6th International Conference on Reliable Software Technologies
Ada-Europe'2001

Leuven, Belgium May 14-18, 2001

Preliminary Program

The information presented here is preliminary - please refer to the conference website for the latest details.

In 2001, the 6th International Conference on Reliable Software Technologies will take place in Leuven, Belgium, from May 14th to May 18th. The conference offers a technical program and exhibition, plus a series of tutorials and a workshop.

The conference provides 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.

The technical program includes keynote addresses, session papers by the international community with refereed contributions from many countries. The proceedings of the conference will be published in the Lecture Notes in Computer Science (LNCS) Series by Springer. An exhibition concurrent to the conference offers an opportunity to explore the latest developments by the commercial marketplace. The tutorials on Monday and Friday offer an excellent opportunity to obtain in-depth knowledge in important technologies in the field.

Leuven is one of Europe's ancient university towns with many old beautiful buildings. The town hall, the famous Beguinage (Begijnhof), the churches, cloisters and colleges stand silent witness to the rich history of Leuven and make it the interesting place it is. Leuven is only 25 km (15 miles) away from Brussels, the capital of Belgium and the seat of the European Union. This year, K.U.Leuven university celebrates its 575th anniversary. The Conference will take place in the unique setting of the classicist buildings of Maria-Theresia College, situated in the historical centre of Leuven.

Overview of the week

	Morning	Late Morning	After Lunch	Afternoon
Monday May 14th Tutorials & Wokshop	Non-standard techniques in Ada			
	Practical experiences of safety-critical Ada technologies			
	Early reliability measurement and improvement		An introduction to XML	
	Workshop on exception handling for a 21st century programming language			
Tuesday May 15th Sessions & Exhibition	Building formal requirement models for reliable software Axel van Lamsweerde, UCL, Belgium	Program Analysis	Distributed Systems	Using Ada in interactive digital television systems Pascal Héraud, CANAL+
		Software Process	Vendor presentations	
Wednesday May 16th Sessions & Exhibition	A Report on the Software Engineering Body of Knowledge Project James W. Moore The MITRE Corporation, USA	Real-Time Systems	Dependable Systems	APIs and Components
		Language and Patterns	Vendor presentations	Vendor presentations
Thursday May 17th Sessions & Exhibition	Logic versus Magic in critical systems Peter Amey, Praxis Critical Systems	Real-Time Kernels	System Evolution	Can Java meet its real-time deadlines? Brian Dobbing, Praxis Critical Systems
		Standard Formats: UML & XML	Vendor presentations	
Friday May 18th Tutorials	From full concurrency to safe concurrency			
	Building distributed systems with Ada			
	Implementing design patterns in Ada: sequential programming idioms		Architecture centered development and evolution of reliable real-time systems	

Exhibition

The exhibition opens in the mid morning break on Tuesday and runs until after the Thursday afternoon break.

Each exhibitor will have at least one half hour presentation slot during the vendor track; the program for the vendor presentations is still being worked out.

The mid morning and mid afternoon breaks are one hour to give attendees ample opportunity to visit the exhibition.

At the time of writing nine exhibitors have registered: Aonix, ACT, DDC-I, Greenhills, Irvine Compiler, Praxis Critical Systems, Rational Software, TNI and Top Graph'X.

Building formal requirement models for reliable software

Axel van Lamsweerde,
Université Catholique de Louvain, Belgium

Tuesday May 15th, 09:00

Requirements engineering (RE) is concerned with the elicitation of the goals to be achieved by the system envisioned, the operationalization of such goals into specifications of services and constraints, and the assignment of responsibilities for the resulting requirements to agents such as humans, devices, and software. Getting high-quality requirements is difficult and critical. Recent surveys have confirmed the growing recognition of RE as an area of primary concern in software engineering research and practice.

The talk will first briefly introduce RE by discussing its main motivations, objectives, activities, and challenges. The role of rich models as a common interface to all RE processes will be emphasized.

We will then review various techniques available to date for system modeling, from semi-formal to formal, with the aim of showing their relative strengths and weaknesses when applied during the RE stage of the software lifecycle, notably, their limited scope, their lack of abstraction, their poor separation of concerns, and their lack of methodological guidance.

The talk will then discuss a number of recent efforts to overcome such problems through RE-specific techniques for goal-oriented elaboration of requirements, multiparadigm specification, the handling of non-functional requirements, the management of conflicting requirements, and the handling of abnormal agent behaviors.

Short biography

Axel van Lamsweerde is Full Professor of Computing Science at the University of Louvain, Belgium. He is co-founder of the CEDITI technology transfer institute partially funded by the European Union. He has also been a research associate at Philips Research Laboratories, the University of Oregon, and the Computer Science Laboratory of SRI International, Menlo Park, CA. His professional interests are in technical approaches to requirements engineering and, more generally, in lightweight formal methods for reasoning about software engineering products and processes.

Axel van Lamsweerde is an ACM fellow. Since 1995, he is Editor-in-Chief of the ACM Transactions on Software Engineering and Methodology (TOSEM). He has been program chair of major software engineering conferences and workshops, including ESEC'91, ICSE'94, and IWSSD'93. He is member of the Editorial Boards of the Automated Software Engineering Journal and the Requirements Engineering Journal.

Using Ada in interactive digital television systems

Pascal Héraud, CANAL+ Technologies, France

Tuesday May 15th, 16:30

The digital television (DTV) market has been growing exponentially since 1996. Based on widely accepted MPEG and DVB standards, digital television offers a higher image quality as well as an unlimited number of interactive services.

Canal+ Technologies provides a complete end-to-end solution for digital television operators, from the central broadcast centers to the set-top boxes at home. The DTV broadcast center systems have availability, reliability and load constraints which require a robust implementation.

For this reason, the server-side components of Canal+ Technologies software have been developed in Ada.

This presentation explains the architecture of a digital television system and how Ada is used inside this system. It also describes how this system is currently re-engineered from a proprietary Ada 83 / OpenVMS implementation using the DEC Ada compiler to an Ada 95 multi-platform implementation using the GNAT compiler.

Short biography

Pascal Héraud works in the team doing the porting and re-engineering of the Canal+ applications from Ada 83 on OpenVMS to Ada 95 on multiple platforms. Before joining Canal+, he spent many years at Aonix as a software engineer working on both AdaWorld and ObjectAda products, both in Paris and San Diego.

