Annual International Conference
7 - 11 December, 2003
Hosted by San Diego SIGAda Chapter
The Engineering of Correct and Reliable Software
For Real-Time & Distributed Systems
Using Ada and Related Technologies

FINAL PROGRAM

CONFERENCE KEYNOTE SPEAKERS
Ben Brosgol (Ada Core Technologies)
David A. Wheeler (Institute for Defense Analyses)
Joyce Tokar (Pyrrhus Software)
Steve Grimaldi (Objective Interface Systems, Inc.)

Conference at a Glance

Sunday, December 7
9:00 AM – 5:30 PM  Tutorials

Monday, December 8
8:30 AM – 5:00 PM  Tutorials
8:00 PM – 11:00 PM SIGAda Extended Executive Committee Meeting

Tuesday, December 9
9:00 AM – 6:10 PM  Technical Program (see page 6)
10:30 AM – 4:15 PM  Exhibits (see Exhibits Guide)
7:00 PM – 9:00 PM  Conference Reception / Screening

Wednesday, December 10
9:00 AM – 12:30 PM  Technical Program (see page 7)
10:30 AM – 2:30 PM  Exhibits (see Exhibits Guide)
2:30 AM – 6:00 PM  WG9 Presentations & Forum (see pages 7 & 9)
8:00 PM – 11:00 PM  Workshops and BoF sessions

Thursday, December 11
9:00 AM – 12:30 PM  Technical Program (see page 7)

SIGAda 2003 Registration
SIGAda 2003 Registration in the Conference Center
Specific Times and Locations are Posted at the Koi Room
An hour before opening of Tutorials / Sessions plus other times
Sunday - Monday: Upper Level
Tuesday - Thursday: Main Level
Ada Core Technologies
Platinum Corporate Sponsor
Welcome to ACM SIGAda's 2003 Annual International Conference in San Diego, California - home to much early pioneering work in Ada. San Diego is also a marvelous place to hold a conference as it has pleasant weather in December facilitating technical discussions in a congenial environment.

We offer you a conference featuring a top-quality technical program focused on important strengths of Ada: distributed, real-time, and embedded systems. The visions of these systems reflected in Ada's original requirements in the 1970s have expanded in almost unimaginable ways with Ada 95 implementations, and continue to be objects of envy by those in the programming language community who understand what the strengths of a language brings to implementers in terms of efficiency, reliability, and effectiveness. Software challenges remain dominant in these domains with rapid hardware advances. Most other languages fail to meet the needs identified as far back as the 1976 Steelman, being able at best to do only 3/4 of the needed function while Ada performs over 95%. Ada's track record of reliability, efficiency, robustness and all-around success is unparalleled at solving real-time and/or distributed system challenges. Ada is used in space/satellite systems, most modern jetliner avionics, high-speed ground transportation systems, and battle automation systems. As such, it is an important part of the world's economies and defenses.

Three days of technical papers, keynotes, and invited presentations will report how these successes are achieved and where remaining issues are leading. We are fortunate to have four leaders in the software engineering community; Ben Brosgol, Joyce Tokar, David A. Wheeler, and Steve Grimaldi (tentative) will provide keynote addresses to set the tone for our conference.

We are also fortunate to have Jim Moore provide a special introduction to the work of ISO/IEC JTC1/SC22 WG9 on Wednesday afternoon. This is followed by a presentation on the Ravenscar Profile by Tullio Vardanega. WG9 will culminate with a third presentation by Pascal Leroy on the ISO/IEC JTC1/SC22 WG9 Forum after the afternoon break on Wednesday. The WG9 Forum will give you an opportunity to find out how Ada will evolve to meet our future requirements and at the same time give you an opportunity to provide input to its future.

Beyond the formal conference of selected papers and presentations, SIGAda 2003 offers workshops and tutorials with the same duality of on-theme and complementary topics. SIGAda's tutorials provide full-day or half-days on selected topics to enhance one’s professional development. SIGAda's workshops allow those working the same issues to share with each other and leverage everyone's accomplishments; workshop products are "delivered" to the community. The broad offerings of career-enhancing tutorials include basic Ada 95 introductions for software engineers new to Ada, intermediate and advanced Ada topics for practitioners striving to expand their Ada expertise, and several language-independent technology topics. These topics are often coupled with Ada technology because only Ada's full and complete definition allows one to indicate what is expected, and to show that it can be achieved. Join us in understanding how these topics mutually support the disciplined development and evolution of serious, high quality software systems.

