

### **ACM SIGAda's**

## **Annual International Conference:**

# SIGAda

Holiday Inn Houston/NASA Houston (at Clear Lake), TX USA 8 - 12 December, 2002

Sponsored by ACM's Special Interest Group on the Ada Programming Language, In Cooperation With SIGAPP, SIGCAS, SIGCSE, SIGPLAN, SIGSOFT and Ada-Europe

Hosted by Clear Lake SIGAda Chapter

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# 20th International Conference on Ada-Related Technologies

SIGAda 2002 is your only opportunity in the U.S. this year to learn the latest developments about Ada and related technologies, from the world's leading Ada practitioners, researchers, and educators. One of the highlights of the conference will be a focus on what is in store for the next version of the language standard - find out late-breaking news on the features that are being considered, and how they will affect your use of the language. Other topics on the refereed conference program include experience reports from Ada developers and educators, new findings from the research community. Supplementing the program will be a selection of exciting tutorials on Ada-related subjects, an exhibit area where you can find the latest products from vendors, and several workshops on technologies relevant to Ada. Continuing an initiative of SIGAda's Education Working Group, the conference is making a special outreach effort to involve students and educators.

Since its inception, Ada has been successful in systems where reliability is essential. Its application domains include aeronautics, air traffic control, aerospace, simulation, shipping, railway systems, communications, and many others. It is used in environments ranging from bareboard embedded devices to large-scale distributed real-time systems, and in multi-language software interfacing with C, C++, Fortran, and Java. Ada is used both in the U.S. and abroad, for both government and commercial systems, and is taught at colleges and universities where software engineering is an important focus. Whether you are from industry, government, or academia, if you are interested in where Ada is today and where it is going,

SIGAda 2002 is a conference that you need to attend.

### Special Keynote Presentations with:

### **Robert Dewar**

President Ada Core Technologies

### **Charles McKay**

Dean, School of Science and Computer Engineering University of Houston Clear Lake

### Michael McEvilley

Deputy Director Systems Security
Engineering
Decisive Analytics Corporation

#### Attend SIGAda 2002 to discover:

• late-breaking news on the features that are being considered for the next version of Ada, and how they will affect your use of the language.

For recent updates / schedule changes, please see the SIGAda 2002 Website: www.acm.org/sigada/conf/sigada2002

### SIGAda 2002 TUTORIAL PROGRAM

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

### SF1: Introduction to Ada and Ada95 David Cook, Ph.D., Les Dupaix & Eugene Bingue, Ph.D.

This tutorial is designed for those who have some familiarity with a programming language, but who are new to Ada. In the morning, we will discuss the basics of programming in Ada, to include typing, packages, syntax rules, and other Ada programming constructs. In the afternoon, we will cover the concepts of object-oriented programming, and show how object-oriented design can easily be implemented using Ada. Simple Ada programs will be constructed during the class, and the attendees will also see how to use various Ada programming environments and tools that can be downloaded for free over the web.

# SF2: CORBA for Embedded Systems S. Ron Oliver, Ph.D.

The Tutorial will begin with an overview of CORBA. The attendee need have no prior knowledge of CORBA. The session will also include a brief introduction to Distributed Computing, in general, including fundamentals of Concurrent and Real Time systems, and of Computer Thus, the attendee need not be highly Networks. experienced in these subjects. However, treatment of this introductory background material will necessarily be limited, so some familiarity with it will be useful. The morning session and about half the afternoon session will include discussions of the CORBA Principles, Interface Definition Language (IDL), Client programs, Object (server) programs, and CORBAServices. The afternoon session will end with a discussion of more advanced features of CORBA 3. including minimumCORBA and Real Time CORBA. These topics will be of particular interest to those who might wish to use CORBA for Embedded Systems. It will begin with a brief introduction to Embedded Systems and an overview of advanced CORBA features that could not be covered in the morning session. All examples for the tutorial will be based on the highly successful TopGraph'X product, ORBAda, and the Ada95 programming language.

