**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!

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**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
Praxis High-Intensity Systems, Ltd

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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.

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*For more detailed information or to register, visit: [www.sigada.org/conf/sigada2007](http://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

**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

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:00 - 10:30 am</td>
<td>Greetings from SIGAda and Conference Officers</td>
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<tr>
<td>10:30 - 11:00 am</td>
<td>Morning Break - Exhibits Open</td>
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<tr>
<td>10:30 - 12:30 pm</td>
<td>Using Mathematics To Improve Ada Compiled Code, Part 2: The Proof</td>
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<td></td>
<td>W. Douglas Maurer (The George Washington Univ.)</td>
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<tr>
<td>11:00 am - 12:30 pm</td>
<td>Generic Discrete Event Simulations using</td>
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<td>DEGAS: Application to Logic Design and Digital Signal Processing</td>
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<td></td>
<td>Paul Pukite &amp; Luke Ludwig (BAE Systems)</td>
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<tr>
<td>12:30 – 2:00 pm</td>
<td>Mid-day Break and Exhibits</td>
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<tr>
<td>2:00 - 3:30 pm</td>
<td>AADL Modeling and Analysis of Hierarchical Schedulers</td>
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<td></td>
<td>Frank Singhoff &amp; Alain Plantec (University of Brest, France)</td>
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<tr>
<td>2:00 - 3:30 pm</td>
<td>Verified Component-based Software in SPARK: Experimental Results for a Missle Guidance System</td>
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<td>Kung-Kiu Lau &amp; Zheng Wang (University of Manchester, UK)</td>
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<tr>
<td>3:30 – 4:00 pm</td>
<td>Afternoon Break &amp; Exhibits</td>
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<td>J. C. Smart (U.S. Dept. of Defense)</td>
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<tr>
<td>4:00 – 5:30 pm</td>
<td>Parallel Evolution of Game Evaluation Functions in Ada</td>
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<td>Tyler B. Hallmark and Eugene K. Ressler (US Air Force Academy)</td>
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<tr>
<td>4:00 – 5:30 pm</td>
<td>Evening Activities (7:00pm - 10:00pm)</td>
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<td></td>
<td>Conference Reception</td>
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### Wednesday, November 7

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:00 - 10:30 am</td>
<td>Announcements</td>
</tr>
<tr>
<td>10:30 – 11:00 am</td>
<td>Morning Break and Exhibits</td>
</tr>
<tr>
<td>11:00 - 12:30 pm</td>
<td>Timing Neural Networks in C and Ada</td>
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<td></td>
<td>Martin C. Carlisle &amp; Leemon C Baird III (US Air Force Academy)</td>
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<tr>
<td>12:30 - 2:00 pm</td>
<td>Mid-day Break and Exhibits</td>
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<tr>
<td>2:00 - 3:30 pm</td>
<td>Multi-Core + Multi-Tasking = Multi-Opportunity</td>
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<td></td>
<td>Karl A. Nyberg (Grebyn Corporation)</td>
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<tr>
<td>3:30 – 4:00 pm</td>
<td>Afternoon Break</td>
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<tr>
<td>4:00 – 5:30 pm</td>
<td>Assessment of String Tests Strategy for an En-Route Air Traffic Control System</td>
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<td>Jeff O’Leary (US Federal Aviation Administration); Denise S. Beidleman, Fred Woodard &amp; Alok Srivastava (Northrop Grumman)</td>
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<tr>
<td></td>
<td>Towards a Demonstrably Correct Ada Compiler</td>
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<td>Chris Nettleton (XGC Software, London); Wilson Ifill, Colin Marsh (AWE plc, Aldermaston, UK)</td>
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<tr>
<td>5:30 – 10:00 pm</td>
<td>Evening Activities (7:00pm - 10:00pm)</td>
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<td>Hibachi Workshop</td>
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<td>Other Workshops TBA</td>
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<td></td>
<td>Birds-of-a-Feather (BoF) Sessions TBA</td>
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### Thursday, November 8

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

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**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
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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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Northrop Grumman
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SIGAda 2007 Advance Registration Form

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

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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:

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<tr>
<th></th>
<th>Member</th>
<th>Non-Member</th>
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<tr>
<td>Conference All 3 Days</td>
<td>$525</td>
<td>$675</td>
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<tr>
<td>Conference One Day</td>
<td>$295</td>
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<tr>
<td>Tutorial 2 Days</td>
<td>$605</td>
<td>$725</td>
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<tr>
<td>Tutorial 1 Day</td>
<td>$430</td>
<td>$530</td>
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At least a 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: $ ________

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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/