Finally, we hope SIGAda 2003 provides you an outstanding opportunity for rewarding affiliation with colleagues in industry, academia, and government - discussions "in the hall," informal meal-time meetings, and even during the more relaxed moments we make for socializing in this wonderful southern city. If you don't realize it already, you will learn that these associations can be as valuable as the technical program at professional conferences, and often extend the experience after you return home.

We take this opportunity to thank our Corporate Sponsors for their generous support for SIGAda 2003: Ada Core Technologies (Platinum Level); Esterel Technologies (Gold Level); Aonix, I-Logix, IBM/Rational, PolySpace Technologies, Quality Checked Software, and TNI Europe (Silver Level).

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Explore San Diego

Take the San Diego Trolley:
To Dream Tomorrow, the newest of Flare's Women of Power documentary films, is the story of Ada Byron Lovelace, her work with Charles Babbage, and their contributions to computing over a hundred years before the time usually thought to be the start of the Computer Age.

Daughter of a mathematically gifted, social activist mother and the "mad, bad and dangerous to know" poet, Lord Byron, Ada's life was unconventional, daring, and short. Possessed of enormous energy and talent, she faced some daunting obstacles -- both in her personal life and the society of her time -- as she fought to work professionally and make a contribution to science and mathematics.

Ada was just 17 when she met Babbage and became intrigued by the workings of a mechanical calculator he had designed. Though as a woman she was barred from universities and scientific libraries, Ada continued her mathematical studies, encouraged by Babbage, who brought her into contact with leading scientists of the day. These included the famous science writer, Mary Somerville; Michael Faraday, Isabard Kingdom Brunel, and Charles Wheatstone. The group discussed with Babbage his idea of the "Analytical Engine," a powerful new calculator he was designing to have a central processor --the "Mill" --divided from the "Store" where data would be kept. It could be programmed to perform any calculation.

Would the government fund such a huge and costly machine? And, if this general-purpose computing machine were built, would it work? a distracted and embattled Prime Minister rejected Babbage's request for further funding, claiming that a computing machine would be "worthless as far as science is concerned."

To help garner support to build the Analytical Engine, Ada sprang into action to describe how such a machine would function. In the Notes, published when she was 27, she went even beyond her famous contemporaries in articulating the concept of symbolic manipulation that would lead beyond number-crunching to applications that are only now, in our own time, beginning to be fully realized.
# Summary Conference Schedule

## Tutorial Program (Sun – Mon)

**All tutorials are in the Pacific, Tropic, or Surf Room.**

### Sunday, December 7

**Full-Day Tutorials (9:00am - 5:30pm)**

- **SF1:** Architecture-Centered Development of Real-Time Critical Systems  
  Ed Colbert (Absolute Software Co., Inc.), Bruce Lewis (US Army Aviation and Missile Command)

- **SF2:** Cancelled

- **SF3:** Introduction to Ada  
  Joyce Tokar. (Pyrrhus Software)

- **SF4:** SPARK, An Intensive Overview  
  Rod Chapman

### Monday, December 8

**Full-Day Tutorials (8:30am - 5:00pm)**

- **MF1:** Normative Quality Specification and Standardized Acceptance Testing  
  Hans-Ludwig Hausen

- **Morning Tutorials (8:30am - 12:00 Noon)**
  - **MA1:** Links in the Chain: Why Mature Systems Engineering is Needed  
    Rick Conn (Microsoft)
  - **MA2:** The HOOD Design Method  
    Jean-Pierre Rosen (Adalog)

- **Afternoon Tutorials (1:30pm - 5:00pm)**
  - **MP1:** High-Integrity Ravenscar using SPARK  
    Rod Chapman, Brian Dobbing (Praxis Critical Systems)
  - **MP2:** A#  
    Martin Carlisle (US Air Force Academy)

- **8:00 - 11:00pm:** SIGAda Extended Executive Committee Meeting (Open to all)  
  In the Pacific Room

## Conference (Tue – Thu)

**All conference sessions are in the Kona Room.**

### Tuesday, December 9

- **9:00 - 10:30am:** Greetings from SIGAda Chair, Vice Chair for Meetings and Conferences, & Conference Chair  
  Introductions of Conference Officers and SIGAda Officers  
  Keynote Address: *The Soul of a New Machine*  
  Joyce Tokar (Pyrrhus Software)

