Tullio Vardanega
Andy Wellings (Eds.)

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Reliable Software Technology – Ada-Europe 2005

10th Ada-Europe International Conference on Reliable Software Technologies York, UK, June 2005, Proceedings

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Reliable Software Technology – Ada-Europe 2005

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Preface

Started on the inspired initiative of Prof. Alfred Strohmeier back in 1996, and spawned from the annual Ada-Europe conference that had previously run for 16 consecutive years, the International Conference on Reliable Software Technologies celebrated this year its tenth anniversary by going to York, UK, where the first series of technical meetings on Ada were held in the 1970s.

Besides being a beautiful and historical place in itself, York also hosts the Department of Computer Science of the local university, whose Real-Time Group has been tremendously influential in shaping the Ada language and in the progress on real-time computing worldwide. This year's conference was therefore put together under excellent auspices, in a very important year for the Ada community in view of the forthcoming completion of the revision process that is upgrading the language standard to face the challenges of the new millennium.

The conference took place on June 20–24, 2005. It was as usual sponsored by Ada-Europe, the European federation of national Ada societies, in cooperation with ACM SIGAda. The conference was organized by selected staff of the University of York teamed up with collaborators from various places in Europe, in what turned out to be a very effective instance of distributed collaborative processing. The conference also enjoyed the generous support of 11 industrial sponsors.

This year's conference was very successful indeed. It attracted the largest number of submissions in years, from as many as 15 countries worldwide, which made the selection process tougher than ever. Overall, the conference program included 21 carefully selected and refereed papers assigned to 8 thematic sessions spanning a variety of high-profile subjects. The technical program included an industrial track, a first in the conference's history, which encompassed 10 contributions illustrating challenges faced by a cross-section of high-integrity software industry in Europe and the US. As usual, the conference program was itself bracketed by two full days of tutorials, with a special half-day presentation on the new Ada 2005 language, offered by four of its lead designers: John Barnes, Alan Burns, Pascal Leroy and Tucker Taft. Furthermore, three keynote presentations, delivered by John McDermid, Martin Thomas and Bev Littlewood, respectively, marked the opening of each of the main conference days. Finally, much in keeping with the well-established tradition of the conference series, the program made provisions for an excellently populated vendor exhibition and for a half-day vendor session, in which participants were able to catch up with the latest advances in reliable software technology products.

Let us now go into the details of some of the conference highlights.

The invited talks were as follows:

- Prof. John McDermid, University of York, UK
  Model-Based Development of Safety-Critical Software
  where the opportunities and challenges of model-based development were discussed.
- Prof. Martyn Thomas, Thomas Associates, UK
  Extreme Hubris
  where the principles of Extreme Programming were critically examined and an alternative manifesto for dependable software development was proposed.
- Prof. Bev Littlewood, City University, London, UK
  Assessing the Dependability of Software-Based Systems: a Question of Confidence
  where the controversial contention was made that dependability claims ought to be associated with a probability-based assessment of the inherent uncertainty about the truth of the claim.

The technical sessions of the program ranged from the illustration of successful applications and distributed systems, to the discussion of design, analysis and implementation methodologies, to formal methods, certification and verification, through to the latest advances with Ravenscar technology, to finish with Ada-related concerns regarding education and language implementation issues.

The tutorial program gathered the following assortment of topics and international expert speakers

- Developing Web-Aware Applications in Ada with AWS, Jean-Pierre Rosen, *Adalog, France*
- Correctness by Construction — A Manifesto for High Integrity Systems, Peter Amey and Neil White, *Praxis High Integrity Systems, UK*
- Real-Time Java for Ada Programmers, Benjamin M. Brosgol, *AdaCore, US*
- SAE Architecture Analysis and Design Language, Joyce Tokar, *Pyrrhus Software, US* and Bruce Lewis, *US Army*
- High-Integrity Ravenscar Using SPARK, Brian Dobbing, *Praxis High Integrity Systems, UK*
- Software Safety Cases, John McDermid and Rob Weaver, *University of York, UK*
- Requirement Engineering for Dependable Systems, William Bail, *The MITRE Corporation, US*
- Software Fault Tolerance, Patrick Rogers, *AdaCore, US*
- Programming with the Ada 2005 Standard Container Library, Matthew Heaney, *On2 Technologies, US*

in addition of course to a special half-day session where four of the lead designers of Ada 2005, John Barnes, Alan Burns, Pascal Leroy and S. Tucker Taft, provided an extensive overview of the new features introduced by the language revision.

A number of people crucially contributed to the success of the conference. First and foremost the authors of all the papers, talks and presentations, for it was from their contribution that the conference was put together. The Program Committee members helped promote the conference in their own circles and also successfully solicited submissions from a variety of authors. The same members along with a number of others also devoted considerable effort to refereeing the submissions in a thorough and timely fashion. The program itself was put together by a smaller group including the Conference Chair, Alan Burns, the Program Co-chairs, Tullio Vardanega and Andy Wellings,

the Tutorials Chair, Iain Bate, the Exhibition and Industrial Track Chair, Rod Chapman, and Dirk Craeynest, representing Ada-Europe. Selected PC members also undertook to shepherd some papers to their final versions. All of these people deserve our gratitude, along with the local organizers, in particular Ian Broster, also in charge of the conference publicity along with Dirk Craeynest, and Sue Helliwell, who oversaw the administrative details of the registration process.

We trust the attendees enjoyed both the technical and social program of the conference, and we close this volume with the confidence of a job well done and the satisfaction of a thoroughly enjoyed experience.

June 2005 Tullio Vardanega

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ILTIS - The Legacy of a Successful Product

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Abstract. ILTIS is probably the most versatile modern railway control and supervisory system available today. From its initial conception in 1990 to the present day, Siemens has been upgrading ILTIS with further functionality while maintaining the quality of original product. The aim of this paper is to analyse what have been the contributing factors in ensuring this success and how this success can be maintained for the future.

Abbreviations

CMMI	Capability Maturity Model Integrated
CTC	Centralised Traffic Control
DEC	Digital Equipment Corporation
GUI	Graphic User Interface
HP	Hewlett Packard
ISO	International Organization for Standardization
LAN	Local Area Network
MMI	Man/Machine Interface
OSF	Open System Foundation
SBB	Swiss National Railways (Schweizerische Bundesbahnen)
SIL	Safety Integrity Level

1 Introduction

ILTIS (an acronym in German for "Integrated Traffic Control and Information System"; it also German for polecat) is a centralised traffic control (CTC) system developed initially for the Swiss National Railways (SBB). All of the software has been written in Ada83 and was originally targeted to DEC's OpenVMS operating system using Alpha computers. On average, 20 developers are employed with ILTIS at any given time adding further functionality to the system.

From humble beginnings, ILTIS has expanded beyond all expectations. Not only is the system currently targeted to OpenVMS (now HP OpenVMS) but also to Microsoft's Windows. The customer base has also expanded dramatically including not only all SBB operating centres, but also those in Austria, Malaysia (national and a private railway), Hungary, Slovenia, Poland, Vietnam and many of the myriad private

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