Testing from formal specifications, a generic approach

Marie-Claude Gaudel,
Université de Paris-Sud, France

CANCELLED: *M C Gaudel has been involved in a car accident. We wish her a speedy recovery.*

Deriving test cases from specifications is now recognised as a major application of formal approaches to software development. Several solutions have been proposed for various formalisms: behavioural descriptions such as transition systems, model-based specifications, algebraic specifications, etc. This talk will present our general approach of test data selection from formal specifications.

A notion of "exhaustive test set" is derived from the semantics of the formal notation and from the definition of a correct implementation. Then a finite test set is selected via some "testing hypothesis". This approach will be illustrated by its application to the case of algebraic specifications, object oriented Petri nets (CO-OPN2), LUSTRE, and full Lotos. Several case studies and industrial experiments will be reported.

Short biography

Marie-Claude Gaudel was appointed full professor at the University of Paris-Sud in 1984 and is now professeur classe exceptionelle. Before joining UPS, she was a researcher at INRIA, then managed the Software Engineering group at the industrial research center of Alcatel-Alsthom (Marcoussis, France).

Her research interests include formal methods, program robustness and testing methods. For many years, she has pushed for effective use of formal methods in all phases of critical system development, with an emphasis on testing activity.

She is president of the Scientific Board of INRIA and is chair of the Board of RENATER (the French computer network for education and research).

She is Doctor Honoris Causa of EPFL, and she got the CNRS Silver Medal in 1996 for her work on software testing.

A Report on the Software Engineering Body of Knowledge Project

James W. Moore, The MITRE Corporation, USA

Wednesday May 16th, 09:00 - *At short notice, J.W. Moore has agreed to speak.*

The Software Engineering Body of Knowledge (SWEBOK) project is an effort of the IEEE Computer Society to characterize the contents and boundaries of the software engineering discipline. The key product of the project is a Guide which outlines the discipline and provides citations to key references in the literature. It is hoped that the Guide will serve as the basis for curriculum development, curriculum accreditation, and professional development. As the SWEBOK project nears the end of its second-of-three phases, we can perceive its likely contents. This brief report provides a summary of the project and its progress, and an overview of the Trial Use version of the SWEBOK Guide.

Short biography

Jim Moore is an Executive Editor of the Software Engineering Body of Knowledge Project. He is a thirty-year veteran of software engineering and an ten-year veteran of software engineering standardization. He received his B.S. in Mathematics from the University of North Carolina (Chapel Hill) and his M.S. in Systems and Information Science from Syracuse University. Jim has worked in both the commercial and defense sectors for IBM and, now, The MITRE Corporation, where he is a focal point for standardization activities. Currently, he serves as the Head of the US delegation to ISO/IEC JTC1/SC7 (Software Engineering). He is a recipient of the IEEE's Third Millenium Award and has been named to the Computer Society's Golden Core. His book on Software Engineering Standards was published in 1997.

Logic versus Magic in critical systems

Peter Amey, Praxis Critical Systems, UK

Thursday May 17th, 09:00

A prevailing trend in software engineering is the use of tools which apparently simplify the problem to be solved. Often, however, this results in complexity being concealed or "magicked away". For the most critical of systems, where a credible case for safety and integrity must be made prior to there being any service experience, we cannot tolerate concealed complexity and must be able to reason logically about the behaviour of the system.

The presentation draws on real life project experience to identify some historical and current magics and their effect on high integrity software development; this is contrasted with the cost and quality benefits that can be made from taking a more logical and disciplined approach.

Short biography

Peter Amey is an aeronautical engineer by original professional training. He was a serving engineering officer in the Royal Air Force where he spent several years at the Boscombe Down test establishment working on the certification of aircraft armament systems. Peter joined Program Validation Ltd to develop SPARK and the SPARK Examiner and continues that work with Praxis Critical Systems. As well as developing SPARK he has used it on the Tornado, Eurofighter and Lockheed C130J programmes.

Can Java meet its real-time deadlines ?

Brian Dobbing, Praxis Critical Systems, UK
co-author Ben Brosgol, ACT

Thursday May 17th, 16:30

Ada has been-there, done-that as regards meeting real-time programming requirements. The Ada95 revision addressed almost all the concerns that had plagued Ada83's usability. But Java is now the flavor of the month for just about everything it seems. Current Java semantics for all things concurrent are much inferior to even the generally rejected Ada83 tasking model, and so two on-going competing initiatives to fix Java concurrency are in progress. Both attempt to make Java suitable for real-time by addressing predictability, performance, footprint and missing features. But how successful are these attempts, and will they achieve the goal of producing high-reliability, high-performance and predictable Java-based software?

Short biography of presenter

Brian Dobbing is a senior technician at Praxis critical Systems. Previously he was Chief Technical Consultant at Aonix Europe and has been involved in the production of Ada development tools and runtime systems for almost 20 years. He was a member of ISO WG9 during the Ada95 revision process and spearheaded the definition of the Ravenscar Profile. Brian is also technical editor of the J Consortium working group that is defining ISO standard extensions to the Java platform for high integrity systems.
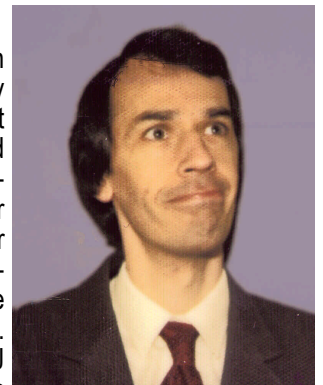
Short biography of co-author

Ben Brosgol, a senior member of the technical staff of Ada Core Technologies in the U.S., has had a long and direct participation in the Ada effort as a language designer, implementor, educator and user. A well-known figure in the international Ada community and currently the Chair of ACM SIGAda, he has delivered many papers and tutorials at Ada conferences, including several in-depth comparisons of Ada and Java. Since early 1999 he has been involved with the real-time Java efforts. Ben is a primary member of the Real-Time for Java Expert Group, who have been operating under Sun's Java Community Process to specify a set of real-time extensions to the Java platform. He is also a reviewer of the J-Consortium's proposed core real-time Java extensions.

