

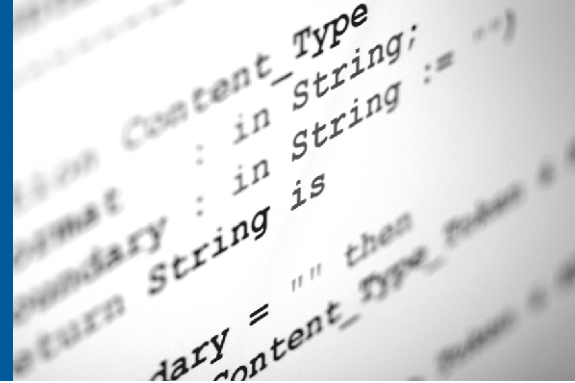
# GNAT Pro

an AdaCore Publication

April 2006

www.adacore.com

# insider



## newsflash

### ► GNAT Pro selected by Hamilton Sundstrand

Hamilton Sundstrand has chosen GNAT Pro for their Air Conditioning Pack airborne software configuration, which regulates cabin air temperature on the Boeing 787 aircraft. As part of the contract, AdaCore will target GNAT Pro to the 787 Pack Control Unit's designated Freescale MPC5554 processor.

### ► GNAT Pro selected by Eurocopter

Eurocopter has chosen GNAT Pro for x86 GNU/Linux to develop a training simulator for the NH90 Helicopter. The use of GNAT Pro continues an established relationship between AdaCore and Eurocopter and the use of Ada in mission-critical avionics projects.

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## GNAT Pro for Wind River's VxWorks 6: New Platform, More Choices

A recent addition to the GNAT Pro family of embedded platforms – GNAT Pro for VxWorks 6 – adds more development options, operating system architectures, language choices, and targets for customers producing real-time, embedded, and high-integrity applications.

GNAT Pro for VxWorks 6 offers a choice of two “personalities” for our GNAT Programming Studio (GPS) integrated development environment. One is our standard GPS product as on other GNAT Pro platforms, and the other is GNATbench, an integration of GPS into Workbench with an Eclipse “look and feel”.

VxWorks 6 now offers a choice of target operating system architectures. The traditional kernel-mode model offers direct access to the hardware, direct interaction with the kernel, and potentially better responsiveness. The Real-Time Process (RTP) model, recently introduced by Wind River, distinguishes between user-mode and protected-mode execution. GNAT Pro for

VxWorks 6 supports both the kernel-mode and RTP models via two different run-time libraries.

For both RTP and kernel mode, developers have the choice of Ada 95 or Ada 2005. AdaCore has completed implementation of the most important features in Ada 2005, and GNAT pro customers can thus exploit features such as Java-like interfaces, a more powerful and expressive “pointer” mechanism, and a general Containers library.

The final choice available is the target itself. In addition to PowerPC targets with VxWorks 6, GNAT Pro also supports the VxSim simulator running on a PC. Thus the application, running in either kernel mode or RTP mode, can be tested on the simulator; scarce hardware resources need not present development bottlenecks.

These choices represent unparalleled capabilities and flexibility in building robust real-time Ada applications, backed by AdaCore's expert support service.

## Product Update: New Features in PolyORB

The latest version of PolyORB, AdaCore's generic middleware technology providing interoperability for distributed systems, brings increased versatility, performance and reliability. PolyORB 2.0 supports new scheduling policies – the Thread Pool, Leader/Followers, and Half-Sync/Half-Async patterns – and thus meets new application requirements corresponding to different patterns of server workload.

Performance has been improved, based on a profiling analysis of the distribution run-time libraries. And a formal model of the internal PolyORB components has been built and verified, providing increased confidence in the code.

PolyORB currently supports multiple application interfaces, including CORBA and the Ada 95 Distributed Systems Annex, and a variety of communication protocols.

# GNAT Pro Available on OpenVMS for HP Integrity Servers

AdaCore has released GNAT Pro 5.04 for OpenVMS on HP's Integrity servers (I64 platform). Marking the culmination of a multi-year contract from HP, this product complements our other offerings on HP's I64 platform – we released GNAT Pro for HP-UX11i and HP Linux last year – and on HP AlphaServer systems.

