

SIGAda 2003



Sponsored by ACM SIGAda

In Cooperation With Ada Europe,
ACM SIGAPP, SIGCAS, SIGCSE,
SIGPLAN, and SIGSOFT

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 SIGAda 2003 from the SIGAda, Conference, and Program Committee Chairs



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).

ACM SIGAda Chair **Currie Colket**

The MITRE Corporation
(colket@mitre.org | colket@acm.org)

General Chair **Robert C. Leif**

Newport Instruments
(RLeif@RLeif.Com)

Program Chair **Ricky E. Sward**


US Air Force Academy
(Ricky.Sward@USAF.AF.Mil)

PolySpace
Silver Corporate Sponsor

QCS
Silver Corporate Sponsor

Aonix Offers Complete Solutions !

Complete Design Support
 UML or Structured Design
Large Scale Consistent Code Generation
 Adaptable WISIWYG MDA Templates
Complete Development Environment Support
 Full command line and GUI/IDE for all Needed Support Tools
Complete Source Level Testing Capability
Complete Machine Level Testing Capability
Complete Safety Critical Certification Material
 Full DO-178B Level A - Certified Embedded Kernels

Making Ideas a Reality 

Explore San Diego



Take the San Diego Trolley:

Ada
Byron
Lovelace



TO
DREAM
TOMORROW



Reception & Screening

Tuesday Evening, 7:00

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.

This Area for Notes

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 Dobbins (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

2:00 -
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.

All conference sessions are in the Kona Room.

Wednesday, December 10

9:00-10:30am	<p>Ada's Birthday and other Announcements SIGAda Awards Keynote Address: Security, Open Source, and Ada <i>David A. Wheeler (Institute for Defense Analyses)</i></p>
10:30 - 11:00am Mid-morning Break and Exhibits	
11:00am - 12:30pm	<p>European Air Traffic Flow Management: Porting a Large Application to GNU/Linux <i>Gaetan Allaert (Thales IS), Dirk Craeynest (Aubay Belgium), Philippe Waroquiers (Eurocontrol)</i></p> <p>Experiences in Developing a Typical Web Database Application <i>J-P Rosen (Adalog)</i></p> <p>A Framework for Designing and Implementing the Ada Standard Container Library <i>Jordi Marco & Xavier Franch (Univ Politecnica de Catalunya)</i></p>
12:30 - 2:30pm Mid-day Break and Exhibits	
2:30 - 4:00pm	<p>WG9 Work Programme: Plans for Amending the Ada Language <i>Jim Moore (MITRE Corporation, and the Convenor of WG9)</i></p> <p>Ravenscar Profile: An Important Addition to Ada 2005 <i>Tullio Vardanega (Università di Padova and a member of the WG9 HRG)</i></p>
4:00 - 4:30pm Afternoon Break	
4:30 - 6:00pm	<p>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 feed back for the evolution of Ada.</p>
6:00 – 8:00pm Adjourn Day 2 of Conference: Evening Break	
8:00 - 11:00pm	<p>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)</p>

All conference sessions are in the Kona Room.

Thursday, December 11

9:00-10:50am	<p>A Comparison of Java to Ada in Implementing a Real-Time Embedded System <i>Eric Potratz (Univ of Northern Iowa)</i></p> <p>Ada Core Technologies - Product Update <i>(Ada Core Technologies)</i></p> <p>The Adventures of Porting IBM Rational Apex Ada to Linux <i>(IBM/Rational)</i></p> <p>Automatic Detection of Runtime Errors at Compile Time <i>(PolySpace Technologies)</i></p> <p>Best Student Paper Award</p>
10:50 - 11:15am Morning Break	
11:15am-12:30pm	<p>The Case for Ada at the USAF Academy <i>Ricky E. Sward, Martin C. Carlisle, Barry Fagin, & David S. Gibson (USAF Academy)</i></p> <p>Keynote Address: <i>Steve Grimaldi (Objective Interface Systems, Inc.)</i></p>
12:30pm Closing Comments, Conference Adjournment	



SIGAda 2003 Exhibits are in **Coast Room.**

Tuesday (12/9): 10:30am – 4:15pm
 Wednesday (12/10): 10:30am – 2:30pm
See separate "Exhibits Guide"

Workshops/Birds of a Feather/Working Group Meetings

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.