Tutorials

Non-standard techniques in Ada

Art Duncan, RPI, USA

Monday May 14th, all day T1

The tutorial is directed toward students and educators as well as professional Ada programmers. The techniques presented have the dual advantage of being both useful and fun.

We will go beyond the normal introductory course in Ada to explore a number of interesting non-standard ways of using Ada. Many of the techniques have been inspired by the author's experiences with the programming paradigms used by programmers of Lisp and various functional programming languages.

The tutorial shows how we can reduce complexity and improve readability of Ada programs by using a number of declarative techniques to replace potentially complex and involved procedural code. These techniques include

- declarative techniques for encapsulating control structures,
- a flexible, data-driven technique that, for want of a better term, I have called "template-driven programming,"
- use of inheritance and iterators to define generalized applications, and
- a technique based on lazy evaluation for the creation and manipulation of infinite data structures.

The tutorial will last a full day and will consist of five sections, followed by the author's conclusions and suggestions for further investigation.

Presenter

Dr. Arthur G. Duncan is an independent consultant, as well as an adjunct professor of Computer Science at th Rensselaer Polytechnic Institute in Troy, New York, U.S.A.

Dr. Duncan has been involved with the Ada language for 20 years. Before becoming an independent consultant, he was a key member of the Ada group at the G.E. Research and Development Center in Schenectady, New York, where he was a major contributor to the Interactive Ada Workstation, the Interactive VHDL Workstation, and ENCORE (the ENvironment for COde REengineering).

When not pursuing computer-language-related activities, Dr. Duncan can generally be found playing big band music on the trombone or Irish dance music on the tin whistle.

Practical experiences of safety-critical Ada technologies

Peter Amey & Rod Chapman, Praxis Critical Systems, UK

Monday May 14th, all day T2

The tutorial identifies the special properties of systems intended for use in ultra-reliable domains and the qualitative shift in development methods that is required to achieve those properties. The advantages (and weaknesses) of Ada are introduced in the context of the ISO HRG report on High-Integrity Ada and the SPARK sublanguage. The demands of common, important development standards are described together with appropriate and cost-effective techniques for meeting them. Finally project experience illustrating successes in meeting the main standards is discussed.

Presenters

The tutorial will be presented by Mr Peter Amey and Dr Rod Chapman of Praxis Critical Systems. Both have extensive teaching and presentation experience mostly obtained in the subject field. Both teach regularly on the 'Software Engineering with SPARK' course run by Praxis Critical Systems. Dr Chapman has been a regular presenter at Ada Europe, Ada Sweden, SIGAda and the World Congress on Formal Methods.

Early reliability measurement and improvement

Jeff Tian, SMU, USA

Monday May 14th, morning T3

This tutorial introduces basic concepts in software reliabilityengineering (SRE) and surveys recent developments in SRE.

Existing reliability models, including both the time domain software reliability growth models (SRGMs) and input domain reliability models based on repeated random sampling are surveyed. Both these types of models were integrated in the recently developed tree-based reliability models (TBRMs) by the author to analyze product reliability and identify high risk areas for focused reliability improvement. Various practical issues in applying existing SRE techniques and the new TBRMs in large software systems are also discussed, including: environmental constraints, measurement types and availability, SRE implementation strategies, and support tools for analysis, modeling, and SRE implementations.

This approach has been used in the testing phase of several large software products developed in the IBM Software Solutions Toronto Laboratory and was demonstrated to be effective and efficient. In addition, other recent work in early measurement of software reliability, integration of SRE and traditional software measurement and analysis activities, and analysis of techniques for reliability assurance and improvement are also covered in this tutorial.

Presenter

Jeff presented a similar tutorial at Ada-Europe 2000 entitled "Tree-Based Reliability Models (TBRMs) for Early Reliability Measurement and Improvement". The tutorial was rated the best by the attendees. Jeff was ranked as one of the "Top Scholars in Systems and Software Engineering" (only top 15 or so ranked) by the Journal of Systems and Software in 1997, 1998, and 1999.

Jeff obtained a Ph.D. from the University of Maryland in 1992 then worked for IBM until 1995 when he became Assistant Professor of Computer Science and Engineering at Southern Methodist University (SMU) since Fall, 1995. Since then Jeff has developed and taught two closely related courses entitled CSE 8317/8391 Software Reliability and Safety and CSE 6340 Advanced Topics in Software Engineering in 1996-2000 at SMU.

An introduction to XML

Gregory Neven, Maarten Coene & Roel Adriaensens, K.U.Leuven, Belgium

Monday May 14th, afternoon **T4**

The Extensible Markup Language (XML) has emerged in just a few years as nothing less than a phenomenon in computing. XML is a "meta language": it is a standard for defining descriptions of structure and content in documents. If HTML provides a universal method to display data, XML takes the next step by separating the content of a document from its representation and by providing not only the data itself but also its interpretation. XML transforms data into information. This universal, flexible and extensible approach opens up an almost unlimited range of uses for XML, from word processing through e-business to data archiving.

Discussed subjects include

- The XML syntax
- How to define constraints on XML documents
  - DTD's
  - Schema
- How to parse, traverse and transform XML documents
  - SAX
  - DOM
  - XSLT
- Some XML standards
  - ebXML
  - Biztalk
  - SOAP
- An example that illustrates XML's role in Business-to-Business e-commerce

Presenters:

Gregory Neven, Maarten Coene, Roel Adriaensens are all teaching assistants at KU Leuven with extensive XML experience.

From full concurrency to safe concurrency

John Harbaugh, Boeing, USA

Friday May 18th, all day T5

The outlook for embedded systems has never been more exciting. Fast 32-bit processors and cheap memory are fueling an explosion of sophisticated applications. From "smart cards" for financial, medical, and governmental records, to drive-by-wire automobiles and integrated e-phones, many "mission-critical" aspects of our lives are coming to depend on the software running on all those processors. Recent research has led to a compact and reliable tasking model, the so-called Ravenscar profile, designed specifically for high-integrity, efficient, real-time systems. In this tutorial, attendees will learn how to write concurrent (multithreaded) applications that are consistent with the Ravenscar profile and use the Ada95 programming language. Attendees will also learn how to assure that real-time programs will meet their deadlines using Rate Monotonic Analysis.

Outline

This tutorial introduces Ada95's support for concurrent program design. Attendees will explore Ada tasking in the context of high integrity applications suitable for safety/mission critical computing.

