SIGAda

The ACM Special Interest Group on Ada

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April 1, 2008

Dear SIGAda Members:

SIGAda 2007 took place in Fairfax, Virginia November 4-9. **Joe Jarzombek**, the Director for Software Assurance in the Department of Homeland Security (DHS) National Cyber Security Division started off the conference with his keynote address *Wanted: Software with Assurance Build In*. He pointed 75% of hacker attacks are aimed at applications rather than the system or network. "If things had been developed in Ada, we would not have the problems we have today." Software is the core constituent of modern products and services. Since software is the weakest link in our systems, software assurance is critical. Functional correctness of application software must be exhibited even when the software is subjected to abnormal and hostile conditions. Joe went on to give us an overview of the DHS software assurance program including its structure and resources for various engineering disciplines. The Common Weakness and Enumeration (CWE) Compatibility and Effectiveness program launched in February 2007 currently lists 625 root causes of around 26,000 Common Vulnerabilities and Exposures (CVEs). One of DHS's goals is to provide guidance for Software Assurance (SwA) to developers. The idea is to build security into applications. Assurance arguments and claims must use measures and be measurable. Joe provided information on standards, models, and schemes for such measures. Joe ended with a discussion of the role Ada can play in software assurance. His three concluding points were

- "Assurance" is easier to find if one simply seeks applications developed in Ada

- A broader stakeholder community is now receptive to finding "solutions" to assurance

- Perhaps now is a good time to "recast" Ada as a solution aligned with software assurance to address broader needs

Jeff O'Leary, the Software Development and Acquisition Lead for the En Route and Oceanic Air Traffic Control Systems for the Federal Aviation Administration (FAA) opened the second day of the conference with his talk *Federal Aviation Administration and Ada*. After introducing us to Archie League, who used a checkered flag and a red flag to provide the first air traffic control system, Jeff gave us a nice introduction to the FAA domains with emphasis on his

area, the en route domain. Next he described the FAA's experience with Ada along with some lessons learned and other experiences in developing systems with Ada (beginning with Ada83), FAA's use of Ada in the recently developed En Route Automation Modernization (ERAM) (1.3 million Line of Code) http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=7714, system and software challenges facing the FAA and key observations on what capabilities and tools are still needed from vendors/developers to meet support challenges.

The FAA's first system that was developed using Ada was fraught with difficulties, mostly associated with scope and requirements. A key lesson learned was to start out in smaller components especially when the developer is adopting and institutionalizing a new technology and development process such as Ada. Since then, the Display System (DS) was developed using Ada83 and deployed while leveraging the middleware infrastructure from the previous failed effort in order to provide highly available interface management, reliable command and data messaging, and support for multiple custom-instances of the Air Traffic Control (ATC) display management application. In the User Requested Evaluation Tool (URET), the middleware was ported to Ada95 on a new operating system and network, as well as extended to support distributed data management applications.

There are a number of important quality-attributes that the FAA's ATC systems must incorporate; and Ada provides most of the features that are important to their ability to develop, operate, and sustain these software systems. Jeff concluded the keynote speech with a discussion regarding compiler and tool capabilities that are important in order to improve software development and how Ada offers support for the qualities as the FAA begins to define and embark on the ambitious Next Generation Air Transportation System (NextGen) envisioned for the year 2015 and beyond including the long term goals for commercial space applications.

Rod Chapman, Principal Engineer with Praxis High Integrity Systems Ltd., opened the last day of the conference with his keynote *Correctness by Construction: Putting Engineering (back) into Software*. He began by reminding us how important a role software plays in our lives. Size, complexity, and perhaps most importantly, criticality in our software are increasing rapidly. Add to the legal regulation, pressure to reduce costs, and need to generate safety and security cases for evaluation and we have a problem. He then went on to describe Correctness by Construction whose main goal is "don't introduce defects in the first place". Of course a big catch with software verification (SV) is the ambiguity of commonly used programming languages. Most SV tools are constrained by the poor definition of the underlying languages. Rod discussed the evolution of the two main families of imperative programming languages. The main goals seemed to have been increased expressive power, backward compatibility, and dynamic features.   Verifiability received little attention in this evolution (with the notable exceptions of Eiffel and SPARK). The best bit of SPARK95 is Ada 95! The best bit of Ada 95 is Ada 83. It is the really basic stuff in Ada 83 that makes SPARK possible. So with the need for correctness, why isn't SPARK the dominant programming language? Mere technical strength is not enough to get beyond early adopters. Packaging and presentation are really important. But success is not the same a dominance. Customers are coming back to SPARK and/or Ada after bad experiences. SPARK is growing in its niche and the niche itself appears to be growing.

I won't dwell on the papers presented at the conference as they were published in the Conference Proceedings—the December 2007 issue of Ada Letters. I will comment on the high quality of the presentations. The papers are also on the post conference CD sent to all SIGAda

members. In addition to the papers, the CD includes all of the speakers' slides and other conference materials.

SIGAda presented three Outstanding Ada Community Contribution Award at the 2007 conference. **Karl Nyberg**, **Jean-Pierre Rosen** and **The GNAT Team** were the recipients.   This issue of Ada Letters contains citations for these awards

It is not too early to start thinking about your nominations for the 2008 ACM SIGAda Distinguished Service and Outstanding Ada Community Contribution awards. Nomination forms are available at http://www.sigada.org/exec/awards/awards.html.

A conference such as SIGAda 2007 is a considerable undertaking for volunteers. As Chair of previous SIGAda conferences I am in a position to appreciate the efforts of those who helped organize it. I would like to thank the folks who volunteered and spent many hours of their time to ensure the success of the conference. Conference Chair **Alok Srivastava** did a fantastic job overseeing the entire conference process. We all enjoyed the Asian Indian cultural dances and instrumental performances that Alok organized for the Tuesday evening reception. Program Chair **Leemon Baird** was responsible for soliciting, choosing, and scheduling the presentations. **Martin Carlisle**, Conference Treasurer, made sure that we stayed within our budget. Publicity Chair **Michael Feldman** made sure that we were all informed of all the conference offerings. **David Cook** organized the ever popular tutorials and **Bill Thomas** put together a large set of Birds of a Feather Workshops and worked with **Paul Black** in the organization of the post conference workshop NIST Static Analysis Summit II. Webmaster and Proceedings Chair **Clyde Roby** put in many hours on the web site and was diligent at the conference in obtaining the necessary permissions from authors to publish their papers in the proceedings. **Thomas Panfil** kept the registration system working and made sure that everyone was well instructed on how to assemble their name tags and ribbons. Tom's and Alok's jobs were made easier by the efforts of our Local Arrangements Co-Chairs, **Kristen Ferretti** and **Ron Price**.

We are always indebted to our corporate sponsors, without which, we would be unable to conduct a financially successful conference. As Exhibits Chair, Ron Oliver did an excellent job soliciting and organizing our sponsors. I thank **Lockheed Martin, AdaCore, OC Systems, Praxis High Integrity Systems, Northrop Grumman, Telelogic, Genco Systems, Ellidiss Software, Artisan Software, Lattix, DDC-I, Sci Toolworks, Aonix and Integrated Computer Solutions Inc** for their support.

Next year we will meet in Portland, OR, October 26 – 30. In March I visited Portland for the first time to attend the ACM SIGCSE conference. I was very impressed by "the City of Roses" and look forward to returning in October. As usual, SIGAda 2008 is organized by volunteers. We always welcome additional help. If you would like to help out with the planning of SIGAda 2008, please contact our Program Chair **Michael Feldman** at mfeldman@gwu.edu He looks forward to hearing from you.

Now is the time to think about submitting a technical paper, extended abstract, experience report, workshop, panel session, or tutorial proposal for SIGAda 2008. You can find the call for participation at the conference website http://www.acm.org/sigada/conf/sigada2008

Since 1994 SIGAda has conducted an **Ada Awareness Initiative** whose centerpiece has been our professional booth display unit in exhibition halls at various major U.S. software

conferences, both inside and outside the DoD arena. Via this exhibiting, SIGAda sustains Ada visibility (name recognition), provides various Ada-awareness materials such as dozens of Ada Success Stories and Ada-related CD-ROMs, and makes available Ada experts (our booth staff volunteers) who can intelligently answer questions, provide pointers and help, and debunk the misinformation about Ada that many attendees at these shows have. Funding for taking the booth to these shows comes from the Ada Resources Association (ARA) and the SIGAda treasury.

The current set of posters we have to display at the booth is very outdated. We are looking for ideas and materials for new posters. We need exciting images of systems where Ada plays a role. If you have some ideas, please contact me <mccormick@cs.uni.edu>. Enlargement to poster size requires an original photograph with enough resolution that we can print a 24" by 30" poster at 300 dots per inch.

If you are a regular reader of the inside front cover of Ada Letters you may have noticed a new name. Chris Sparks served as SIGAda's Vice-Chair for Liaison since 2005. As a result of some changes in his personal life, Chris tendered his resignation late last year. As specified in Article 6 of our bylaws, the Chairman of the ACM SIG Governing Board, may on nomination of the SIGAda Chair, fill an officer vacancy. My nomination of William Glascoe was approved just before the SIGAda 2007 conference. William became involved with SIGAda through volunteering to staff the SIGAda booth. He is currently on a mission in Bagdad, Iraq. I look forward to working with William through 2009 when a new set of SIGAda officers will be nominated and elected. If you are interested in serving as a SIGAda officer, contact Currie Colket <colket@colket.org> who, as past SIGAda Chair, is in charge of nominations.

Ada Inside

After several years of inactivity with the **Ada Project List**, Mike Feldman has begun to maintain it actively again. He has put a revised version online at

http://www.seas.gwu.edu/~mfeldman/ada-project-summary.html

He changed the "look" a bit, added a few listings, changed the order of the project groupings, and removed all the dead links (without removing the associated listings). There aren't too many links now, but he thinks they are all valid.

Now he needs your help. Please look at this long and interesting list, and let him know if you have anything to add to it (or delete if necessary). If you can provide a valid link for a project that doesn't have one, that would be great.

This list will best serve the community if its listings refer to actual applications of Ada that are either fielded or under active implementation. "Who is actually using Ada in industry?".

If you are close enough to a project to know there's "Ada inside", please let Mike hear from you. In the past, some listings have come from "anonymous sources"; you can be assured of our discretion; Mike always respects the confidentiality of his informants.

You can contact Mike at mfeldman@gwu.edu

Thanks very much in advance for your help and interest!

John W. McCormick
Chair, ACM SIGAda