### SF3: Introduction to Common Criteria for Information Technology Security Evaluation (CC) and the Underlying Concepts of Trust in Computer Systems Michael McEvilley

The Common Criteria (CC) is an international standard (ISO 15408) that is used to articulate the requirements for the development and verification of the security capabilities in products and systems. The articulation of security requirements is accomplished by employing the requirements specification framework defined by the CC to

create security specifications. These specifications, referred to as the Protection Profile (PP) and Security Target (ST), express security requirements based upon the functional and assurance criteria catalogs also defined by the CC.

The CC and its accompanying Common Evaluation Methodology form the technical basis for an international cooperative program whereby participants agree to trust the results of independently conducted product security evaluations.

This tutorial will present a technical introduction to the Common Criteria with focus on the principles of establishing trust through disciplined, structured and rigorous software engineering and verification activities. Discussion of the overlap between security and safety principles and the application of the CC by the Ada community will be included.

### Clear Lake is:

- ₩ 30 minutes from downtown Houston and Galveston Island
- ₩ Home to NASA/JSC and America's astronauts
- ₩ On Galveston Bay and the Gulf of Mexico
- # Home to dozens of native and migratory bird species



Located midway between Houston and Galveston, the Clear Lake/NASA Area encompasses 125 square miles, bordered on the west by Interstate 45 and on the east by Galveston Bay. The over 200,000 residents of nine separate municipalities and unincorporated areas enjoy a highly diversified, balanced economic structure with a strong base of aerospace, high-tech, petrochemical, commercial fishing and boating industries. Attractions and visitor-friendly businesses have promoted a tremendous growth in tourism in recent years.



### SIGAda 2002 TUTORIAL PROGRAM (cont.)

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

# MF1: Spark, an "Intensive Overview" *Rod Chapman*

SPARK is an annotated sub-language of Ada which is unambiguous and suitable for rigorous static analysis. The tutorial will cover: the rationale of SPARK; the core language and annotations; data-and information-flow analysis, SPARK program design; and verification techniques such as proof of partial correctness and freedom from exceptions. The tutorial is intended primarily for those with current or recent experience of software development in Ada, especially those who will work on or lead safety critical or other high integrity developments, although detailed knowledge of Ada is not a prerequisite.

Attendees will be encouraged to bring laptop computers on which the SPARK Examiner will be installed and used for practical exercises.

### Monday Morning Tutorials (8:30am - 12:00 Noon)

# MA1: Introduction to Tasking Les Dupaix, Eugene Bingue, Ph.D.

In most languages, writing potentially parallel code is very difficult – hard to implement and hard to test. Tasking, a construct of Ada, allows developers to design and code parallelism with great ease. This tutorial is targeted at developers who want to understand how Ada tasking works, and see how to build Ada tasks. Knowledge of basic Ada syntax is all that is required. There will be multiple examples of Ada code showing how to correctly design and code Ada tasks.

# MA2: Implementing Design Patterns in Ada 95 Matthew Heaney

A design pattern is a description of how a group of objects collaborate to solve a general problem in a specific context. Although Ada is a feature-rich language, it is sometimes not obvious how to actually implement many design patterns, and knowledge of certain advanced language features is often necessary. Accordingly, I present several idioms for object-oriented programming in Ada95, including using controlled types and smart pointers to perform memory management, and for using access discriminants to implement Java-style interfaces.

### Monday Afternoon Tutorials (1:30am - 5:00pm)

### MP1: Exceptions (What You Always Wanted to Know About Exceptions, But Were Afraid to Ask) Currie Colket

Exception processing was considered by Jean Ichbiah to be one of the 3 most important features of the Ada language. It has the power to detect serious problems in the execution of a program and return one back to a known safe state with high integrity. As such, it can be a very powerful tool for developing high quality software. Unfortunately many developers do not use the full power of exceptions. Frequently the use of exceptions is to simply log the problem and continue execution, allowing things to gracefully degrade. In the case of Ariane 5, exceptions were raised appropriately, but the result had not been well thought out, resulting in a disaster.