Language features are introduced in the context of the Ravenscar profile for high integrity Ada tasking. Attendees will learn to analyze task schedulability and estimate CPU utilization using Rate Monotonic Analysis.

Presenter

John Harbaugh graduated with a BSEE from the University of Washington in 1980 and has worked for The Boeing Company ever since. John has written and tested embedded software for missiles, helicopters, and commercial aircraft, much of it in Ada and assembler. From 1995 to 1999 he was on staff in the Employee Training & Development organization where he developed and taught courses in software engineering, using Ada as the primary teaching language. He currently writes software for a large, distributed, Object Oriented upgrade program to the NATO Airborne Warning and Control System (AWACS) using Ada95.

Building distributed systems with Ada

*Samuel Tardieu, Laurent Pautet &
Thomas Quinot, ENST, France*

Friday May 18th, all day T6

This tutorial will cover the various ways of conceiving and building a distributed application in Ada 95. From BSD sockets to the Distributed Systems Annex without forgetting CORBA, the audience will learn how to efficiently and easily build a powerful distributed application using portable methods.

Description of the topic

Every month subscribers to new software mailing-lists see a new language specially designed for the Internet, whose revolutionnary communication capabilities will solve any problem encountered by designers of distributed applications. Unfortunately, these languages are often short-lived and are solely used by their authors.

However, Ada is a long-lived language whose communication skills are hardly known. Since Ada 95, bindings to standard communication services make it easy to use any network layer. Moreover, the standardization of CORBA for Ada and of the Distributed Systems Annex make it one of the most easy-to-use languages for building large distributed applications.

This tutorial will show how Ada can be used efficiently to build reliable distributed applications. Although proprietary software also exists, the tutorial will outline standardized solutions that are available as free software packages, so that the audience can experiment with them right after the course.

Presenters

Laurent Pautet and Samuel Tardieu are both working as assistant professors in the French "Ecole Nationale Superieure des Télécommunications" (ENST). In cooperation with Ada Core Technologies and ACT Europe they have been developing and enhancing GLADE, a freely available implementation of the Distributed Systems Annex for GNAT for more than 5 years. Their team has also recently released a free 100% Ada CORBA implementation called AdaBroker.

Thomas Quinot is a PhD student at ENST and part of the AdaBroker team. His main research topic is interoperability of distributed object-oriented systems.

Implementing design patterns in Ada: sequential programming idioms

Matthew Heaney, USA

Friday May 18th, morning T7

This tutorial illustrates the use of advanced idioms for object-oriented programming in Ada95, using design patterns as examples. A broad range of language features is covered, including controlled types, access discriminants and parameters, mix-in style inheritance, and hierarchical namespaces.

Description of the topic

When building a software system using object-oriented programming, you soon realize that you can't think of an object all by itself. You also have to consider how it interacts with its clients, and with the other objects on which it depends.

A design pattern is a standard collaboration among objects, with its own mini-architecture, that occurs over and over again as a solution to a common design problem. It acts like a primitive building block, that can be assembled together with other patterns into ever larger systems.

But the tutorial is really about Ada, and we explore the programming idioms necessary in order to effectively use the language.

Discussed topics include

- Interpreter Pattern
- Smart Pointers
- Factory Method
- Observer Pattern
- Rosen Trick
- Generic Dispatching

Presenter

Matthew Heaney has been using Ada since 1987 to successfully build large, real-time systems in the areas of simulation and electronic intelligence.

His interest in software design and object-oriented programming led to his work on design patterns, and over the last couple of years he has converted all the C++ examples in the Gamma book to Ada95. Lately he has been studying general systems theory and constructivist philosophy.

He graduated from Rensselaer Polytechnic Institute in 1985 with a degree in Chemical Engineering.
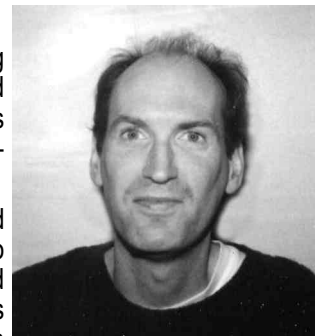
Architecture centred development and evolution of reliable real-time systems

Bruce Lewis & Ed Colbert, USA

Friday May 18th, afternoon T8

This tutorial will describe an architecture centric approach to developing and evolving reliable systems using the MetaH Architecture Description Language and UML. MetaH is an ADL specifically developed for time critical, reliable applications. It supports building multiprocessor, fault tolerant, multi-level safety critical systems. It was developed for the avionics domain but useful in many applications such as robotics, simulation, engine controls, automotive etc. UML is a widely used object orient general purpose software specification language. The tutorial will describe its specialization mapping and use with the real-time ADL MetaH. It will also briefly describe standardization activities of the Avionics Architecture Description Language under SAE based on MetaH as well as new capabilities and research directions.

Description of the topic:

We believe that the most powerful approach to building real-time reliable, evolvable architecture centered systems is through an architecture description language that supports specification of the

architecture, modeling of architecture level system properties and automated integration of hardware and software components from multiple sources preserving modeled properties. Glue code is generated in conformance to specification. Generated kernel supports space and time partitioning for multi-level safety and reduced testing and validation costs. Generation is in Ada95 and supports the transparent integration of Ada, C, C++ software components and use of the Ada95 runtime or POSIX. The approach reduces costs in multiple significant areas in software development and evolution - system level design error reduction, rapid system integration and re-integration, code generation for complex component infrastructure, rapid retargeting of time critical software to new execution environments, and reduced revalidation costs.

Extensions for UML for real-time architecture description are needed by and are of high interest to industry and at least an hour will be devoted to this topic in the tutorial.

Presenters

Bruce Lewis

Technical POC for DARPA MetaH development over last 7 years Chair of Architecture Description Language task group for SAE, Avionics Software Engineering Directorate Lead for advanced software technology development and acquisition.

Has taught similar tutorials on the ADL for Digital Avionics Systems Conference (2), SIGAda, AdaEurope (Spain), International Reuse Conference, Tools USA 2000.

Ed Colbert

Taught and consulted on software engineering, including objectoriented methods and languages, Ada and UML since 1982.