- **10:30 - 11:00am:** Mid-morning Break - Exhibits Open

- **11:00am - 12:30pm:**
  - Multilanguage Programming with Ada in the .NET Environment  
    Jeffery W. Humphries, Martin C. Carlisle, & Terry A. Wilson (USAF Academy)
  - Static Verification and Extreme Programming  
    Peter Amey, Roderick Chapman (Praxis Critical Systems)
  - Correct-by-Construction  
    (Esterel Technologies)

- **12:30 - 2:00pm:** Mid-day Break and Exhibits

- **2:40 - 3:40 pm:**
  - AdaSlicer: An Ada Program Slicer  
    Ricky E. Sward & A.T. Chamillard (USAF Academy and Univ of Colorado, Colorado Springs)
  - Verifying Linear Time Temporal Logic Properties of Concurrent Ada Programs with Quasar  
    S. Evangelista, C. Kaiser, J.F. Pradat-Peyre, & P. Rousseau (Cedric-Cnam Paris)
  - Rapid Ada application development with the Unified Modeling Language (UML)  
    (I-Logix)
  - OO Tool Support for AADL  
    (TNI Europe)

- **3:40 - 4:15 pm:** Afternoon Break & Exhibits

- **4:15 - 6:10pm:**
  - Keynote Address: Ada and Real-Time Java: Cooperation, Competition, or Cohabitation?  
    Ben Brosgol (Ada Core Technologies)
  - A DSA Model for Data Access in Self-Organizing Systems  
    Dhavy Gantsou (Univ of Valenciennes)
  - Automated Global Data Checking for Ada  
    Mr. Ian Gilchrist (Quality Checked Software)
  - Safety Critical Development Solutions  
    (Aonix)

- **6:10 pm:** Adjourn Day 1 of Conference

- **7:00 - 9:00pm:** Conference Reception / Screening  
  In the Kona Room
<table>
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<tr>
<th><strong>Wednesday, December 10</strong></th>
<th><strong>Thursday, December 11</strong></th>
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<td><strong>9:00-10:30am</strong></td>
<td><strong>9:00-10:50am</strong></td>
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| Ada’s Birthday and other Announcements | A Comparison of Java to Ada in Implementing a Real-Time Embedded System  
*Eric Potratz (Univ of Northern Iowa)* |
| SIGAda Awards | Ada Core Technologies - Product Update  
*(Ada Core Technologies)* |
| Keynote Address: Security, Open Source, and Ada  
*David A. Wheeler (Institute for Defense Analyses)* | The Adventures of Porting IBM Rational Apex to Linux  
*(IBM/Rational)* |
| **10:30 - 11:00am** | **10:50 - 11:15am** |
| **Mid-morning Break and Exhibits** | **Morning Break** |
| **11:00am - 12:30pm** | **11:15am - 12:30pm** |
| European Air Traffic Flow Management: Porting a Large Application to GNU/Linux  
*Gaetan Allaert (Thales IS), Dirk Craeynest (Aubay Belgium), Philippe Waroquiers (Eurocontrol)* | The Case for Ada at the USAF Academy  
*Ricky E. Sward, Martin C. Carlisle, Barry Fagin, & David S. Gibson (USAF Academy)* |
| **Experiences in Developing a Typical Web Database Application**  
*J-P Rosen (Adalog)* | **Keynote Address:**  
*Steve Grimaldi (Objective Interface Systems, Inc.)* |
| **A Framework for Designing and Implementing the Ada Standard Container Library**  
*Jordi Marco & Xaiver Franch (Univ Politecnica de Catalunya)* | **12:30pm** Closing Comments, Conference Adjournment |
| **12:30 - 2:30pm** | **12:30 - 4:00pm** |
| **Mid-day Break and Exhibits** | **WG9 Forum:** Pascal Leroy will give a technical presentation of a number of key improvements that are currently under consideration for inclusion in Ada 2005. The 5 major areas where enhancements to the Ada Language are projected include: 1. Real-Time, Safety and Criticality; 2. OO Programming 3. General Purpose Capability 4. Programming By Contract, and 5.Interfacing with Other Languages of Computing Environments. SIGAda 2003 attendees will have the opportunity to discuss alternatives with the WG9 leaders and provide feedback for the evolution of Ada. |
| **2:30 - 4:00pm** | **4:00 - 4:30pm** |
| **WG9 Work Programme: Plans for Amending the Ada Language**  
*Jim Moore (MITRE Corporation, and the Convenor of WG9)* | **Afternoon Break** |
| **Ravenscar Profile: An Important Addition to Ada 2005**  
*Tullio Vardanega (Università di Padova and a member of the WG9 HRG)* |  
**SIGAda 2003 Exhibits are in Coast Room.** |
| **11:00am - 12:30pm** | **Tuesday (12/9): 10:30am – 4:15pm**  
**Wednesday (12/10): 10:30am – 2:30pm**  
**See separate “Exhibits Guide”** |

**BoF:** APIWG plenary, 8:00-8:30pm *(see page 8)*  
**BoF:** APIWG XML subgroup, including XML subgroup, 8:30-10:00pm *(see page 8)*  
**BoF:** ASISWG, 10:00-11:00pm *(see page 8)*  
**Birds-Of-a-Feather (BOF) sessions** *(to propose a BOF, see page 8)*
While there is no charge to attend Workshops, all participants must be registered for at least one full day of the conference. Listed below are Workshops already organized at SIGAda 2003.

Conference attendees interested in forming a Birds of a Feather (BOF) get-together with colleagues or who would like to organize a Working Group meeting with those who share an interest, should post BOF proposals on the main conference bulletin board, stating topic, objective or issues, and organizer’s name. Schedule and time/room assignments will be finalized Wednesday afternoon.

**Please check bulletin boards and registration materials at the conference for late additions/changes to this list, including possible BOFs.**

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Workshop</th>
<th>Room</th>
<th>Organizer</th>
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<tbody>
<tr>
<td>Wednesday</td>
<td>8:00 pm – 8:30 pm</td>
<td>APIWG plenary, Birds of a Feather</td>
<td>Pacific Room</td>
<td>Clyde Roby</td>
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<td>8:30 pm – 10:00 pm</td>
<td>APIWG XML subgroup, Birds of a Feather, including XML subgroup</td>
<td>Pacific Room</td>
<td>Robert Leif</td>
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<td></td>
<td>10:00 pm – 11:00 pm</td>
<td>ASISWG, Birds of a Feather</td>
<td>Pacific Room</td>
<td>Currie Colket</td>
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A deep Appreciation to the 2003 Program Committee

**Ben Brosgol**  
Ada Core Technologies

**Ed Falis**  
Ada Core Technologies

**Dick Hull**  
Lenoir-Rhyne College

**Jean-Pierre Rosen**  
Adalog

**Martin Carlisle**  
USAF Academy

**Franco Gasperoni**  
ACT-Europe

**S. Ron Oliver**  
caress Corporation

**Ricky E. Sward**  
USAF Academy

**David Cook**  
AÉgis Technologies Group, Inc

**Greg Gicca**  
Aonix

**Juan A. de la Puente**  
Universidad Politécnica de Madrid

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WG9 Work Programme & Ravenscar Guide

Wednesday Afternoon, 2:00

**WG9 Work Programme:** The ISO technical group responsible for the Ada standards is the ISO/IEC JTC1/SC22 WG9. WG9 is currently working to amend the Ada language to support the needs of the user community. Mr. Jim Moore, of The MITRE Corporation and the Convenor of WG9, will provide a briefing on the plans for amending the Ada language for application in the 2005 timeframe. This presentation will outline the standardization process and schedule and prepare the conference attendees for the next session when WG9 presents the possible revisions to the Ada language. The WG9 Work Programme includes a number of other valuable artifacts, such as the one discussed next.

**Ravenscar Profile:** Tullio Vardanega, of the Università di Padova and a member of the WG9 HRG (Annex H Rapporteur Group), will be speaking on the WG9 new work item for an ISO Technical Report titled: "Guide for the use of the Ada Ravenscar Profile in High Integrity Systems." The Ravenscar Profile will be an important addition to Ada 2005, supporting the use of concurrent processes in mission-critical, high integrity applications. The Ravenscar Profile is becoming of great importance as it appears to be acceptable for certification in these high integrity systems.

WG9 Forum

Wednesday Afternoon, 4:30

**WG9 Forum:** Pascal Leroy, of IBM, and Chair of the WG9 Ada Rapporteur Group (ARG) will give a technical presentation of a number of key improvements that are currently under consideration for inclusion in Ada 2005. In 2000, the WG9 ARG started looking into possible changes for the next revision of the standard. These are expected to be approved in late 2005 as an amendment to ISO/IEC 8652:1995, the Ada 95 Standard. Based on the input from the Ada community, it was felt that the revision was a great opportunity for further enhancing Ada by providing new capabilities for embedded and high-reliability applications; by integrating new programming practices (e.g., in the Object Oriented Programming (OOP) area); and by remedying annoyances encountered during many years of usage of Ada 95. This led to the decision to make a substantive revision rather than a minor one.

The 5 major areas where enhancements to the Ada Language are projected include:
1. Real-Time, Safety and Criticality (e.g., Ravenscar, Execution Time Clocks);
2. OO Programming (e.g., Abstract Interface to Provide Multiple Inheritance);
3. General Purpose Capability (e.g., Handling Mutually Dependent Types across Packages);
4. Programming By Contract (e.g., Pragma Assert, Pre-Conditions and Post Conditions);
5. Interfacing with Other Languages of Computing Environments (e.g., Directory Operations).

A similar discussion at SIGAda 2002 was influential in providing WG9 with guidance. Although many of the key improvements to the Ada language are becoming rather solid, WG9 views our input as valuable in addressing the needs of the Ada community. There may be some areas where SIGAda 2003 attendees will have the opportunity to discuss alternatives with the WG9 leaders and provide feed back for the evolution of Ada. Please note that December 2003 is the drop dead month for final proposals to be considered for Ada 05 from WG9 or delegated bodies.
A hearty “Thank You” to the
2003 Conference Committee

<table>
<thead>
<tr>
<th>Conference Chair, Robert C. Leif, Ph.D., Newport Instruments (<a href="mailto:RLeif@RLeif.Com">RLeif@RLeif.Com</a>) +1 619-582-0437</th>
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<td>Tutorials Chair, David Cook, Ph.D. AEgis Technologies Group, Inc. (<a href="mailto:dcook@aegis.com">dcook@aegis.com</a>)</td>
</tr>
<tr>
<td>Registration Chair, Thomas A. Panfil, US Department of Defense (<a href="mailto:tapanfil@ieee.org">tapanfil@ieee.org</a>) +1 301-498-7313</td>
<td>SIGAda Vice Chair for Meetings and Conferences, David Harrison, Northrop Grumman IT (<a href="mailto:dharrison@ACM.org">dharrison@ACM.org</a>)</td>
</tr>
<tr>
<td>Proceedings Chair, Clyde Roby, Institute for Defense Analyses (<a href="mailto:ClydeRoby@ACM.org">ClydeRoby@ACM.org</a>)</td>
<td>SIGAda Chair, Currie Colket, The MITRE Corporation (<a href="mailto:colket@acm.org">colket@acm.org</a>) +1 (703) 883-7381</td>
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**Keynote Speakers:**

- **Ben Bros gol** (Ada Core Technologies)
- **David A. Wheeler** (Institute for Defense Analyses)
- **Joyce Tokar** (Pyrrhus Software)
- **Steve Grimaldi** (Objective Interface Systems, Inc.)
Sight Seeing Around San Diego

- **The World Famous San Diego Zoo** - Home to 4,000 rare and endangered birds, mammals, reptiles and 6,500 varieties of exotic plants.

- **SeaWorld** - 189.5-acre, marine life, entertainment park located on Mission Bay. Features 5 shows, and more than 20 exhibits.

- **Old Town State Park** - Where many of San Diego’s original settlement has been preserved to provide visitors with a glimpse of California in the Mexican and early American periods. Points of interest, quaint shops, and early California-style restaurants abound.

- **Wild Animal Park** - Set up as a preserve for rare and endangered birds, mammals and reptiles. This exotic safari-style park is located near Escondido, north of San Diego.

- **Seaport Village** - Shopping, dining and entertainment on the San Diego Bay. 75 one-of-a-kind shops, boutiques and award-winning restaurants.

- **Beaches** - Close to Mission Bay, Coronado, Pacific Beach and more.

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Check the SIGAda website at any time for SIGAda activities, resources, and future conference plans

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