This tutorial will start at the basics, discussing the Ada 83 concept of exceptions. To be effective, exceptions and their handling must be addressed at the design level and not at the code level where it is frequently performed today. This presentation will discuss several alternative approaches to addressing error handling in the design using exceptions. Ada 95 introduced some important changes to the exception area making them more effective. In particular, the addition of package Ada. Exceptions provides excellent facilities to support debugging and provides a mechanism to eliminate erroneous mapping of raised exceptions.

# MP2: Embedded / Real-Time Ada95 Pat Rogers

This advanced tutorial focuses on two major requirements for real-time systems: storage management and time management. We examine the potential pitfalls associated with Ada's storage facilities and explore in detail how to write predictable user-defined storage managers that are seamlessly integrated with the language. We then explore how to use offline schedulability analysis and predictable tasking to ensure application timing behaviour. This part forms the bulk of the tutorial. The required analysis theory - explained in concrete terms and examples -- is covered to a sufficient detail (fear not!) so that the Ada Real-Time Systems Annex, covered in the last part of the tutorial, will be abundantly clear.

For more detailed information, select "Tutorials" from http://www.acm.org/sigada/conf/sigada2002/

# **Summary Conference Schedule**

Sunday, December 8							
TUTORIAL PROGRAM							
Full-Day Tutorials (9:00am - 5:30pm)							
SF1:	Introduction to Ada and Ada95  David Cook, Ph.D. (Shim Enterprise),  Les Dupaix (Software Technology Support Center)  & Eugene Bingue, Ph.D. (Independent Consultant)						
SF2:	CORBA for Embedded Systems S. Ron Oliver, Ph.D. (caress Corporation)						
SF3:	Common Criteria, Information Assurance, and Implications for the Ada Community Michael McEvilley (Decisive Analytics Corporation)						
- 00: <i>L</i>	Workshop: Ada Semantic Interface Specification Working group/Rapporteur Group (ASISWG/ASISRG) (see page 6)						
Monday, December 9							
Full-Day Tutorials (8:30am - 5:00pm)							
MF1:	Spark Rod Chapman (Praxis Critical Systems)						
Morning Tutorials (8:30am - 12:00 Noon)							
MA1:	Introduction to Tasking Les Dupaix (Software Technology Support Center), Eugene Bingue, Ph.D. (Independent Consultant)						
MA2:	Implementing Design Patterns in Ada 95 Mathew Heaney (On2 Technologies)						
Afternoon Tutorials (1:30pm - 5:00pm)							
MP1:	Exceptions Currie Colket (MITRE Corporation)						
MP2:	Embedded / Real-Time Ada95 Pat Rogers (Independent Consultant)						
7:00 - 11:00pm	SIGAda Extended Executive Committee Meeting (Open to all)						

For more detailed information, select "Tutorials" from www.acm.org/sigada/conf/sigada2002/

### Tuesday, December 10 Greetings from SIGAda Chair, Vice Chair for Meetings 9:00- 10:30am and Conferences, & Conference Chair Introductions of Conference Officers and SIGAda Officers Keynote Address: The impact of Free/Open Source Software on Software Engineering, Robert Dewar (Ada Core Technologies) 10:30 - 11:00am Mid-morning Break - Exhibits Open **Industrial Strength Exception Handling** Peter Amey & Roderick Chapman (Praxis Critical Systems, Ltd.) Ada, CMM Level 4, and the C-130J Aircraft Richard Conn (Lockheed Martin) 12:00 - 1:30pm Mid-day Break and Exhibits **Invited Paper: The National Ignition Facility: Early Operational Experience with a Large Ada Control** System Robert Carey (Lawrence Livermore Laboratory) **Development of Distributed, Cross-Platform Simulator** Thomas C. Brooke **COTS Safety Critical Solutions** Greg Gicca (Aonix) 3:20 - 4:00 pm **Afternoon Break & Exhibits** WG9 Forum: WG9 is working to amend the Ada language to support the needs of the user community. A WG9 representative will provide a briefing on the plans 4:00 - 5:30pm for amending the Ada language for application in the 2005 timeframe. This presentation will nurture thinking about Ada language issues and their proposed solutions. It will prepare conference attendees for the events on Thursday morning when WG9 gathers feedback on the proposed solutions. 5:30 pm **Adjourn**