Creator of the Colbert ObjectOriented Software Development method (OOSD), which NASA Langley Research Center used for a Software Engineering Process manual, choosing OOSD partly for its strength in realtime software development

Developer of UML Real Time ADL modeling capability for MetaH

Co-taught tutorial on MetaH/UML at the TOOLS USA 2000 Conference.

Tutorial timetable

Monday May 14th

	T1	T2	T3
09:00	Non-standard techniques in Ada	Practical experiences of safety-critical Ada technologies	Early reliability measurement and improvement
10:30	break	break	break
11:00	Art Duncan	Peter Amey, Rod Chapman	Jeff Tian
12:30	lunch	lunch	lunch
			T4
14:00	Non-standard techniques in Ada	Practical experiences of safety-critical Ada technologies	An introduction to XML
15:30	break	break	break
16:00	Art Duncan	Peter Amey, Rod Chapman	Gregory Neven, Maarten Coene, Roel Adriaensens

Friday May 18th

	T5	T6	T7
09:00	From full concurrency to safe concurrency	Building distributed systems with Ada	Implementing design patterns in Ada: sequential programming idioms
10:30	break	break	break
11:00	John Harbough	Samuel Tardieu, Laurent Pautet, Thomas Quinot	Matthew Heaney
12:30	lunch	lunch	lunch
			T8
14:00	From full concurrency to safe concurrency	Building distributed systems with Ada	Architecture centered development and evolution of reliable real-time systems
15:30	break	break	break
16:00	John Harbough	Samuel Tardieu, Laurent Pautet, Thomas Quinot	Bruce Lewis, Ed Colbert

Refreshments will be served in the breaks. Lunch is included for those following all-day programs or two half day tutorials on the same day. *Additional lunch tickets are on sale throughout the conference.*
Monday evening there is a welcome reception starting at 19:00.

Tuesday May 15th

09:00	**Opening** *John Barnes, president of Ada-Europe*	09:00
09:15	Invited speech: **Building formal requirement models for reliable software** *Axel van Lamsweerde, UCL, Belgium*	09:15
10:15	break - exhibition opens	10:15

11:00	**Program Analysis** *Session chair to be announced* Main Auditorium	**Software Process** *Session chair to be announced* Second Auditorium	11:00	
	Parameter-induced aliasing in Ada *Wolfgang Gellerich* *IBM Deutschland Entwicklung GmbH, Germany* *Erhard Ploedereder* *University of Stuttgart, Germany*	Why we have problems producing quality software: When the product and process become confused *David A. Cook* *Les Dupaix*		
11:30	Slicing tagged objects in Ada *Z. Chen, Southeast University, China* *B. Xu, Wuhan University, China* *H. Yang, De Montfort University, UK*		11:45	
12:00	OASIS - an ASIS secondary library for analyzing object-oriented Ada code *Alexei Kuchumov & Sergey Rybin* *Moscow State University, Russia* *Alfred Strohmeier* *Swiss Federal Institute of Technology in Lausanne.*	A report on use of Ada in development of high integrity systems prepared by Ada UK Ltd. *Presented by Rod Chapman*		
12:30	lunch & exhibition		12:30	

14:00	**Distributed Systems** *Session chair to be announced* Main Auditorium	**Vendor presentations** *Session chair to be announced* Second Auditorium	14:00
	Building modern distributed systems *Laurent Pautet, Thomas Quinot & Samuel Tardieu* *Ecole Nationale Supérieure des Télécommunications, France*	**Aonix**	
14:30	Reliable communication in distributed computer-controlled systems *Luis Miguel Pinho, Polytechnic Institute of Porto, Portugal* *Francisco Vasques, University of Porto, Portugal*	**ACT Europe** ACT Europe Products/Services offering for 2001 *Franco Gasperoni*	14:30
15:00	Building robust applications by reusing non-propietary software *F. Guerra, J. Miranda & J. Calero* *University of Las Palmas de Gran Canaria, Spain.*	**Praxis Critical Systems**	15:00
15:30	break & exhibition		15:30

16:30	Invited speech: **Using Ada in interactive digital television systems** *Pascal Héraud* *CANAL+ Technologies, France*	16:30
17:30	Ada-Europe General Assembly	17:30
18:15		18:15
18:30	**Guided tour of historic town hall followed by civic reception**	18:30

Wednesday May 16th

09:00	**A Report on the Software Engineering Body of Knowledge Project** *James W. Moore, The MITRE Corporation. USA*	**09:00**
10:00	break & exhibition	**10:00**

	Real - Time Systems *Session chair to be announced* Main Auditorium	**Language and Patterns** *Session chair to be announced* Second Auditorium	
11:00	New developments in Ada runtime profile definition and language refinements *Joyce L Tokar, DDCI, USA*	Expression templates in Ada *Alexandre Duret-Lutz, EPITA R&D Lab, France*	**11:00**
11:30	Complex Task Implementation in Ada *Alfons Crespo, Patricia Balbastre & Silvia Terrasa* *Universidad Politécnica de Valencia, Spain*	A design pattern for state machines and concurrent activities *Bo Sandén, Colorado Technical University, USA*	**11:30**
12:00	Implementing a flexible scheduler in Ada *Guillem Bernat & Alan Burns* *University of York, UK*	Component libraries and language features *Ehud Lamm, The Open University of Israel*	**12:00**
12:30	lunch & exhibition		**12:30**

	Dependable Systems *Session chair to be announced* Main Auditorium	**Vendor presentations** *Session chair to be announced* Second Auditorium	
14:00	Experience report: using the SPARK toolset for showing the absence of run-time errors in safety-critical software *Darren Foulger, BAE Systems, UK* *Steve King, University of York, UK*	**TNI Europe** HOOD - The Real-time embedded approach for legacy systems *Tony Elliston*	**14:00**
14:30	Scenario-based system assessment *Silke Kuball, University of Bristol, UK*	**ACT Europe** The GNAT Visual Debugger (GVD) *Franco Gasperoni*	**14:30**
15:00	Test suite reduction and fault detection effectiveness: an empirical evaluation *T.Y. Chen & M.F. Lau* *Swinburne University of Technology, Australia*	**Irvine Compiler** ICC 83/95 Ada for TI-DSP C6XXX family of processors *Joe Kohli*	**15:00**
15:30	break & exhibition		**15:30**

