To develop a qualified space platform that can be used for general demonstration applications, UPM has selected the GNAT cross-development environment for the UPMSat-2 project. The GNAT cross-development environment was selected for the UPMSat-2 microsatellite project’s real-time on-board and ground control software. The GNAT cross-development environment offers a robust and secure platform for developing high-integrity systems, with a focus on safety-critical applications.

The GNAT cross-development environment provides a comprehensive toolset for developing and verifying safety-critical systems. This toolset includes a comprehensive set of tools for Ada development, including a high-level language processor, a static analyzer, and a compiler. The toolset also includes a comprehensive set of tools for verifying safety-critical systems, including a model checker, a formal verification tool, and a runtime checker.

UPM is collaborating with AdaCore to develop the GNAT cross-development environment for the UPMSat-2 project. The collaboration includes the development of a custom version of the GNAT cross-development environment, tailored to meet the specific needs of the UPMSat-2 project. This custom version includes a number of enhancements, including a custom compiler, a custom static analyzer, and a custom model checker.

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Cybersecurity requires a multifaceted defense. For software developers the programming language technology plays a critical role, and Ada and SPARK stand out with a proven track record of preventing vulnerabilities or detecting them early. This issue of Inside AdaCore highlights some of the recent cybersecurity-related news from AdaCore, including a webinar on NVIDIA’s selection of SPARK for some of its firmware products, and an announcement of AdaCore’s participation in the UK HCLASS project focused on redefining the digital future of embedded software ecosystems.

Webinar on NVIDIA Use of SPARK for Secure Firmware

A webinar titled "Securing the Future of Safety and Security of Embedded Software" delivered by Daniel Rohrer and Dhawal Kumar from NVIDIA on October 3, and in Boston on November 12–13, with insightful presentations from the company's technical staff and guest speakers. Attendees were able to view the webinar, which covered topics such as "RecordFlux, a secure SPARK-based message-parsing framework from Componolit." The webinar also highlighted several specific improvements in the v20 release that are detailed below; full documentation is available at tinyurl.com/techdays2019videos/.

Introduction

In the first part of the webinar ("Adoption Journey"), Mr. Rohrer explained the nature of firmware ecosystems, gave an overview of SPARK, discussed alternative development approaches, and presented SPARK-related capabilities for the High-Integrity, Complex, Large-Scale Systems (HICLASS) project in the UK. This project, sponsored by the Department of Trade and Industry, presented a four-year collaborative work package including a cybersecurity-focused research challenge. Mr. Kumar explained the nature of firmware ecosystems, gave an overview of SPARK, discussed alternative development approaches, and presented SPARK-related capabilities for the HICLASS project in the UK.

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Webinar on NVIDIA Use of SPARK for Secure Firmware

A webinar featuring the future of security and technology, with NVIDIA’s Andrew Yam, Agenda Manager, and AdaCore’s Michelle Ricardo, Account Manager, was held on October 29, 2019. During the webinar, NVIDIA shared some of the innovative features of its new SPARK Pro products, including support for Ada and SPARK, as well as integrated tools for AdaCore’s SPARK Pro. The webinar also included an overview of AdaCore’s SPARK Pro environment, which is designed to meet the needs of organizations that require a high level of security and reliability in their software development and maintenance processes. For more information, please visit www.adacore.com/nvidia-webinar/.

AdaCore UK Participating in HICLASS Program

AdaCore has announced that it will be a UK partner in the newly launched HICLASS (High Integrity Cybersecurity in Critical Applications) project. This project is a four-year collaborative work package that includes a cybersecurity-focused Software and Electronic Systems (HICLASS) project in the UK. This project focuses on the development of secure and reliable software systems, particularly those in which certification or a reduced footprint is needed. AdaCore will contribute its expertise in formal methods-based language and development model for NVIDIA’s Embedded Software”), Mr. Kumar explained the nature of firmware capability, researching and implementing compile-time cyberattack detection and prevention algorithms.

SPARK Pro 2019 Development Environment Enhancements

AdaCore’s SPARK Pro development environment has been updated with several new features and improvements. These enhancements include support for AdaCore’s QGen 20.1 Qualifiable Model-Based Engineering (MBE) tool, which can be used to model and verify complex Ada-based systems. The SPARK Pro environment has also been qualified at Tool Confidence Level 4 (TCL-4) and with the Radio Technical Commission for Aeronautics (RTCA) DO-178C and DO-278A standards.

GNAT Pro 2020.1: Enhanced GNAT Targeted to LLVM

AdaCore’s GNAT Pro development environment has been updated with support for the GNU Compiler Collection (GCC) and the LLVM compiler infrastructure. This allows developers to build and run their Ada programs on a wider range of platforms, including Windows and Linux. The SPARK Pro environment also includes support for AdaCore’s QGen 20.1 Qualifiable MBE tool, which can be used to model and verify complex Ada-based systems.

V20 Product Release

AdaCore's V20 release is now available to production users of the product during the first quarter of 2020. This release includes several new features and improvements, such as support for AdaCore’s QGen 20.1 Qualifiable MBE tool, which can be used to model and verify complex Ada-based systems. The SPARK Pro environment also includes support for AdaCore’s QGen 20.1 Qualifiable MBE tool, which can be used to model and verify complex Ada-based systems.

Adacore in Space

Ada and AdaCore have a long and successful track record in the Space and Defense industry. The company has been selected by various customers, including the European Space Agency (ESA), to provide software development and verification services for space missions. AdaCore has also been selected by the European Space Agency (ESA) to provide software development and verification services for space missions.
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This issue of Inside AdaCore highlights some of the recent cybersecurity-related news from AdaCore, including a webinar on NVIDIA’s selection of SPARK for some of their firmware products, and an announcement of AdaCore’s participation in the UK HCLASS cybersecurity project and RecordFlux, a new SPARK-based message-passing framework from Componentoo.

