



SIGAda 2007 Advance Program

ACM SIGAda
Annual International Conference
(including NIST Static Analysis Summit II)

www.sigada.org/conf/sigada2007/

November 4-9, 2007

Hyatt Hotel Fair Lakes

Fairfax, Virginia (near Washington, DC) USA

Why You Should Attend

The Ada 2005 language became an official ISO Standard on March 9, 2007. Ada software is powering Boeing's new 787 Dreamliner, the record-setting high-speed trains of Europe, the FAA's air traffic control systems, the New York subway, and numerous military and commercial systems in which software reliability, safety, and security are paramount. Don't miss this chance to bring yourself up to date on Ada!

Keynote Addresses

***Wanted: Software with Assurance
Built-in***

Joe Jarzombek

National Cyber Security Division

U.S. Department of Homeland Security

***The Federal Aviation Administration
and Ada***

Jeff O'Leary

Air Traffic Control Systems Development

U.S. Federal Aviation Administration

***Correctness by Construction:
Putting Engineering (Back) into
Software!***

Rod Chapman

Safety and Security-Critical Systems

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Sunday Tutorial Schedule and Abstracts

Morning Tutorials (9:00am - 12:30pm)

SA1: Introducing the Best of Ada

John G.P. Barnes, John Barnes Informatics

Level: Introductory. This tutorial assumes no previous knowledge or experience with the Ada programming language. Ada was originally designed in around 1980. Important goals included: to provide a portable and uniform language to replace a number of existing languages then in use; to capture the state of the art in language design; to recognize that programming was a serious engineering discipline; and to be highly reliable and encourage the development of long lived and maintainable programs.

However, Ada 83 (as the first version was known) was developed before the ideas of OOP matured and tasking was fully understood. Accordingly Ada was enhanced in 1995 to cover these topics and others. This tutorial introduces the main themes of Ada and show why it is an excellent language for systems that need to be reliable and to be maintained.

SA2: Languages for Safety-Critical Software: Issues and Assessment

Ben Brosgol, AdaCore

Level: This intermediate-level tutorial is aimed at people with a technical background in software development. No previous experience with safety-critical standards is required. Some familiarity with C, C++, Ada, or Java would be useful.

Safety-critical systems (whose anomalous behavior could cause catastrophic or major failure involving loss of life) are becoming increasingly prevalent. Standards such as **DO-178B**, originally developed for commercial avionics, are attracting attention in other segments. Compliance imposes constraints (on quality assurance, traceability, etc.) much beyond what is typical for Commercial-Off-The-Shelf Software. This tutorial explains existing safety standards and how they affect the requirements on a programming language, and addresses the challenges imposed by Object-Oriented Technology. The tutorial assesses C (including C++), Ada, and Java with respect to suitability for meeting these requirements through appropriate subsetting. MISRA C, SPARK, and the in-progress Safety-Critical Java Technology are specifically reviewed.

Afternoon Tutorials (2:00pm - 5:30pm)

SP1: Introducing the Best of Ada 2005

John Barnes, John Barnes Informatics

Ada 2005 is the latest chapter in the Ada story. Ada 95 was a huge leap forward from Ada 83. However, experience showed that Ada 95 has a number of gaps. Ada 2005 is not such a giant leap forward but aims rather to round off Ada 95 and so provide the community with a really smooth programming language suited for the demanding applications of the 21st century.

John will explain the specific goals of the development and introduce the key new features of Ada 2005. The most obvious new features are in the OO model with the introduction of interfaces and in the real-time area with more control over timing and scheduling plus much more in the predefined library. But there are other improvements as well in areas such as visibility control, exceptions and generics. And of course also downward closures so that Ada is at last as good as Algol 60 in that area.

SP2: Exposing Ada Web Services Using a Service-Oriented Architecture (SOA)

Ricky E. Sward, The MITRE Corporation

Level: Intermediate. This tutorial covers the principles of Service-Oriented Architectures (SOA) including loose coupling, encapsulation, reusability, composability, etc. The attendee will learn about the Ada Web Server (AWS) and how SOA interfaces, session management, etc., are implemented using AWS. The tutorial will also cover the fundamentals of the Enterprise Service Bus (ESB), a key enabling component of an SOA. Attendees will learn about ESB endpoints, data routing, automatic translations, etc. They will also learn how to connect Ada web services to an ESB, how to expose the web services, and how to use AWS with the ESB through in-class exercises and demonstrations. The tutorial will be very interactive and attendees are encouraged to bring their laptop computers.

For more detailed information or to register, visit: www.sigada.org/conf/sigada2007

Monday Tutorial Schedule and Abstracts

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

MF1: Security by Construction

Roderick Chapman, Praxis Critical Systems Ltd

Level: Intermediate. Practicing software engineers, program managers, and those involved with procurement of high-integrity software systems will benefit from this tutorial. Some background in the development of safety- or security-critical software might be useful, but not essential.

This tutorial will cover the use of "Correctness by Construction" (CbyC) techniques in the development of highly secure software systems. While the use of CbyC is well-known in the development of safety-related systems, it has also been deployed in the domain of highly secure systems. The software world seems plagued by security problems caused by basic mistakes in software design and construction, but this tutorial will show how practices from the safety-critical domain can be used to tackle these problems. In particular, the role of formal methods, programming language design, and strong static verification will be covered. The tutorial will be illustrated with reference to CbyC security projects such as the MULTOS smart-card certification authority system and the National Security Agency Tokeneer system.

Software security is one of the highest-profile and most important topics facing researchers today. The plague of "buffer overflow" and similar attacks that we read about every day seem almost endemic, yet these are problems that have been faced (and solved) by the safety-critical community for many years. This tutorial will recount our experience in building high-grade secure systems using the CbyC approach developed by Praxis over the last 15 years.

Morning Tutorial (9:00am - 12:30pm)

MA1: Real-time and Parallel Processing in Ada

Eugene W.P. Bingue (Independent Consultant), David A. Cook (AEGIS Technologies Group, Inc.), and Les Dupaix (U.S. Air Force Software Technology Support Center)

Level: Intermediate. This tutorial assumes basic knowledge or experience with the Ada programming language.

This tutorial covers two of the major problems with parallel and real-time programming - time management and storage management. Parallel processing, whether on single-processor machines or multiple processors, has many pitfalls. We will examine these potential pitfalls, and discuss ways to avoid common problems, such as deadlocks and race conditions. We will also discuss how to write code that efficiently passes data with other parallel processes. The basics of parallel processing are covered, leading to a discussion and examples using Ada tasking. In addition, the Ada Real-Time Systems Annex is also covered.

Afternoon Tutorial (2:00pm - 5:30pm)

MP1: Real Time Scheduling Theory and Its Use with Ada

Frank Singhoff, University of Brest, France

Level: Intermediate. This tutorial assumes basic knowledge or experience with the Ada programming language. Basic understanding of tasking and real-time constructs – at the level of tutorial MA1 – would be helpful.

This tutorial deals with real time scheduling theory and its use with Ada. Real time scheduling theory was first proposed in 1974, but stays mostly unused by many software designers.

Too many practitioners have no background on real time scheduling. This tutorial should help them to understand the basis of such a theory and to apply it with Ada technologies. This tutorial is expected to help Ada engineers to predict the performances of their critical Ada real time applications.

For more detailed information or to register, visit: www.sigada.org/conf/sigada2007

Summary Conference Schedule

Sunday-Monday, November 4-5

Full and Half-Day Tutorials

Tuesday, November 6

9:00- 10:30am

Greetings from SIGAda and Conference Officers

Keynote Address:

Wanted: Software with Assurance Built-in

Joe Jarzombek, Director for Software Assurance

National Cyber Security Division

U.S. Department of Homeland Security

10:30 - 11:00am **Morning Break - Exhibits Open**

11:00am - 12:30 pm

Using Mathematics To Improve Ada Compiled Code, Part 2: The Proof

W. Douglas Maurer (The George Washington Univ.)

Generic Discrete Event Simulations using DEGAS: Application to Logic Design and Digital Signal Processing

Paul Pukite & Luke Ludwig (BAE Systems)

Sponsor Presentation(s)

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

2:00 - 3:30 pm

AADL Modeling and Analysis of Hierarchical Schedulers

Frank Singhoff & Alain Plantec (University of Brest, France)

Verified Component-based Software in SPARK: Experimental Results for a Missile Guidance System

Kung-Kiu Lau & Zheng Wang (University of Manchester, UK)

Sponsor Presentation(s)

3:30 – 4:00 pm **Afternoon Break & Exhibits**

4:00 – 5:30pm

The Ada Reference Implementation of the Tuple Object Machine: A Computing System for Dynamic Peer-to-Peer Processing

J. C. Smart (U.S. Dept. of Defense)

Parallel Evolution of Game Evaluation Functions in Ada

Tyler B. Hallmark and Eugene K. Ressler (US Air Force Academy)

Sponsor Presentation(s)

Evening Activities (7:00pm - 10:00pm)

Conference Reception

Wednesday, November 7

9:00- 10:30am

Announcements

SIGAda Awards

Keynote Address:

The Federal Aviation Administration and Ada

Jeff O'Leary

Air Traffic Control Systems Development

U.S. Federal Aviation Administration

10:30 – 11:00am **Morning Break and Exhibits**

11:00 - 12:30pm

Timing Neural Networks in C and Ada

Martin C. Carlisle & Leemon C Baird III (US Air Force Academy)

Using SPARK for a Beginner's Course on Reasoning about Imperative Programs

Kung-Kiu Lau (University of Manchester, UK)

Sponsor Presentation(s)

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

2:00 - 3:30pm

Multi-Core + Multi-Tasking = Multi-Opportunity

Karl A. Nyberg (Grebyn Corporation)

The Ada Compiler as a Static Analysis Tool

Robert Dewar (AdaCore)

Sponsor Presentation(s)

3:30 – 4:00 pm **Afternoon Break**

4:00 – 5:30pm

Assessment of String Tests Strategy for an En-Route Air Traffic Control System

Jeff O'Leary (US Federal Aviation Administration); Denise S. Beidleman, Fred Woodard & Alok Srivastava (Northrop Grumman)

Towards a Demonstrably Correct Ada Compiler

Chris Nettleton (XGC Software, London); Wilson Ifill, Colin Marsh (AWE plc, Aldermaston, UK)

Sponsor Presentation(s)

Evening Activities (7:00pm - 10:00pm)

Hibachi Workshop

Other Workshops TBA

Birds-of-a-Feather (BoF) Sessions TBA

Thursday, November 8

9:00- 10:30am	Announcements Keynote Address: Correctness by Construction: Putting Engineering (back) into Software <i>Roderick Chapman, Safety and Security-Critical Systems, Praxis High Integrity Systems, Ltd</i>
	10:30 - 11:00am Morning Break
11:00 - 12:00 noon	Using Ada in a Service-Oriented Architecture <i>Ricky E. Sward (MITRE Corporation)</i> Selecting A High Assurance Profile for CORBA Middleware <i>Victor Giddings (Objective Interface Systems)</i>

12:00 - 12:30 pm

Ada Europe Presentation
ACM SIGAda 2008 Presentation
Other Conference Presentations TBA
Closing Remarks

Thursday-Friday, November 8-9

NIST Static Analysis Summit II

Workshop Schedule and Abstracts

Thursday-Friday Two-Day Workshop

W1: NIST Static Analysis Summit II, Thursday – Friday Two Full Days

Paul Black, National Institute of Standards and Technology (NIST)

Funded by the Department of Homeland Security (DHS), the National Institute of Standards and Technology (NIST) started a long-term, ambitious project to identify, enhance and develop software assurance tools. The Software Assurance Metrics And Tool Evaluation (SAMATE) project is leading in (a) developing test for software evaluation tools, (b) measuring the effectiveness of tools, and (c) identifying gaps in tools and methods. See our web site at <http://samate.nist.gov/index.php/SASII>.

Source code security analyzers to find weakness and potential problems are quite capable and developing quickly. Yet, developers, auditors, and examiners could use far more. The problem is to clearly define the biggest obstacles to these urgently needed capabilities and try to identify feasible approaches to overcoming them, either engineering ("solved" problems) or research. Questions to be considered include embedded systems, binaries, obfuscation, formal pattern languages, higher level functions, and integration with other tools.

This workshop follows an August 2005 workshop to define the state of the art in software security tools:

<http://samate.nist.gov/softSecToolsSOA> and a November 2005 workshop on software security assurance tools, techniques, and metrics: <http://samate.nist.gov/index.php/SSATTM>

The two-day workshop will have a combination format. The first day is paper presentations and a panel session followed by guided discussion. The second day has some additional paper presentations, another panel, and two sessions of guided discussion.

Wednesday Evening Workshop (7:00 pm – 10:00 pm)

W2: Hibachi - the Eclipse Ada Development Toolset

Tom Grosman, Aonix

Hibachi is an open source (EPL), standard, extensible, vendor-neutral Eclipse Ada development environment. Hibachi is currently in the project proposal phase (see http://www.eclipse.org/projects/dev_process/development_process.php), which involves gathering a viable developer/tester/user community around the project and IP rights to any code contributions. When these pieces are in place, the project can be approved by the Eclipse Management Organization (EMO) and begin producing high quality releases available to end users, as well as third party integrators. Workshop discussions will cover history and current status, and focus on future direction. The result of the future-direction discussions will serve as input to the ongoing Hibachi project development and release plan.

CONFERENCE VENUE & HOTEL

Hyatt Fair Lakes Hotel

12777 Fair Lakes Circle,

Fairfax, Virginia, USA 22033

Tel: 1 800 492 8804 (US/Canada) or +1 703 818 1234

Fax: +1 703 653 6190



The SIGAda 2007 Conference will be held at the Hyatt Fair Lakes Hotel, in Fairfax, Virginia, in the suburbs of Washington, D.C. The hotel is convenient to Washington Dulles International Airport, and to the spectacular new Steven F. Udvar-Hazy Center of the National Air and Space Museum which displays the Space Shuttle, JSF F-35, Concorde and many other actual aircraft and space vehicles of historical importance. For hotel guests interested in visiting the museums and monuments of central Washington, the hotel operates a free shuttle to the nearby Metro rail station.

We have arranged a special rate of \$159 per night (single/double bed) for the conference attendees. A block of rooms has been set aside and will be available only until October 4, 2007, after which room availability and rate in the Conference hotel cannot be guaranteed, so don't delay in making your reservations. Use the hotel reservation link and instructions found on the conference web site.

EXHIBITORS

SIGAda 2007 will include vendor participation, featuring presentations on their products and services. For specific information, please contact the Exhibits Chair, **S. Ron Oliver**, caress Corporation, SRoliver@CSC.CalPoly.Edu

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** mfeldman@gwu.edu or from the conference website. Applications must be sent by e-mail, no later than October 1, 2007. On-Line Registration using information provided with grants must be completed by October 15, 2007.

WORKSHOPS / BOFS

Focused workshops are important in shaping Ada technology to better meet the needs of the Ada community. Workshops are free for those registered for the conference. Workshop descriptions are listed on the SIGAda 2007 Home Page. Additional workshops or Birds-of-a-Feather (BOF) sessions 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, **Bill Thomas**, BThomas@MITRE.Org

CONFERENCE TEAM

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SIGAda



ACM SIGAda Annual International Conference

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

Fairfax, Virginia, USA, November 4-9, 2007

SIGAda 2007 Advance Registration Form

For On-Line Registration, see www.acm.org/sigada/conf/sigada2007/

Name (First, Middle Initial, Last): _____
 (Dr / Mr / Mrs / Ms): _____ Job Title: _____
 Badge Name (as you wish it to appear): _____
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You must provide your membership number, or join ACM and/or SIGAda now, to qualify for Member Rates. ACM occasionally makes its conference attendee lists available to companies and other societies for computer related mailings. Please check one of the following which will apply to the appearance of your name and contact information on those lists: No restrictions ACM or ACM SIG Announcements only ACM and other societies' announcements only. // May we include your Name, Organization Name, and Country in the Post Conference CD-ROM Attendance List?: YES: [] NO: []

Conference & Tutorial Rates: <i>Educators: See Special Educator Grant Information</i>	Member		Non-Member		Full-Time Student	
	On/Before 8 Oct	After 8 Oct	On/Before 8 Oct	After 8 Oct	On/Before 8 Oct	After 8 Oct
Conference All 3 Days	\$525	\$675	\$675	\$825	\$50	\$50
Conference One Day	\$295	\$295	\$295	\$295	\$25	\$25
Tutorial 2 Days	\$605	\$725	\$825	\$925	\$50	\$50
Tutorial 1 Day	\$430	\$530	\$530	\$630	\$25	\$25

At least a one day Conference Registration is required to participate in THU-FRI SAMATE Workshop.
Conf: All Conference Sessions, Exhibits, Tuesday Reception, & Proceedings (Hard Copy & CD-ROM)
Conf - Any 1 Day: Conference Sessions, Exhibits, Tuesday Reception, & Proceedings (HC & CD-ROM)
Tutorials - Two Days: Tutorial Sessions totaling 2 days, Exhibits, & Full Tutorials CD-ROM
Tutorials - One Day: Tutorial Sessions one full-day (or two half-days), Exhibits, & Full Tutorials CD-ROM

Special Requirements (if any): _____

Payment Computation

Conference Fee: \$ _____
 Tutorials Fee: \$ _____
 Membership Dues: \$ _____
Additional Proceedings:
 CD-ROM: ___ copies x \$15 \$ _____
 Hard Copy: ___ copies x \$30 \$ _____
Tuesday Evening Reception:
 ___ Additional tickets x \$30 \$ _____
TOTAL ENCLOSED: \$ _____

Payment Method Used

___ Check Payable to "ACM SIGAda 2007"
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Your signature indicates your agreement to pay the conference fees with the credit card number you specified below.
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Registration Procedure:

Mail form with payment to:
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 C/O Thomas A. Panfil
 Registration Chair
 PO Box 5210
 Laurel, MD 20726-5210
Or fax to: +1-301-498-7313
Reg'n Form: AP

Cancellation Policy:

Registrants who cannot attend and do not send a substitute are entitled to a refund of fees paid (less a \$50 processing charge) if a written request is received on or before **8 October 2007**. Registrants are liable for their full fees after that date.

ACM & SIGAda Membership:

Professional Membership:	
___ SIGAda Professional	\$ 25
___ ACM Professional	\$ 99
___ ACM Prof + Portal	\$198
Student Membership:	
___ Student Portal	\$42
___ Student Print	\$42
___ Student Portal + Print	\$62
___ Student Lite Package	\$19
___ SIGAda Student	\$10
Total Dues	\$ _____
Qualifications & Pledge at: www.acm.org/membership/	

SAMATE Workshop -- Circle

Attend THU Yes No
 Attend FRI Yes No

Tutorial Selections:

Tutorials are listed on the conference web-site. Please enter codes for your selections below:

	Sunday	Monday
Full Day		
or	*or*	*or*
AM		
PM		

Hotel Reservations: A block of rooms has been set aside for SIGAda 2007 attendees at the rate of **US \$159 single / double, \$184 triple; \$209 quad plus tax, per night**. Rooms in this block will be available at this favorable rate **until October 4, 2007** after which room rates and availability in the Conference hotel cannot be guaranteed. Please make reservations directly with the **Hyatt Fair Lakes Hotel, 12777 Fair Lakes Circle, Fairfax, VA 22033 USA: 1.800.492.8804** (Toll-Free Phone from USA/Canada Only) or **+1.703.818.1234** (Direct Toll Phone Worldwide).
 or on-line via instructions posted on the ACM SIGAda 2007 Website: <http://www.acm.org/sigada/conf/sigada2007/>