	APIs and Components *Session chair to be announced* Main Auditorium	**Vendor presentations** *Session chair to be announced* Second Auditorium	
16:30	JEWL: a GUI library for educational use *John English, University of Brighton, UK*	**DDC-I**	**16:30**
17:00	Object-oriented stable storage based on mirroring *Xavier Caron, Jörg Kienzle & Alfred Strohmeier,* *Swiss Federal Institute of Technology in Lausanne.*	**Rational**	**17:00**
17:30	Transaction support for Ada *Jörg Kienzle* *Swiss Federal Institute of Technology in Lausanne.* *Ricardo Jiménez Peris* *Universidad Politécnica de Madrid, Spain* *Alexander Romanovsky* *University of Newcastle, UK* *M. Patiño Martinez* *Universidad Politécnica de Madrid, Spain*	**Green Hills**	**17:30**
18:00			**18:00**
18:30	**Guided historic walk**		**18:30**
19:15	**Conference Banquet at Faculty Club in Groot Begijnhof**		**19:15**

Thursday May 17th

09:00	Invited speech: **Logic versus Magic in critical systems** *Peter Amey, Praxis Critical Systems, UK*	09:00

10:00	break & exhibition	10:00

11:00	**Real - Time Kernels** *Session chair to be announced* Main Auditorium	**Standard Formats: UML & XML** *Session chair to be announced* Second Auditorium	11:00
	MaRTE OS: an Ada kernel for real-time embedded applications *Mario Aldea Rivas & Michael González Harbour* *Universidad de Cantabria, Spain*	Modelling communication interfaces with ComiX *Frank Oppenheimer & Dongming Zhang* *University of Oldenburg, Germany* *Wolfgang Nebel* *OFFIS, Germany*	
11:30	Implementing Ada.Real_Time.Clock and absolute delays in real-time kernels *Juan Zamorano, Jose F. Ruiz & Juan A. de la Puente* *Universidad Politécnica de Madrid, Spain*	Safe web forms and XML processing with Ada *Mário Amado Alves* *Universidade Nova de Lisboa, Portugal*	11:30
12:00	Defining new non-preemptive dispatching and locking policies for Ada *Alan Burns, University of York, UK*	Mapping UML to Ada *Bill Taylor, Rational Software, UK* *Einar Karlsen, Rational Software, Germany*	12:00

12:30	lunch & exhibition	12:30

14:00	**System Evolution** *Session chair to be announced* Main Auditorium	**Vendor presentations** *Session chair to be announced* Second Auditorium	14:00
	Ship System 2000, a stable architecture under continuous evolution *Björn Källberg, Rei Stråhle* *SaabTech Systems AB, Sweden*	**Top Graph'X**	
14:30	Migrating large applications from Ada83 to Ada95 *Philippe Waroquiers, et al.* *Eurocontrol, Belgium*	**Aonix**	14:30
15:00	An application case for Ravenscar technology: porting OBOSS to GNAT/ORK *Tullio Vardanega* *European Space Research and Technology Centre, Netherlands* *Rodrigo García & Juan Antonio de la Puente* *Universidad Politécnica de Madrid, Spain*	**Praxis Critical Systems**	15:00

15:30	break - exhibition final session	15:30

16:30	Invited speech: **Can Java meet its real-time deadlines?** *Brian Dobbing, Praxis Critical Systems, UK* *co author Ben Brosgol, ACT.*	16:30

17:30	Closing Session *Awards: best paper & best presentation*	17:30

18:00		18:00

20:00	**Visit to Stella Artois brewery**	20:00

Workshop on exception handling for a 21st century programming language

As the complexity of modern software systems grows, so does the need to deal reliably and efficiently with an increasing number of abnormal situations. The most general mechanism for this is exception handling, which is becoming a standard feature in modern languages.

A general exception handling mechanism should be well integrated with the other features of a language and conform to its programming paradigms. Increasing evidence from researchers and practitioners indicates that the exception handling in Ada 95 does not adequately reflect the whole range of programming paradigms supported by the language. In particular, the exception handling model remains based on Ada 83 while Ada 95 is object oriented. Furthermore, exceptions and concurrency are, arguably, not well integrated. A task with an unhandled exception dies silently, and one has to resort to asynchronous transfer of control for passing exceptions asynchronously between tasks. It is not clear that this solution extends well into a distributed environment. Yet another problem is the existence of anonymous exceptions.

New fault tolerance schemes based on existing exception handling facilities have been developed in research environments. This is important as it allows higher level abstractions providing more advanced mechanisms to be introduced without impacting the language definition.

The aims of the workshop are:

- to share experience on how to build modern systems that have to deal with abnormal situations
- to discuss how solutions to those needs can be developed employing standard Ada features including the current exception handling paradigm
- to propose new exception handling mechanisms / paradigms that can be included in future revisions of the Ada language and also fit high integrity language profiles for safety critical systems.

Workshop co-chairs:

Alexander Romanovsky (University of Newcastle)
Alfred Strohmeier (EPFL)
Andy Wellings (University of York)

Workshop Program Committee:

Bill Bail (MITRE)
Jörg Kienzle (EPFL)
Pat Rogers (Software Arts and Sciences)
Bo Sanden (Colorado Technical University)
Anand Tripathi (University of Minnesota)
Tullio Vardanega (ESA)
Thomas Wolf (Paranor)

http://www.cs.ncl.ac.uk/people/alexander.romanovsky/home.formal/eh-ada.html

There is a link to the workshop website URL below from the conference website. See Program ➜ workshops ➜ workshop web page.

Social Program

Monday evening: Welcome reception

The welcome reception will be an informal gathering point for conference attendees. Nibbles and drinks, especially Belgian Beer, will be served. *19:00 to 22:00. Sponsored event. Venue to be announced.*

Tuesday evening: Civic reception

Tour of the Town Hall followed by a reception there hosted by the City of Leuven. *Sponsored event.*

The Town Hall of Leuven is pictured on the front cover and features in the logo of the city on the back page. It is located on the Grand Market, its construction started in 1439 and it is one of the master pieces of Flamboyant Gothic in Belgium, expressing its character through four corner turrets, two ridge turrets and a balustrade all around the building. The Town Hall has three floors. Between the windows are oriels each of which with two niches; three corner-turrets also have niches. The carved bases of these niches represent biblical subjects. The motif 'sin-punishment' is often repeated. These scenes had a didactic and admonishing function, not only for the common people but also for the judges who resided in the building.

