model for Natural Catastrophe Reinsurance - Experience using Ada and the GNAT Programming Environment *Gautier de Montmollin*	Efficient Constraint Handling during Designing Reliable Automotive Real-Time Systems *Florian Pölzlbauer, Iain Bate, Eugen Brenner*	
18:00 – 18:30	Designing the API for a Cryptographic Library: A Misuse-Resistant Application Programming Interface *Christian Forler, Stefan Lucks, Jakob Wenzel*		Development of Controller Pilot Automatic Data Communication (Data Comm) System *Alok Srivastava, Jeff O' Leary*	**Closing** Chair: Rei Ståhle (Wallenbergaren room) Best Presentation Award, Presentation of related events	
18:30 – 19:30	Ada-Europe General Assembly (Wallenbergaren room)				
			Banquet and Best Paper Award		

T6: Experimenting with ParaSail – Parallel Specification and Implementation Language

Tucker Taft,
SofCheck div. of AdaCore, USA
(Monday June 11th, afternoon, Mars room)

This tutorial will allow experimentation with a prototype compiler and virtual machine for ParaSail, a new language designed to support the safe, secure, and productive development of parallel programs. ParaSail has pervasive parallelism along with extensive compile-time checking of annotations in the form of assertions, preconditions, postconditions, etc. ParaSail does all checking at compile time, and eliminates race conditions, null dereferences, uninitialized data access, numeric overflow, out of bounds indexing, etc. as well as statically checking the truth of all user-written assertions. After a short introduction to the language, attendees will receive a prototype ParaSail compiler and an accompanying ParaSail Virtual Machine interpreter for writing and testing ParaSail programs. The tutorial will finish with a group discussion and feedback on the experience of using this new language.

Level
The tutorial includes an introduction to the language. No specific prerequisites other than an interest and ability in learning a new language, plus a basic understanding of parallelism, assertions, pre-conditions, and postconditions.

Reasons for attending
This is a chance to experiment with a new programming language oriented around parallelism and formal verification. The language is still quite new, so it is also a chance to provide feedback on the language, and perhaps gain some insights that might contribute to other language design efforts.

Presenter
The presenter has been involved with language design since 1975, and with Ada since 1980. He was the technical lead for the design of Ada 95, and was heavily involved in the design of Ada 2005 and the forthcoming Ada 2012. In addition to language design, the presenter has been the technical lead on the development of an Ada 83 and of an Ada 95 compiler, as well as of an advanced language-independent static analysis technology. Since 2009, the presenter has been developing the ParaSail language and a prototype implementation.

T7: Basics of Oracle Database Programming with Ada: Introduction to the Konada.Db Library (morning)

T8: Oracle Database GUI-programming on MS Windows (afternoon)

Frank Piron,
KonAd GmbH, Germany
(Friday June 15th, morning/afternoon, Tellus room)

The tutorial gives an introduction to Oracle Database Programming with Ada. Based on the Konada.Db library and the GWindows extensions made by KonAd it will be shown how to develop GUI and non-GUI Oracle Database Applications or to enhance existing applications with Oracle Database connectivity. Except the Ada libraries, only the Oracle Call Interface library and (for GUI-Applications) the Win32 API is needed.

The tutorial will be divided in two parts, which can be taken independently, with the morning session devoted to Oracle programming, with command line programs which are operating system independent, and the afternoon session integrating the GUI components for Microsoft Windows.

Level
The tutorial is directed to Ada developers who want to extend their applications with Oracle Database connectivity in a pure Ada Way without using JDBC or ODBC nor using other third party libraries except the Oracle Call Interface.
The attendees of the tutorial are expected to have intermediate experience in Ada development and a basic understanding of what database programming is. For example they should know about SQL, relational Databases and transactions. Special knowledge about Oracle Databases would be helpful but is not necessary.
If interested in the GUI-part of the tutorial the attendees should know the basics of Windows GUI-development concepts e.g. the message loop, controls, callbacks, window management, etc.

Reasons for attending

- Learning how to use the freely available Konada.Db basic library.
- Extending Ada programs with Oracle Database interaction - with or without a GUI-part. If the programs do not contain a GUI-part then this is possible on any Ada and OCI aware platform. This includes Linux, Solaris and MS Windows.
- With the GUI-part this approach may be an alternative direction for Oracle Forms Developers to go. Making the transition easier because of the similarity between Ada and PL/SQL. The GUI-binding is available only for MS Windows.
- Enhancing an AWS (Ada Web Server) application with Oracle Database access.

