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## AdaCore Update

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### Vendor Presentation

**SIGAda 2005 Conference**  
**Atlanta, GA**

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## Outline

- AdaCore news
- Products: GNAT Pro, GPS, tools
- New Platforms
- Language development: **Ada 2005**
- Safe programming: environment and tools
- **GAP**: The GNAT Academic Program

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## Who we are, what we do


- **AdaCore = Ada Core Technologies + ACT Europe**
  - Separate legal entities but single organization
  - Founded in 1994 (US) and 1996 (Europe)
    - Robert Dewar, Edmond Schonberg, Richard Kenner in US
    - Cyrille Comar, Franco Gasperoni in Europe
  - Staff comprises around 52 people worldwide, 45 technical
    - *Extreme Ada*, compiler and software engineering expertise
- **Flagship product is *GNAT Pro***
  - GUI-based Integrated Development Environment
  - Full Ada (core language + all annexes)
  - Toolchain / libraries / bindings
  - On-line consulting / support
  - Documentation
  - Add-ons
  - On-site training in Ada and/or tools

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## GNAT Pro basic components

- **Integrated Development Environment**
  - GPS (GNAT Programming Studio)
- **Compilation tools**
  - gcc
  - gnatbind
  - gnatlink
  - Gnatmake
  - **Next release: version 5.04, Q1 2006**
- **Project facility**
  - Management of settings used for program builds
- **Debugger**



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## GPS IDE

- **Functionality**
  - Context-sensitive, language-aware, configurable editor
  - GNAT Pro Ada compilation system
  - Visual debugger
  - Source browsing / navigation facility
  - Interface to source configuration management tools
  - Control over project settings
  - Pretty printing / reformatting
  - Control over window topography
- **Attributes**
  - Intuitive, easy to use
  - On-line help includes access to source files for predefined libraries (in GPS 2.1)
  - Configurability, extensibility through scripting
  - **Eclipse plug-in under development**

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## Project facility

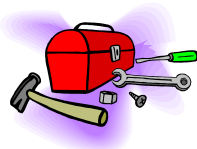
- **Introduction**
  - A *project* is a configurable set of properties for a collection of source files
  - Developer can specify
    - Directories for source files, objects, executables
    - Source file naming conventions (per-unit or global)
    - Switch settings
  - Access to command-line switches, environment variables
  - Hierarchical organization
    - Project may inherit / override source files from parent project
  - Project may import other projects containing required source files
- **Some uses**
  - Common set of sources generates object files in different directories, via different switches
  - Multiple versions of the body for a package spec
  - **New version to support multi-language builds**

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## GNAT Pro tools (1)

- **Monitoring**
  - `gnatmem` (heap monitor)
  - `GNAT.Debug_Pools` (diagnose heap problems)
  - `gprof` (profiler)
  - **Stack checking tool** (under development)
- **Reducing code space**
  - `gnatelim` (minimize executables)
- **Testing**
  - `gcov` (test coverage)
  - `aunit` (test harness)
- **Browsing**
  - `gnatxref` (cross-referencer)
  - `gnatfind` (definition / use finder)
  - `gnatls` (library browser)
- **Many of the above are ASIS-based**

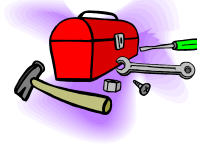


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## GNAT Pro tools (2)

- **Documentation**
  - `gnathtml` (HTML generator)
- **Utilities**
  - `gnatchop` (file splitter)
  - `gnatkr` (file name "kruncher")
  - `gnatprep` (preprocessor)
  - `gnatstub` (body generator)
  - `gnatpp` (pretty printer)
  - `gnatclean` (delete intermediate files)
  - `gnatmetric` (metrics tool, coming in GNAT Pro 5.03a)
- **Distributed systems**
  - GLADE
  - PolyOrb