GNAT Pro for OpenVMS I64 is a full implementation of Ada, including the most important new features of Ada 2005,

integrated into the OpenVMS environment and providing an OpenVMS “look and feel”. Designed to ease transitioning from HP Ada (previously known as DEC Ada), GNAT Pro implements the HP Ada pragmas, attributes, and data representations, and it includes a binding to the HP Ada predefined library.

In order to enhance the integration of GNAT Pro into OpenVMS I64, debugging support is being implemented in HP's Debug tool. This work is being performed by HP and is

being phased into the OpenVMS kits during 2006.

GNAT Pro for OpenVMS I64 is an up-to-date Ada solution that fully exploits the 64-bit address space of the Itanium architecture and that provides a natural migration path from other platforms. It is already being used by customers for applications such as database management that require reliability and performance from both their operating system and their programming language.

## AJAX in Ada Web Server

**AdaCore's Ada Web Server (AWS) now supports AJAX (Asynchronous Javascript and XML), a popular industry standard that provides a rich graphical user interface through a standard Web browser. AJAX is supported through a simple XML framework comprising ready-to-use templates. The Web interface can be controlled through XML actions, avoiding the overhead of full Web page reloading.**

## Webinar with ARTiSAN

AdaCore will be holding a web seminar on May 24, in conjunction with our UML tools partner, ARTiSAN Software. This presentation will discuss the Ada 2005 language enhancements, AdaCore's GNAT Pro product line, and ARTiSAN Software's Real-time Studio. For more information, please visit [www.adacore.com/category/press-center/events](http://www.adacore.com/category/press-center/events)

## In the Product Pipeline: Stack Usage Analysis Tool

AdaCore is working on a tool that statically predicts the maximum stack space required by each task in an application. The computed bounds can be used to ensure that sufficient space is reserved, thus guaranteeing safe execution with respect to stack usage. The tool uses a conservative analysis to deal with complexities such as subprogram recursion, while avoiding unnecessarily pessimistic estimates.



A stack usage analysis tool is of benefit in general, but it is especially well suited to safety- or security-critical systems. Although it is possible to address this issue by detecting such errors at run time, this would add overhead. Further, when the error is detected there is little recourse but to terminate the task suffering the overflow. Such unexpected task termination is unacceptable in programs where safety or security are needed. Our stack usage analysis work includes compiler extensions that output per-function stack usage data and per-unit call-graph information. These compiler extensions are already available in GNAT Pro 5.04 on some platforms, through the `-fstack-usage` and `-fcallgraph-info` GCC command line options.

We are also working on tools that exploit the compiler-generated information related to stack usage, and that offer convenient ways of performing application-level static analysis.

# GNAT Programming Studio (GPS)

## Remote programming becomes a reality

The next major release of GPS will introduce, among many other new features, a completely integrated remote programming facility. The idea is to use the power and graphical capabilities of modern personal computers to perform the traditional GPS functions (code browsing, editing, graphical debugging, etc), while all compilation, execution, and debugger operations are carried out remotely on one or several servers.

Remote programming will allow you to define any number of Unix or Windows servers, accessed through commonly available tools such as rsh, ssh, rsync or telnet. The remote project is synchronized locally or accessed locally through the network file system, for easy and efficient browsing. The path translations between host and target will be handled by GPS, and remote operations will be performed transparently, with GPS automatically handling the connection to the target server. Several different servers can even be defined, for example to separately launch builds, execution and debugging. This facility will be available with the GPS 4.0 release, scheduled for Q2 2006.

## Use the latest version of GPS with earlier versions of GNAT Pro

Customers often ask us whether newer versions of GPS are compatible with earlier versions of GNAT Pro. The answer is a definite yes! For example, GPS 3.1 is compatible with all versions of GNAT Pro from 3.15 through 5.04.

## GPS usage is expanding

The use of GPS continues to grow, with a number of large projects selecting the GNAT Programming Studio as their Integrated Development Environment of choice. As one example, Boeing has adopted GPS for software development on the 787 Dreamliner. Several of our partners have also integrated GPS with their tools.



## Interview with Zépur Blot Business Manager, AdaCore Europe

**GNAT Pro Insider:** Tell us a bit about your background, how you came to be involved with Ada and AdaCore, and what your current role is.

**Zépur Blot:** My experience in the computer industry goes back to the early 1980s when I was with Apple in a product marketing role. When the opportunity arose to join AdaCore (then known as ACT-Europe) in the mid 1990s and help set up their Paris office, I couldn't resist. There's tremendous excitement and energy in getting a start-up company off the ground, and after meeting the people behind the company, both in New York and Paris, I foresaw a promising future. My original role was to establish the

sales department and administrative organization. Although I do not come from a technical background, my exposure to computer languages in some BASIC and COBOL courses helped make me familiar with the company's mission.

I am currently the Business Manager of AdaCore's Europe office. We cover clients based in Europe, India and the Mid-East. My job spans the spectrum of sales-related activities and includes initial customer contact, client visits, account management, and, importantly, keeping in touch with customers to make sure that they are making best use of our services and that we are meeting their needs.

**GNAT Pro Insider:** AdaCore has been establishing partnerships with a variety of companies whose products complement GNAT Pro. Can you describe some of these relationships and how they help AdaCore's customers?

**Zépur Blot:** Our strategic alliances and tool partnerships play a key role in our business. Our partners offer products that bring extra value to GNAT Pro in many areas, including multi-language development, GUI building, real-time software modeling, testing, distributed systems, model-driven development, and safety certification. In the other direction, GNAT Pro brings an excellent off-the-shelf Ada solution to hardware and RTOS providers. The extensibility and freely-licensed open-source nature of our technology is especially useful; for example, tool partner Praxis High Integrity Systems has configured the GNAT Programming Studio IDE to provide menu entries for the SPARK tools.

**GNAT Pro Insider:** As someone who has been dealing directly with customers for nearly ten years, what sorts of changes or trends have you observed in terms of application domains, product requirements, or other factors? How has AdaCore responded?

**Zépur Blot:** The dilemma that we have always faced in the software business is that hardware has continued to get more powerful – increased speed, greater memory capacity, higher communication bandwidth – spurring demand for systems that can exploit these advances, with the burden falling on the software to make everything work. This is made even more difficult by the growing need for safety (as software is moving more and more into domains where failure can cause injury or loss of life) and security (especially for networked systems). We are thus seeing more customers who need to produce software for large systems with safety and/or security requirements. Fortunately we have a solution, since the Ada language is ideal for these sorts of demanding applications, especially with some of the new features added in Ada 2005, and AdaCore has products that are being used to develop safety-critical systems (DO 178B, Level A). Security presents additional issues, and we will be focusing on that domain in coming products.

**GNAT Pro Insider:** AdaCore's US. office celebrated its 10th anniversary in 2004, and the European office will be doing likewise this summer. Such longevity and continued growth as an independent company are unusual in the software industry. To what do you attribute AdaCore's success?

**Zépur Blot:** There's no "magic bullet", it's a combination of many factors: good people, prudent management, hard work, a technology that lets us adapt quickly to changing requirements, user-friendly product licensing, and, most importantly, a commitment to customer service. In short, a corporate culture where the emphasis is on excellence and openness in all that we do. Earlier I talked about the energy and excitement associated with working for a start-up; I see those same qualities today at AdaCore, even after ten years.

### Learn Ada and GNAT Pro from AdaCore

If your organization is using GNAT Pro and you are interested in training on the Ada language or the GNAT Pro tool set, including GPS, please contact [sales@adacore.com](mailto:sales@adacore.com) or visit our website [www.adacore.com/home/gnatpro/add-on\\_services/training](http://www.adacore.com/home/gnatpro/add-on_services/training) for a summary of our offerings.

We can conduct courses at customer site, and we also offer training at our New York City office.

# Verocel Completes Safety Certification Package for GNAT Pro Libraries

Verocel, an AdaCore tools partner, has recently completed the certification material for the run-time libraries from the GNAT Pro High-Integrity Edition for VxWorks 653, demonstrating compliance with the requirements for DO-178B, Level A.