The 236 statues in the niches were only placed after 1850. The whole set has become the Leuven pantheon! In contrast to the figures in the bases who wear Burgundian clothes, the statues in the niches wear the clothes of the period in which they lived. The two rows of the ground floor represent artists, scholars and eminent citizens of the Leuven past. The first floor displays figures who symbolise the municipal privileges and the patron saints of the parishes. On the second floor the Counts of Leuven and the Dukes of Brabant are visible; the turrets represent biblical figures.

Since the nineteenth century three restorations have taken place. The latest was finished in 1983 and repaired the war damage, suffered when a bomb scraped the façade and did not explode...

The Town Hall is across from Saint-Peter's Church, the oldest church in Leuven. It is thought to have been founded in 986. The first church burnt down in 1176. The construction of the present Gothic building, much larger than the Romanesque church, started in 1425 and was practically completed in 1497. Of the three towers that were planned, one of which should have reached a height of 170 meters, only the bases remain. In 1541 when the height of 50 meters was reached, work was stopped. The subsoil was not stable enough to support a higher tower. After some collapses, the tower was lowered to its present level. The successive architects

did not change the original plans and this brought about a fine example of pure Brabantine Late Gothic Style.

Wednesday evening: Banquet

Banquet in the Faculty club of the university, at the Great Beguinage - *remember to book this on the registration form as it is not covered by the conference fee.*

The 'Begijnhof', or 'garden of the Begijns', was founded in the 13th century outside the town wall of the time. The oldest houses date from the 16th century when the original houses were replaced by brick structures. The 72 houses are generally named after a saint or a Biblical event.

The church, dedicated to St. John the Baptist, is early Gothic. The date of construction, 1305, is carved into the right buttress of the north portal. Approximately 300 'Begijns' lived in the 'Begijnhof' in the 17th century. The 'Begijns' or 'Beguines' were women who lived a religious life but kept their own property and supported themselves. They did not make perpetual vows. The movement was very strong throughout the Low Countries.

The 'Begijnhof' was taken over by the Welfare Commission in 1925. Except for the church, it was sold to the University in 1962 under the condition that the entire complex be restored.

The 'Groot Begijnhof' is now a University residential quarter for students, professors, and employees of the University. Foreign guests are also housed here. There is room for 500 people.

The Infirmary of the 'Begijnhof' has been converted into the Faculty Club.

Thursday evening: Brewery visit

A guided visit of the famous brewery Stella Artois hosted by Interbrew.

Interbrew can trace its origins back to 1366 to a brewery called Den Hoorn, located in Leuven. In 1717, Sebastien Artois, the master brewer, purchased the brewery and changed its name to Artois. Interbrew was formed in 1987 from the merger of Brasseries Artois, then the second largest brewer in Belgium, and Brasseries Piedboeuf, then the largest brewer in Belgium and the brewer of Jupiler.

Both of these brewers had a history of acquisitions with Brasseries Artois having acquired the Leffe brand in 1952, the Dommelsch Brewery in The Netherlands in 1968, and the Brasseries Motte Cordonier in France in 1970, while in 1984, Brasseries Piedboeuf had acquired the Lamot brewery in Belgium from Bass PLC. Interbrew soon acquired other Belgian speciality brewers, including Hoegaarden in 1989 and Belle-Vue in 1990. In 1991, Interbrew entered a phase of rapid expansion, and have since completed 30 acquisitions and strategic joint ventures, the largest of which were Labatt (Canada), Oriental Breweries (South-Korea), SUN Interbrew (Russia), Bass Brewers and Whitbread Beer Company (United Kingdom).

Interbrew is the second largest brewer in the world by volume with operations spanning from Europe and North America to the Asia-Pacific region. Its portfolio consists of a combination of strong international and local brands sold in over 110 countries.

During the visit we will be able to see the whole brewing process.

To make beer, brewers use water and barley to create a sweetened liquid (called the wort), which they flavour with hops, then ferment with yeast. The basic process may be simple but the execution is highly sophisticated. The three most important stages are malting, brewing and fermentation - followed by maturation, filtering and bottling. All of these stages will be visited during the visit.

After the visit there will be time to taste different beers !
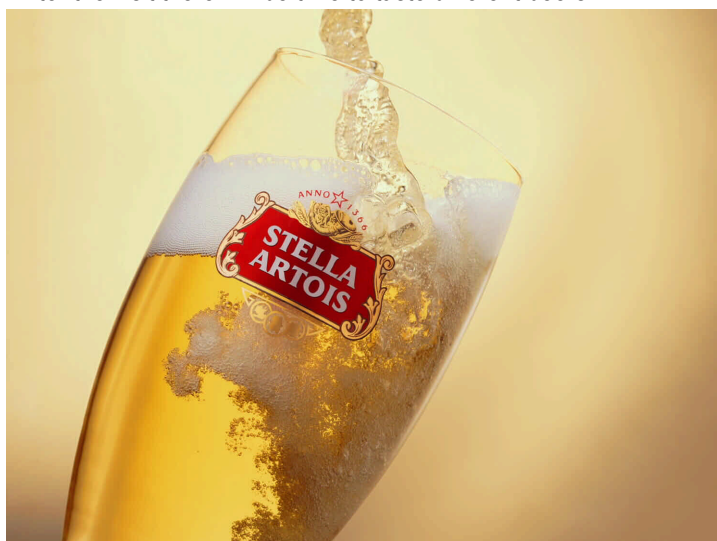
6th International Conference on Reliable Software Technologies - Ada-Europe'2001

Leuven, May 14-18, 2001

REGISTRATION FORM

PARTICIPANT

Please use block capitals

❏ Ms   ❏ Mr   ❏ _____

Family name_____ First name _____

Affiliation / Organisation _____

Address _____

_____

City_____ Post / Zip code _____ Country_____

Telephone_____ Fax _____ E-mail_____

Special requirements (e.g. diet) _____

Reduced registration fee	❏ member Ada-Europe; national organization_____	❏ academia
	❏ member ACM; membership number _____	

Registration Time	❏ Early registration (by April 22nd)	❏ Late or on site (after April 22nd)

REGISTRATION FEES

Conference registration fee (see table on next page)