Presenter

Frank Piron graduated in 1986 from the University of Bonn. From 1987 – 1991 worked at the Computer Science Department of the RWTH-Aachen including Tutorials and Seminars in Computer Science. Since 1997 he is a Database developer. He is co-founder of the KonAd GmbH. Data Warehousing Projects with the Deutsche Post AG included giving tutorials for Database Administrators and Developers in PL/SQL and Oracle Performance tuning. Since 2002 Ada he has been involved with the programming and development of the Konada.Db Framework. From 2003 – 2005 he developed the KWfl/ElSch Workflow and Document Management System which currently runs in a production environment in the city of Zurich. Since 2005 he further developed the Konada.Db framework.

T9: The Benefits of Using SPARK for High-Assurance Software (morning)

T10: The Use of Proof and Generics in SPARK (afternoon)

**Trevor Jennings,
Altran Praxis, UK**
(Friday June 15th,
morning/afternoon,
Mars room)

SPARK is a contract-based sub-language of Ada which is unambiguous and suitable for rigorous static analysis. It has been extensively used in industrial applications where safety and security are paramount. The tutorial will begin with an introduction to SPARK for those who are unfamiliar with the language. We then consider simple examples of the proof of properties in SPARK programs. In particular we will look at the proof of absence of runtime exceptions. We explain the use of the proof tools, including the new counter-example finding tool, Riposte. The language and tools now support generics, so we will see how to use generics in SPARK to provide reusable components. Finally, we will consider proof of properties of these generic units with the SPARK proof tools.

The tutorial will be divided in two parts, which can be taken independently, with the morning session devoted to SPARK programming, and the afternoon session dedicated to recent features such as the Riposte tool and generics support.

Level

The level of the tutorial is intermediate. The recommended experience and background of the audience are practising software engineers, programme managers, and those involved with procurement of high-integrity software systems might attend this tutorial. Some background in the development of safety- or security-critical software might be useful, but not essential. The audience should not be put off by the fact that we discuss program proof. The examples used will be simple and accessible. The afternoon part expects previous knowledge of SPARK (provided in the morning).

Reasons for attending

- To learn about the trade-offs in the design of programming languages and static analysis tools.
- To learn about what such tools can and can't offer in terms of soundness, depth, efficiency and completeness of analysis.
- To appreciate the SPARK language, and the capabilities of the SPARK toolset.
- To gain an understanding of automated program proof and how it is done in SPARK
- To learn about new developments in SPARK such as generics and counter-example finding.
- To discuss possible extensions to SPARK to incorporate new features from Ada 2012.

Presenter

Trevor is a Fellow of the British Computer Society with over 40 years of experience in the computer industry, both in hardware and software roles. His involvement with Ada started in 1979 during his postgraduate research at The City University in London. Whilst a research fellow at Southampton University between 1986 and 1989, he developed SPARK, an annotated subset of Ada specifically

designed for deep static analysis for use in high-assurance systems and co-authored its first published definition. He is now a member of the SPARK team, developing and supporting the SPARK Toolset. He regularly presents SPARK training courses.

T11: Design of Multitask Software: the Entity-Life Modeling Approach

Bo Sandén,
Colorado Technical University,
USA
(Friday June 15th, full day, Merkurius room)

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 an extension of object orientation into the time dimension: the central idea is that the task architecture should reflect concurrency that exists in the problem. The tutorial follows the presenter's recent 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.

Presenter
Dr. Bo Sandén 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. Sandén is the inventor of entity-life modeling (ELM). He gave a number of tutorials on ELM in the mid-90s: ACM Professional Development Seminar 1994, Washington Ada Symposium 1994, 1995, 1996; TRI-Ada 1994, 1995, 1996. Since then he has taught ELM at Colorado Tech and externally, and published a number of articles on the topic primarily in the IEEE magazines. He holds an MS in Engineering Physics from Lund Institute of Technology and a Ph.D. in Information Processing from the Royal Institute of Technology, Stockholm.

ADA IN MOTION SESSION

A special session "Ada in Motion" will show off invited cases of Ada being used in moving equipment. The session will feature drive-by-wire and segway-like Lego Mindstorm robots and Arduino based devices. This session will occur in the coffee breaks of Thursday, in the Atrium and "Solen" area. In this session an announcement will also be made on the public release of the reference implementation for the Ada Way 2010/11 contest.