This product is being used by Smiths Aerospace across multiple aerospace programs including the Mission Control System on the Boeing KC-767 Tanker.

Verocel was an obvious candidate to develop the certification package. They have considerable experience with Ada safety certification, and they developed the certification evidence for VxWorks 653. Moreover, having a third party produce the certification material helps meet the DO-178B Level A requirement for independence between the software developers and the ones conducting the verification work.

## AdaCore at Upcoming Conferences

### ► SSTC 2006 (Systems and Software Technology Conference)

May 1–4, 2006 / Salt Lake City, Utah (US)

[www.sstc-online.org](http://www.sstc-online.org)

AdaCore is exhibiting at this event (Booth 520 & 522). **Ben Brosgol** is presenting a paper, *Object-Oriented Technology and Safety Certification: A Language Comparison*

### ► Wind River 2006 Worldwide User Conference

May 15–18, 2006 / Orlando, Florida (US)

[www.windriverevents.com/userconference06](http://www.windriverevents.com/userconference06)

**Pat Rogers** is presenting a paper, *GNAT Pro Integration in VxWorks 6 and Workbench*

### ► DASIA 2006 (Data Systems in AeroSpace)

May 22–25, 2006 / Berlin, Germany

[perso.wanadoo.fr/eurospace/dasia.html](http://perso.wanadoo.fr/eurospace/dasia.html)

AdaCore is a corporate sponsor of this event, and several papers are being presented by AdaCore speakers:

**Franco Gasperoni**: *Safety, Security and OOP: Inheritance, Dynamic Binding and Testing*

**José Ruiz**: *Ada 2005 for Mission-Critical Systems*

**Romain Berrendonner and José Ruiz** (with M. Rytter Nielsen from ESA France, J. Zamorano from Universidad Politécnica de Madrid, and T. Vardanega from University of Padua):

*ERB: for Embedded, Ravenscar is Beautiful*

### ► Ada-Europe 2006

June 5–9, 2006 / Porto, Portugal

[www.hurray.isep.ipp.pt/ae2006](http://www.hurray.isep.ipp.pt/ae2006)

AdaCore is a corporate sponsor of this event, and several papers are being presented:

**Ben Brosgol**: *A Comparison of Ada and Real-Time Java for Safety-Critical Applications*

**Javier Miranda and Edmond Schonberg**: *Abstract Interface Types in GNAT: Conversions, Discriminants, and C++*

### ► GCC and GNU Toolchain Developers' Summit

June 28–30, 2006 / Ottawa, Canada

[www.gccsummit.org/2006](http://www.gccsummit.org/2006)

AdaCore is a corporate sponsor of this event. The paper, *Multi-Language Programming: The Challenge and Promise of Class-level Interfacing* is being presented by AdaCore authors **Cyrille Comar, Matthew Gingell, Olivier Hainque, and Javier Miranda**.

## newsflash

### ► GNAT Pro selected by EADS CASA

EADS CASA has chosen the GNAT Pro High-Integrity Edition for the Wind River VxWorks Cert operating system, for use on the MIC – MIDS Interface Computer project. EADS CASA has previously used the GNAT Pro High-Integrity Edition for the in-flight Air Refueling Boom System on the A330 Multi Role Tanker Transport. An AdaCore case study highlighting this project will be available later this year.

### ► New Website Section for Software Developers

Please visit the Developer Center, a new area on our site dedicated to keeping programmers informed about the ongoing enhancements to the GNAT technology. You can follow AdaCore's Development Log to learn about the latest features and advances in our tools, or search the reference library to find documentation, code examples and technical papers on Ada and GNAT Pro.

[www.adacore.com/category/developers-center](http://www.adacore.com/category/developers-center)

### ► GNATbench for Eclipse

In addition to the GNATbench integration into Wind River's Workbench IDE, AdaCore is developing a configuration of GNATbench for Eclipse. This configuration has all the editing and browsing features of the Workbench version. The difference is the intended execution target: the builder produces executables for native systems, rather than embedded processors, and likewise the debugger supports native system debugging.

The GNAT Pro insider is published twice a year simultaneously in New York and Paris by AdaCore  
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