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## GNAT Pro platforms

- **Native**
  - Alpha OpenVMS
  - Alpha Tru64
  - Mac OS X
  - MIPS IRIX
  - PA-RISC HP-UX
  - PowerPC AIX
  - SGI Altix
  - SPARC Solaris
  - x86/Pentium GNU Linux
  - x86 Windows
  - x86 Trusted Solaris
- **High-Integrity Edition**
  - DO-178B VxWorks/Cert
    - PowerPC (Solaris hosted)
    - PowerPC (x86 Windows)
  - VxWorks AE653
    - PowerPC (Solaris hosted)
    - PowerPC (x86 Windows)
- **Cross / Tornado**
  - SPARC Solaris ⇔ 68K
  - x86 Windows ⇔ 68K
  - SPARC Solaris ⇔ PowerPC
  - x86 Windows ⇔ PowerPC
  - x86 Windows ⇔ StrongARM/XScale
  - SPARC Solaris ⇔ UltraSPARC
- **LynxOS**
  - Native x86
  - SPARC Solaris ⇔ PowerPC
- **Ports in progress**
  - HP-Linux Itanium
  - IVMS
  - SPARC Solaris ⇔ x86 VxWorks
  - Vxworks 6


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## GNAT 2005

- **Implementation of the new standard continues.**
- **Programming in the large**
  - Limited\_With clauses
  - Private\_With clauses
- **Object-Oriented features**
  - Interfaces
  - Object notation
  - Task, protected, synchronized, limited interfaces
- **Containers**
- **Generalized anonymous access types**
- **New real-time features (flexible scheduling policies, time budgets) to be provided by MarteOS (Madrid/Santander collaboration)**

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 **GNAT Pro High-Integrity Edition (1)**

- **Enforcement of selected profile**
  - High-Integrity profiles
    - Zero Footprint
    - Cert
    - Ravenscar
  - Full-Runtime
- **Allowance of user-specified profile**
  - Run-time libraries selected *à la carte*, based on features actually used in the program
- **Platform / application**
  - Wind River Platform for Safety Critical ARINC 653
  - Boeing 7E7 Dreamliner Common Core System (Smiths Aerospace)
- **Status**
  - **Certification materials (DO-178B, Level A) for Ada libraries are being completed** (collaboration with Verocel and Wind River, for Smiths Industries)

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 **GNAT Pro High-Integrity Edition (2)**

- **Product highlights**
  - Binding to ARINC 653 Application Executive (APEX)
  - Support for AE653 partition types
- **Compiler features relevant to High-Integrity development**
  - Generation of human-readable low-level intermediate representation (-gnatD, -gnatG)
  - Generation of human-readable data layout information (-gnatR)
  - Generation of assembly language listing
  - Restrictions identifiers for implicit loops or conditionals
  - Restrictions identifier for form of explicit conditionals
  - Style checks (-gnaty)

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## User interface to AdaCore: **GNAT Tracker**


- **Secure web-based customer interface**
- **Download of GNAT Pro tool suite and components**
- **Online version of GNAT Pro documentation**
- **Submit toolset support or online consulting requests**
- **Download of GNAT Pro releases**
- **Access to up-to-date versions of known-issues and features**
- **Browse/search all request exchanges for your account**

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## Additional services

- **GNAT consulting**
- **On-site courses**
  - Introduction to GNAT Pro and GPS
  - Introduction to GNAT Pro and GPS for AE653
  - Ada Programming with GNAT Pro: Fundamentals
  - Ada Programming with GNAT Pro: Advanced Topics
  - Ada Programming with GNAT Pro: Beyond Ada 83
- **Professional services**
  - GNAT Pro ports
  - Special-purpose run-time libraries
  - Tool customization and enhancements
  - Assistance with in-house specialized GCC and GNAT ports



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## The GNAT Academic Program

- **GAP is an AdaCore initiative to foster the use of Ada in academia**
  - AdaCore serves as clearinghouse of resources for universities that use Ada for teaching and research
- **GNAT software freely available to faculty and students**
  - GNAT binaries for XP, Linux, Solaris
  - GPS
  - On-line GNAT and Ada technical support
- **Clearinghouse for Ada information**
  - Teaching materials
  - Textbooks in electronic form
  - Software (GNAT et al, **MarteOS**)
- **A catalyst for Ada activities**
  - Over 100 members today