VENDOR SESSIONS AND EXHIBITION

The conference will feature an exhibition in the Atrium; coffee breaks will be served in the exhibition space. Exhibitors: AdaCore, Altran-Praxis, Ellidiss, Rapita, Vector Software. Exhibitors and vendors will also deliver technical presentations in one of the tracks on Tuesday and Wednesday.
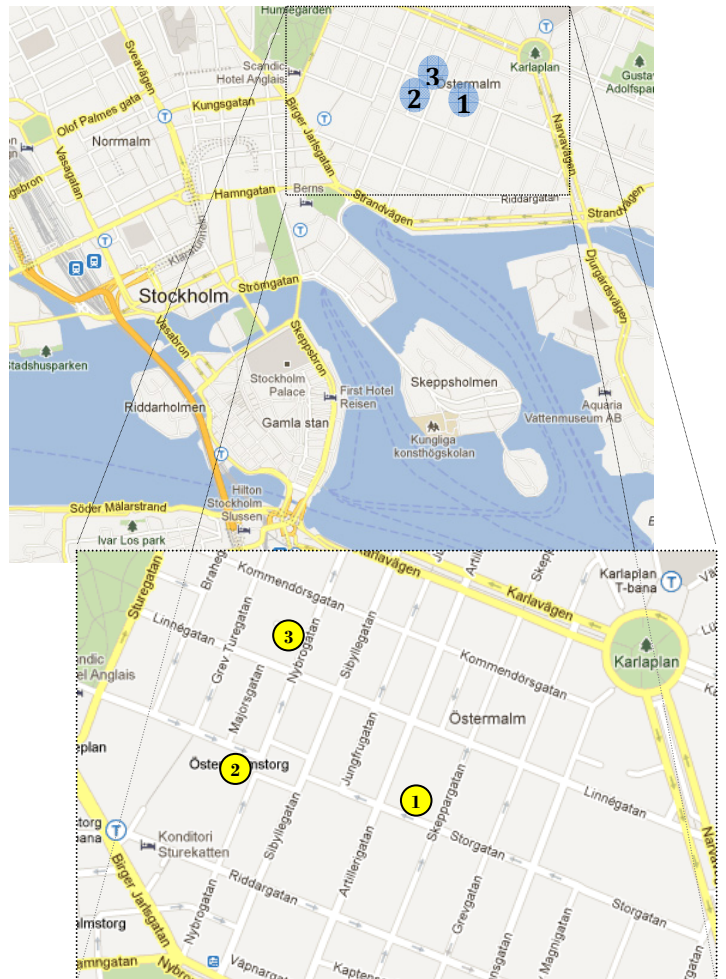
CONFERENCE VENUE AND SOCIAL PROGRAM

The Ada-Europe 2012 conference will take place at Näringslivets Hus ①, a modern conference centre situated in the very heart of Stockholm, located near the Östermalmstorg metro station and close to the Gamla Stan historic district.
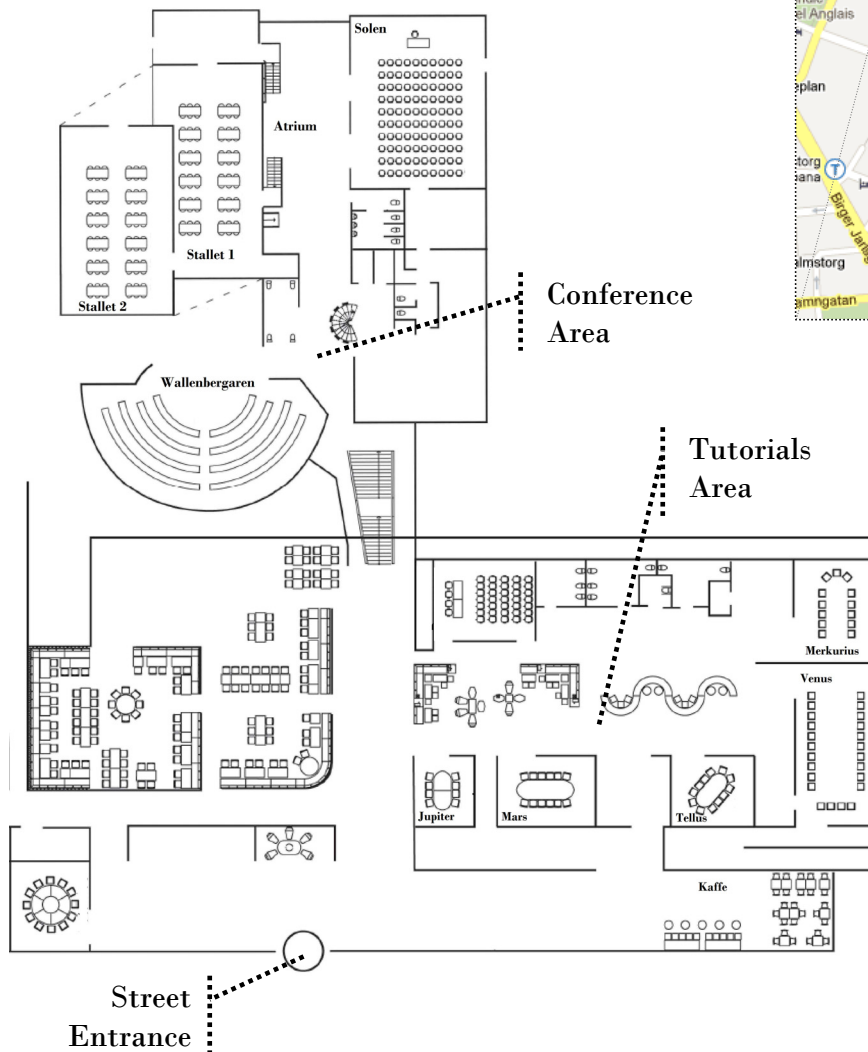
The program of the conference will offer ample time for interaction and networking, with extensive lunch (in the Stallet area) and coffee periods (in the Atrium).