Conference Reception / Dinner

7:00 -9:00pm

### Wednesday, December 11

Announcements

30am

SIGAda Awards

Keynote Address: **Ada: One Maverick's Perspective of It's Past, Present and Potential for the Future** 

[Definitions: "Maverick: 1) an unbranded animal 2) a person not labeled as belonging to any one party, faction, etc. who acts independently" specially in Texas] *Charles McKay (University of Houston Clear Lake)* 

### 10:30 - 11:00am Mid-morning Break and Exhibits

n - 12:30pm

Weaving Ada 95 into the .Net Environment

Martin C. Carlisle, Ricky E. Sward, & Jeffrey W. Humphries (US Air Force Academy)

An Architectural Framework for Supporting Distributed Object Based Routing

Dhavy Gantsou (University of Valenciennes)

**Visual Ada Developer** *Leonid Dulman (DES Inc.)* 

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

- 3:50pm

Keynote Address: **The Essence of Information Assurance and Why it is Important to the Ada Community,** *Michael McEvilley (Decisive Analytics Corporation)* 

The Anatomy of an FAA-Qualifiable Ada Subset Compiler

V. Santhanam (Boeing)

**Embedded Ada Solutions** 

Eddie Glenn (Rational Software)

#### 3:50 - 4:30pm Afternoon Break

Creating a Symbiotic Relationship Between XML and Ada  $\,$ 

Robert C Leif (Ada\_Med)

30 - 6:00pm

**Developing a Generic Genetic Algorithm** 

Melvin Neville and Anaika Sibley (Northern Arizona University)

**Experimental Performance Analysis of Ada95 and Java Parallel Programs on SMP Systems** 

Dmitry Korochkin & Sergey Korochkin (National Technical University of Ukraine)

### 6:00 – 7:00pm **Evening Break**

- 11:00pm

Workshop: Ada Application Program Interfaces
Management (see page 6)

Workshop: Portable Common Tool Environment (PCTE) – Portable Common Interface Specification (PCIS) (see page 6)

Birds-Of-a-Feather (BOF) sessions (contact Workshops Chair to propose a BOF, see page 6)

### Thursday, December 12

- 11:30am

WG9 Forum: WG9 will conduct workshops to address the 5 major areas where enhancements to the Ada Language are projected: 1. Real Time Features; 2. High Integrity Features; 3: Static Error Detection; 4. Interfaces to Other Languages; and 5: Object Oriented Features. SIGAda 2002 attendees have the opportunity to discuss alternatives and provide feed back for the evolution of Ada.

11:30am - 12:00 Noon Short Break

2:00-:00pm Forum: SIGAda, its Mission and Future

Currie Colket (SIGAda Chair), David Harrison (SIGAda Vice Chair for

David Harrison (SIGAda Vice Chair for Meetings and Conferences)

1:00pm Closing Comments

### **WG9 Forums**

### Tuesday, December 10, 4:00 pm

The ISO/IEC JTC1/SC22 WG9 is currently working to amend the Ada language to support the needs of the user community. A WG9 representative will provide a briefing on the plans for amending the Ada language for application in the 2005 timeframe. This presentation will nurture thinking about Ada language issues and their proposed solutions. It will prepare conference attendees for the events on Thursday morning when WG9 gathers feedback on the proposed solutions.

### Thursday, December 12, 9:00 am

WG9 will conduct workshops to address the 5 major areas where enhancements to the Ada Language are projected: 1. Real Time Features; 2. High Integrity Features; 3: Static Error Detection; 4. Interfaces to Other Languages; and 5: Object Oriented Features. SIGAda 2002 attendees have the opportunity to discuss alternatives and provide feed back for the evolution of Ada.

For more up-to-date information, visit our conference website: www.acm.org/sigada/conf/sigada2002

For more detailed information on Workshops and BOFs, visit: www.acm.org/sigada/conf/sigada2002/

### **CONFERENCE COMMITTEE**

General Chair,

Salih Yurttas,

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Local Arrangements Chair,

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Texas A&M University
(yurttas@cs.tamu.edu)

Program Chair,

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STGAda Chair.

Currie Colket,

The MITRE Corporation

(colket@mitre.org)

+1 (703) 883-7381

### **EXHIBITORS**

SIGAda 2002 will include vendor participation, featuring presentations on their products and services. For specific information, please contact the Exhibits Chair: Hal Hart, +1-310-764-6880, E-mail: *Hal.Hart@acm.org* or see:

www.acm.org/sigada/conf/sigada2002/exhibits.html

#### **CONFERENCE VENUE & HOTEL**

We are very pleased to hold the SIGAda 2002 Conference at the Holiday Inn Houston/NASA. The Holiday Inn is located in Houston (at Clear Lake) Texas within walking distance of the NASA/Johnson Space Center. Additional information on the Holiday Inn can be found on the Registration Form on page 7 and on the Conference Website: <a href="https://www.acm.org/sigada/conf/sigada2002/">www.acm.org/sigada/conf/sigada2002/</a>

Please identify your affiliation with "SIGAda 2002" to obtain the Conference Rate. This rate is available until 21 November 2002.

#### **GRANTS TO EDUCATORS**

As in past years, SIGAda is offering grants to educators to attend the conference. Grants cover the registration and tutorial fees; travel funds are not available. Details on the grant program are available from: **Prof. Michael B. Feldman** 

E-mail: *mfeldman@seas.gwu.edu* or see: www.acm.org/sigada/conf/sigada2002/

Applications are due by e-mail (preferred), fax, or regular mail (postmarked) by November 15, 2002.

Faculty members are encouraged to bring the Student Work-Grant opportunity below to the attention of their best Ada students.

#### STUDENT WORK-GRANTS & DAILY NEWSLETTER

SIGAda 2002 will feature a daily newsletter Ada's Window on the World (Ada-WOW), mixing interviews with key people, session summaries, and previews of next-day activities with local color, general computing thought pieces, and relevant world news briefs in an informal, fun format. A limited number of student grants are available to staff Ada-WOW. Work involves full participation in conference activities, writing some of the articles, and production editing for some; an estimated 2-3 hours of newspaper work nightly will be required, Monday - Wednesday (Sunday, too, for those who arrive by then). Benefits include free lodging (2 or more per room) and free conference & tutorial registration. A room with computer production facilities will be provided.

Interested students should contact Ann Brandon at abrandon@sover.net

#### WORKSHOPS

Focused workshops are important in evolving Ada technology to better meet the needs of the Ada community. Workshops are free for those registered for the conference. The following workshops are planned for SIGAda 2002:

- Ada Semantic Interface Specification Working group/Rapporteur Group (ASISWG/ASISRG) workshop/meeting, Currie Colket Sunday, December 8, 7:00
- Ada Application Program Interfaces Management, Clyde Roby Wednesday, December 11, 7:00
- Portable Common Tool Environment (PCTE) Portable Common Interface Specification (PCIS), Ronald Price Wednesday, December 11, 9:00
- Real Time Features, High Integrity Features, Static Error Detection, Interfaces to Other Languages, Object Oriented Features, WG9 Thursday, December 12, 9:00

Workshop descriptions will be on the SIGAda 2002 Home Page when they are available. Additional workshops or Birds-of-a-Feather (BOF) are welcome. Workshops have a focused objective and result in a report to be published in Ada Letters. BOFs are informal discussion groups. If you would like to propose a Workshop or BOF, please contact the Workshops Chair, Salih Yurttas, E-mail: yurtas@cstamu.edu



Sponsored by the ACM Special Interest Group on the Ada Programming Language

# **ACM SIGAda Annual International Conference**

Registration Procedure:

ACM SIGAda 2002

Registration Chair

Reg'n Form: AP

Cancellation Policy:

PO Box 5210

C/O Thomas A. Panfil

Mail form with payment to:

Laurel, MD 20726-5210 USA

Or fax to: +1.301.498.7313

Houston (at Clear Lake), Texas USA -- 08-12 December 2002

## SIGAda 2002 Advance Registration Form

For On-Line Registration, see www.acm.org/sigada/conf/sigada2002/

For On-Line Regist	ration, see w	ww.acm.or	g/sigada	/coni/si	Lgada2002	4/	Registrants who cannot attend	
Name (First, Middle Initial, Las	t):						and do not send a substitute are entitled to a refund of fees paid	
(Dr./Mr./Mrs./Miss): Jo	(less a \$50 processing charge) i							
Badge Name (as you wish it to a	a written request is received or or before <b>November 10, 2002</b>							
Organization/Affiliation:	Registrants are liable for their							
Address:							full fees after that date.  ACM & SIGAda Membership:	
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Please Circle Selection(s)	On/Before 10 Nov	After 10 Nov	On/Before 10 Nov	After 10 Nov	On/Before 10 Nov	After 10 Nov	For a list of tutorials available visit the tutorials section of the registration web-site. Write the	
Conference All 3 Days	\$495	\$645	\$645	\$795	\$50	\$50	code for your selected tutorials	
Conference One Day	\$295	\$295	\$295	\$295	\$50	\$50	on the appropriate lines.	
Tutorial 2 Days	\$575	\$695	\$795	\$895	\$50	\$50	Sunday Full Day	
Tutorial 1 Day	\$400	\$500	\$500	\$600	\$25	\$25	Monday Full Day	
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Conference Fee: \$ —		Check Payable to Impo confe Visa Pleas		Important conference Please be	Credit Card Payment Information Important: Your signature indicates your agreement to pay the conference fees with the credit card number you specified below Please be advised that this transaction will be described on your statement as a charge from ACM.			
Additional Proceedings:	-	MasterCard			-			
CD-ROM: copies x \$20		American Express			Card Number:			
Hard Copy: copies x \$50	\$	Other:		Good Thru:				
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Additional tickets x \$30	\$	within 10		Cardholde				
TOTAL ENCLOSED: \$		arrange payment.						

A block of rooms has been set aside for SIGAda 2002 attendees at the rate of **US \$73 plus tax, single or double,** per night (the US government perdiem rate). It includes a buffet breakfast (extra **\$5.95 plus tax & gratuity** for buffet breakfast for 2<sup>nd</sup> occupant). Please identify your affiliation with **SIGAda 2002** to receive this rate. Rooms in this block will be available at this favorable rate **until 21 November 2002**, after which the Conference rate and room availability cannot be guaranteed. Register early to obtain the Conference rate. Please make reservations directly with **Holiday Inn Houston/NASA**, 1300 NASA Road One, Houston, Texas 77058 USA. Toll-Free Phone **+1.800.682.3193** (USA/Canada Only). Toll Phone: **+1.281.333.2500** (Worldwide). FAX: **+1.281.335.1578**. URL: http://www.Houston-NASA.Holiday-Inn.com





### **Annual International Conference 20<sup>th</sup> International Conference** on Ada-Related Technologies

SIGAda o

Sponsored by ACM SIGAda

### GOOD REASONS WHY YOU SHOULD COME TO SIGADA 2002

Find out late-breaking news on the features being considered for the next version of Ada, and how they will affect your use of the language

Participate in workshops that will influence Ada technology

Hear recognized speakers on Ada and software engineering issues relevant to your organization

Consider how Ada may be employed to meet Information Assurance requirements expressed in Common Criteria Language

Meet others addressing the same software engineering problems facing your organization

Learn how Ada is being used successfully in application areas where Fortran, C, C++ and even Java were previously chosen

Explore for yourself how Ada compilers and tools are becoming more powerful and cost effective

See how Ada is being used to support the development of distributed, real-time, highly-reliable systems

Understand how Ada is open to interfacing with legacy & COTS software programmed in other languages

Realize the growing number of tools and third-party libraries available to Ada programmers

Discover that Ada is easy to learn and is used by many colleges and universities in introductory computer science courses

# **ADVANCE PROGRAM**

Register early save up to

See page 7 for details

For the latest updates, please visit the SIGAda 2002 Website: www.acm.org/sigada/conf/sigada2002