Day	Time	Workshop	Room	Organizer
Wednesday	8:00 pm – 8:30 pm	APIWG plenary, Birds of a Feather	<i>Pacific Room</i>	Clyde Roby
	8:30 pm – 10:00 pm	APIWG XML subgroup, Birds of a Feather, including XML subgroup	<i>Pacific Room</i>	Robert Leif
	10:00 pm – 11:00 pm	ASISWG, Birds of a Feather	<i>Pacific Room</i>	Currie Colket

A deep Appreciation to the 2003 Program Committee

Ben Brosgol
Ada Core Technologies

Martin Carlisle
USAF Academy

David Cook
AEgis Technologies Group, Inc

Ed Falis
Ada Core Technologies

Franco Gasperoni
ACT-Europe

Greg Gicca
Aonix

Dick Hull
Lenoir-Rhyne College

S. Ron Oliver
caress Corporation

Juan A. de la Puente
Universidad Politécnica de Madrid

Jean-Pierre Rosen
Adalog

Ricky E. Sward
USAF Academy

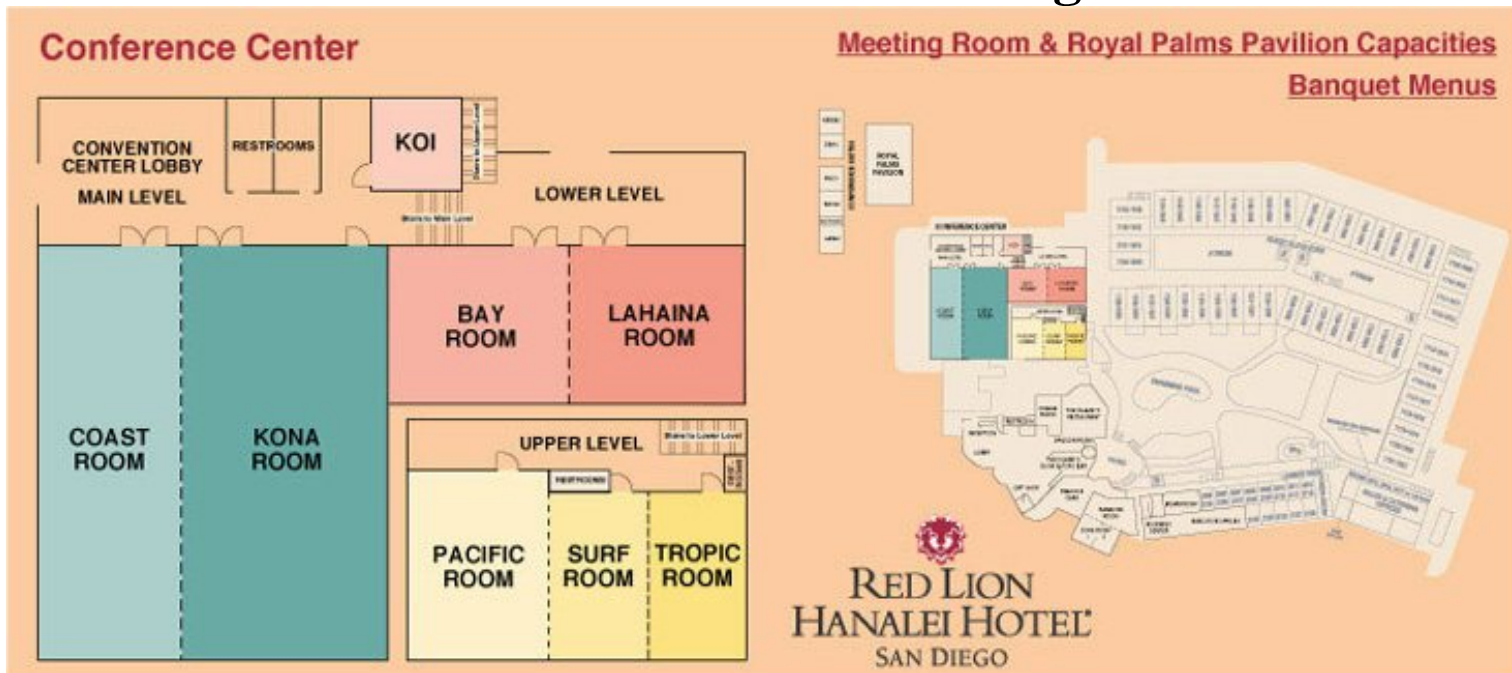


OO software technology supplier to major international projects including Airbus, Eurocopter, Eurofighter and Tornado



www.tni-world.com

Conference Center and Meeting Rooms



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

<p><i>Conference Chair,</i> Robert C. Leif, Ph.D., Newport Instruments (RLeif@RLeif.Com) +1 619-582-0437</p>		<p><i>Program Chair,</i> Ricky E. Sward, Ph.D., LtCol, USAF US Air Force Academy (Ricky.Sward@USAF.AF.Mil)</p>
<p><i>Exhibits Chair,</i> Greg Gicca, Aonix (adamark@sd.aonix.com) +1 858-457-2700</p>	<p><i>Local Arrangements Chair,</i> Robert C. Leif, Ph.D., Newport Instruments (RLeif@RLeif.Com) +1 619-582-0437</p>	<p><i>Workshops Chair,</i> Alok Srivastava, Ph.D. Northrop Grumman / FAA (Alok.Srivastava@NGC.Com) +1 202-314-1419</p>
<p><i>Publicity Chair,</i> Mark Glewwe, Goodrich Corporation, Sensor Systems (m.glewwe@acm.org)</p>	<p><i>Webmaster,</i> Clyde Roby, Institute for Defense Analyses (ClydeRoby@ACM.org)</p>	<p><i>Education Working Group Chair,</i> Michael Feldman, Ph.D. George Washington University (MFeldman@GWU.Edu)</p>