The conference banquet will take place Wednesday (19:30) at Östermalms Saluhall ②, a marketplace food hall in a magnificent building from 1888. The banquet location is within walking distance from both the conference centre and the recommended hotel ③.
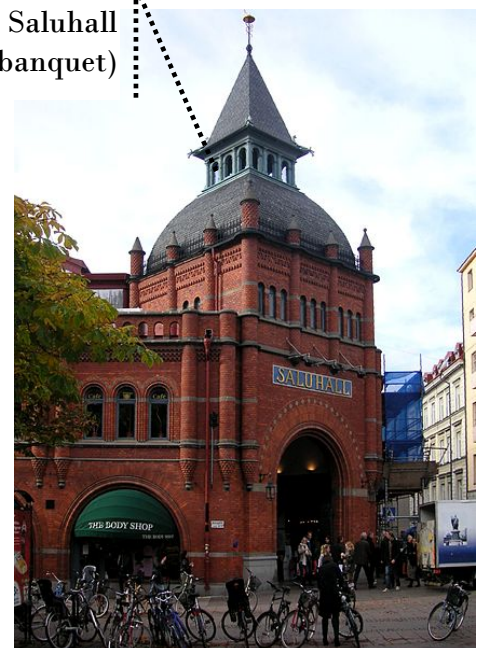
Additional tickets for the banquet can be purchased at registration.

LAYOUT OF THE CONFERENCE AREA

Conference Area

Tutorials Area

Street Entrance

After entering the conference venue, please access the Ada-Europe area by either showing your badge or informing the security of being a participant in the conference.

Östermalms Saluhall (banquet)

REGISTRATION AND ACCOMMODATION

Conference Registration

The registration fee for the three days of the technical program (June 12th - June 14th) includes one copy of the proceedings, coffee breaks, lunches, and banquet. The registration fee for a single day of the technical program includes one copy of the proceedings, coffee breaks, and lunch for the day of the registration.

	Member of Ada-Europe or ACM SIGAda, SIGBED, SIGPLAN		Non-member	
	Non academia	Academia	Non academia	Academia
Early registration (by May 7th)	5500 SEK	5000 SEK	6000 SEK	5500 SEK
Late/on-site registration (after May 7th)	6000 SEK		6500 SEK	
Individual registration (per day)	3000 SEK		3200 SEK	

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 (by May 7th)	1150 SEK	2300 SEK
Late/on-site registration (after May 7th)	1300 SEK	2600 SEK

Payment and Canceling Information

Registration may be paid by bank transfer or credit card (VISA or Master Card). Please note that a surcharge of 2% will be added to credit card payments. No registration request will be confirmed until the payment has been processed. To save on administrative costs and postage, receipts will be given out at the conference.

Cancellations must be given in writing. A cancellation fee of 5% will be applied to all cancellations. No refunds will be given for cancellations received after the 22nd of May. Substitutions will be accepted.

For latest information see the web page at http://www.ada-europe.org/conference2012. For additional information, please contact the Ada-Europe 2012 Local Chair: **Rei Stråhle**, E-mail: rei@ada-sweden.org.

Student grants

A limited number of student grants is available. Prospective applicants are invited to contact the Conference Chair for further information.

Accommodation

We have negotiated specially reduced rates at the Hotel Mornington nearby the conference. Please contact directly Christina Wiberg at christina.wiberg@mornington.se, quoting reference G744172. This offer is limited and is on a first come first serve basis. Please book accommodation as soon as possible. Stockholm will be very busy in that week.

Registration

Please access the registration system at the conference web page: http://www.ada-europe.org/conference2012.

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Please refer to the website for information on Program and Industrial Committees

ACM SIGAda, SIGBED, SIGPLAN

The organizers thank the exhibitors and supporters of the conference:

Springer Verlag publishes the proceedings of the conference, in the
Lecture Notes in Computer Science series (LNCS 7308)