Three day conference...EUR_____

One day (Tue ❏ Wed ❏ Thu ❏) ....EUR_____

Tutorial registration (see table on next page)

Please indicate tutorials for which you want to register:

Monday, May 14th	❏ T 1	❏ T 2	❏ T 3	❏ T 4
Friday, May 18th	❏ T 5	❏ T 6	❏ T 7	❏ T 8

Tutorial registration fee ....EUR_____

Conference Banquet: _____tickets @ 55 EUR.. EUR_____

Extra proceedings: _____proceedings @ 30 EUR .... EUR_____

TOTAL PAYMENT DUE...EUR_____

PAYMENT METHOD

❏ **By bank transfer** to account number: 432-0000091-40, "*K.U.Leuven Reliable Software Technologies - Ada-Europe 2001".* The account is at the KBC Bank, Belgium whose bank identifier (swift) code is KREDBEBB (Please mention "Ada-Europe 2001" and your name and attach proof of payment, e.g. a copy of the bank draft, to this form).

❏ **By cheque** drawn on a Belgian Bank and made payable to *K.U.Leuven Reliable Software Technologies - Ada-Europe 2001.*

❏ **By credit card**   ❏ MasterCard   ❏ Visa

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Mail or fax this form to:
AE2001 Registration, Department of Computer Science, KULeuven,
Celestijnenlaan 200A, B-3001 Leuven, Belgium.
Fax +32 (0)16 327996

Conference registration fee:

3 days of conference (May 15th – May 17th) including one copy of the proceedings, coffee breaks, lunches and welcome reception on Monday evening May 14th, visit and reception in town hall on Tuesday 15th, visit to Stella Artois brewery on Thursday 17th.

	member Ada-Europe or ACM SIGAda		non member	
	non academia	academia	non academia	academia
Early registration (by April 22nd)	450 EUR	390 EUR	510 EUR	450 EUR
Late/on site registration (after April 22nd)	510 EUR	510 EUR	570 EUR	570 EUR
One day registration	255 EUR	255 EUR	285 EUR	285 EUR

Tutorial registration fee:

Prices are per tutorial, including tutorial notes and coffee breaks.
Lunches are only included when registered for full day tutorial or 2 half day tutorials on the same day.

	half day	full day or two halves on same day
Early registration (by April 22nd)	120 EUR	230 EUR
Late / on site registration (after April 22nd)	150 EUR	290 EUR

Overview of Tutorials:

Monday May 14th	T1	full day	Non-standard techniques in Ada - *Art Duncan*
	T2	full day	Practical experiences of safety-critical Ada technologies *- Peter Amey & Rod Chapman*
	T3	morning	Early reliability measurement and improvement - *Jeff Tian*
	T4	afternoon	An introduction to XML - *Gregory Neven, Maarten Coene & Roel Adriaensens*
Friday May 18th	T5	full day	From full concurrency to safe concurrency - *John Harbaugh*
	T6	full day	Building distributed systems with Ada *- Samuel Tardieu, Laurent Pautet, Thomas Quinot*
	T7	morning	Implementing design patterns in Ada: sequential programming idioms *- Matthew Heaney*
	T8	afternoon	Architecture centered development and evolution of reliable real-time systems *- Bruce Lewis, Ed Colbert*

Note: No registration request will be confirmed until payment has been received. CANCELLATIONS must be in writing. A cancellation fee of 100 EUR will be applied to all cancellations. No refunds will be given for cancellations postmarked after May 2nd 2001. Substitutions will be accepted. The hotel information can be found through the web page of the conference; a hotel booking form is available on line also. Additional lunch tickets will be on sale throughout the conference.

For latest information see the web page at http://www.ada-europe.org/conference2001.html,
or send email to *ae2001-info* @cs.kuleuven.ac.be.

For any information, please contact:

Esther Renson (Conference Secretariat)
Department of Computer Science   Tel: ++32(0)16327640
K.U.Leuven   Fax ++32(0)16327996
Celestijnenlaan 200A   email: ae2001-info@cs.kuleuven.ac.be
B-3001 Leuven, Belgium

6th International Conference on Reliable Software Technologies - Ada-Europe'2001

Leuven, May 14-18, 2001

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Accompanying Person(s)_____

All rooms with bath or shower. RATES PER ROOM PER NIGHT, BUFFET BREAKFAST & TAXES INCLUDED

Hotel	Code	Single Room	Double Room
Holiday Inn Garden Court*	LVHHOLI	4.250 BEF	4.250 BEF
Begijnhof Congreshotel*	LVHBEGI	5.400 BEF	5.900 BEF
Hotel Binnenhof *	LVHBINH	3.800 BEF	4.250 BEF
Hotel New Damshire	LVHNEWD	3.800 BEF	4.300 BEF
Hotel Ibis *	LVHIBIS	3.300 BEF	3.600 BEF

* = Parking space (no advance reservations)   1 EUR = 40.3399 BEF

First choice :_____Second choice :_____

Arrival date : _____ Departure date : _____Number of nights :_____

❏ SINGLE ROOM   ❏ DOUBLE ROOM

Rooms will be allocated on a first-come-first-served basis. We strongly advise all participants to book early, as May is a busy period for hotels in Leuven.

PAYMENT

The total amount must be paid directly to the hotel when checking out. Reservations must be guaranteed by means of a Credit Card (Eurocard / Mastercard - Visa Card - Diners Club) or by a cheque (Bank- or Eurocheque) for an amount equivalent to 1 night.

I will pay by: Credit Card ❏ Credit Card Number _____   Bank / Eurocheque ❏

In case of cancellation less than 7 days before arrival or "no-show" (reservation not cancelled before arrival) 1 night will be charged to your credit card or your cheque will not be given back.

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Further information

The conference website gives full and up to date details of the program. Also on the website are details of the venue, including travel advice, maps and a link to the hotel booking page. Other sites providing local information are linked to.

http://www.ada-europe.org/conference2001.html

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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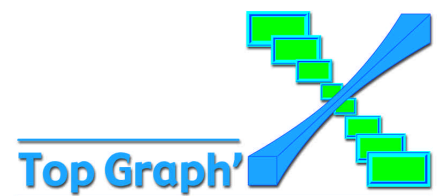K.U.Leuven, Belgium
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