<p><i>Treasurer,</i> Hal Hart, Northrop Grumman Mission Systems (Hal.Hart@ACM.ORG) +1 310-764-6880</p>	<p><i>Tutorials Chair,</i> David Cook, Ph.D. AEgis Technologies Group, Inc. (dcook@aegistg.com)</p>	<p><i>SIGAda Vice Chair for Meetings and Conferences,</i> David Harrison, Northrop Grumman IT (dharrison@ACM.org)</p>
<p><i>Registration Chair,</i> Thomas A. Panfil, US Department of Defense (tapanfil@ieee.org) +1 301-498-7313</p>	<p><i>Proceedings Chair,</i> Clyde Roby, Institute for Defense Analyses (ClydeRoby@ACM.org)</p>	<p><i>SIGAda Chair,</i> Currie Colket, The MITRE Corporation (colket@acm.org) +1 (703) 883-7381</p>

Keynote Speakers:

Ben Brosgol
(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.

I-Logix
Silver Corporate Sponsor



SCADE Suite™ Correct-by-Construction ADA



SCADE Suite is used to develop a formal and unambiguous software specification and automatically produce embeddable code in ADA or C for safety, mission, and business-critical embedded software.

- Flight Control Systems
- Engine Control Systems
- Nuclear Systems Control and Command
- Autopilots
- Airbags

Because the embeddable code is correct by construction and automatically generated, the tedious unit test phase can be eliminated, typically reducing overall development costs by up to 50%.

The SCADE Suite development environment offers a unique benefit to its users:

It formally and automatically ensures that what you specify is what you simulate, verify and embed.

Website: www.esterel-technologies.com
Email: info@esterel-technologies.com



SIGAda & SIGAda 2003 Thank Our Corporate Sponsors:



www.gnat.com



www.tni-europe.com



Aonix®

www.aonix.com



www.rational.com



www.esterel-technologies.com



www.qcsLtd.com



www.ilogix.com



www.polyspace.com

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

www.sigada.org