Webinar on NVIDIA Use of SPARK for Secure Firmware
A webinar, “Firmware Development - The NVIDIA Story,” was hosted on March 26, 2020, as part of AdaCore’s Tech Days event. 

For information on AdaCore’s plans for Tech Days 2020, please visit docs.adacore.com/R/relnotes/features-spark-2021-

V2O Product Release
AdaCore released an annual update of its products during the 3rd quarter of each year. This year’s release, V2O, has a number of major updates.

• OSSTM Pro technology: Docs.adacore.com/technology/osst/31-
• SPARK Studio and GNAT Studio: Docs.adacore.com/technology/sparkstudio/31-
• CodeSonic: Docs.adacore.com/technology/codesonic/31-
• Coq: Docs.adacore.com/technology/coq/31-
• GNAT coverage: Preliminary support for source instrumentation (see separate newsflash in this issue)

Use of SPARK for Secure Firmware and AdaCore’s participation in the UK HCLASS project.

AdoCore published the GNAT LLVM sources on GitHub in September 2019, for hobbyists and researchers to experiment with and report back their comments. As part of the company’s ongoing research in compiler technology, AdaCore has developed a GNAT Ada compiler that interfaces with the LLVM back end to produce native executable code. AdaCore is also developing AdaCore’s SPARK Compiler Engine (ACE) to make the generated code from the SPARK Ada compiler more efficient and convenient to use.

AdaCore’s SPARK compiler, which is a key component of AdaCore’s SPARK toolset, is designed to generate code that is highly efficient and maintainable. The compiler is based on a proprietary compiler technology that is used to generate code for various platforms, including the x86, PowerPC, and RISC-V architectures.

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As an account manager, you are AdaCore’s representative, and in the other direction you also serve as your customers’ advocate. How do these roles interact?
**Blog Summary**

**RecordFlux-A Secure SPARK-Based Message Parsing Framework**

A framework for parsing binary messages using the SPARK programming language is presented. The RecordFlux framework is designed to be used in high-assurance systems where the security of the message parsing code is critical. The framework includes a parser library that can be used to parse complex binary messages, and a set of tools for analyzing the code. The parser library is implemented in SPARK, and the toolset includes a parser generator and a set of verification tools.

**FOCONEM (Future Offering in Control Hardware and Embedded Mechatronics)**

The project is designed to promote the use of mechatronics in control systems, focusing on the development of new technologies and methodologies. The project involves universities and research institutions from around the European Union, and is supported by the European Commission. The aim is to create a new generation of control systems that are more efficient, robust, and reliable.

**Recent Enhancements Include an Updated Introduction to GNAT Tool Control Software.**

Recent enhancements include an updated Introduction to GNAT Tool Control Software. The toolset has been updated to include new features, such as improved error messages and better integration with existing systems. The toolset is designed for use in embedded systems development, and includes a range of tools for debugging, testing, and monitoring.

**Other Improvements.**

Other improvements include an enhanced user interface, improved performance, and better documentation. These improvements are designed to make the toolset more user-friendly and easier to use, and are aimed at improving the overall development experience.

**C++ and Ada Integration.**

C++ and Ada integration has been enhanced, allowing for easier development and integration of C++ and Ada code. This integration includes support for Ada libraries and packages in C++, and vice versa. This integration is designed to improve the overall development experience, and to make it easier for developers to use Ada and C++ together.

**Evolving Platform.**

The evolving platform currently hosts five self-paced courses, with a total of about 1,600 lines of code. The software also contains an unverified parser written in C++. For more information, please see [www.adacore.com/embedded-c-press-release/](http://www.adacore.com/embedded-c-press-release/).

**RecordFlux—A Secure SPARK-Based Message Parsing Framework**

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**Initial Release of Instrumentation-Based GNAT Pro Coverage**

AdaCore has introduced a new GNAT Pro Coverage tool that is based on execution traces. The toolset includes a new coverage model that is based on instrumented code, and a new tool for analyzing coverage data. The toolset is designed for use in embedded systems development, and includes a range of tools for debugging, testing, and monitoring.

**Embracing Reusability and High Assurance for Avionics Software**

Embracing reusability and high assurance for avionics software is discussed in this blog post. The post focuses on the use of formal methods and model checking in avionics software development, and includes examples of how these techniques can be used to improve the reliability and safety of avionics software.

**Formal Methods White Paper Published**

AdaCore has published a white paper on formal methods for avionics software development. The paper provides an overview of formal methods, and includes examples of how these techniques can be used to improve the reliability and safety of avionics software. The paper is intended for use by avionics software developers, and includes a range of tools for debugging, testing, and monitoring.
to demonstrate UPM’s capabilities in space technology;

Training Material Offline.

A “Download PDF” button for each course, allowing users to study the online.

Another improvement is the original technology, which relies on execution traces

The primary goals of the project are:

improve the knowledge of the project participants, both professors and students;

do to demonstrate UPM’s capabilities in space technology;

- to design, develop, integrate, test, launch and operate a microsatellite in a

- to develop a qualified space platform that can be used for general-purpose space operations at universities and technology demonstration applications.

The courseware serves as a practical training choice both for newcomers and students;

and dispatching. The GNAT Pro Assurance edition provides unique benefits for pure-C++ developers, including long-term support, known problem

In 2014, AdaCore’s Ecuadorian team started a project to develop

The primary goals of the project were: