



AdaCore

**Helping people build
software that matters**



AdaCore – A brief history

- **Tool Provider for Ada, C & C++ for Safe & Secure Software**
- **Founded in 1994 (headquarters in Paris and New York)**
- **Technology used and being used by over 1,200 projects worldwide in many high-integrity applications (Military, Avionics, Railroad, Space, Air Traffic Management)**
- **Over 500 customers worldwide**
- **Expertise in compilation, code generation, embedded platforms, static analysis, dynamic analysis, formal proof, certification...**
- **Major contributor to the Free Software Foundation (FSF)**

The AdaCore offer

**Code
Development
& Dynamic
Analysis**

**Static
Analysis &
Verification**

**Model-Based
Engineering**

**Certification
&
Qualification**

The AdaCore offer

Development Tools

- **Native/Cross toolchains**
- **IDEs**
- **Debugger**
- **Product: GNAT Pro**
- **IDE: GPS, GNATbench**
- **Product: GDB**

Static Analysis & Verification

- **Static Analysis tools**
- **Coding Standards compliance**
- **Formal Verification and Proof**
- **Stack Analysis**
- **Product: CodePeer**
- **Product: SPARK Pro**

The AdaCore offer

Model-Based Engineering

- **Simulink® and Stateflow®**
- **Code generation**
- **Model verification**
- **Customisable generation framework**
- **Product: QGen**

Certification & Qualification

- **DO-178 (avionics)**
- **EN 50128 (rail)**
- **ECSS (space)**
- **IEC 61508 (industrial automation)**
- **(ISO 26262)**



AdaCore

Customers

Thales
BAE Systems
Boeing
Airbus
Toyota
Eurocontrol
Alstom
Siemens
Ansaldo
Esterline
Raytheon
Lockheed Martin
Honeywell
General Dynamics
NATS
Eurotunnel
Hamilton Sunstrand
Atlas Elektronik
MBDA
ABB
EDF
Rockwell Collins
CNES
BNP

...

AdaCore products for RISC-V

- **Compiler:**
 - **Ada/C/C++**
 - **Based on GCC**
- **Debugger**
 - **Based on GDB**
- **IDEs:**
 - **GNAT Studio**
 - **Eclipse**
- **Unit testing**
- **Static analysis**
- **Formal verification**
- **Simulink code generator**

Ada Specification Power

```
-- High level view of the type
type Angle is new Float range -90.0 .. 90.0

-- Hardware representation of the type
with Size      => 32,
     Alignment => 16;
```


Contract based programming

```
type Stack is tagged private;
```

```
function Empty (S : Stack) return Boolean;
```

```
function Full (S : Stack) return Boolean;
```

```
procedure Push (S : in out Stack; Val : Integer)
```

```
    with Pre => not S.Full,
```

```
         Post => not S.Empty;
```

```
procedure Pop (S : in out Stack; Val : out Integer)
```

```
    with Pre => not S.Empty,
```

```
         Post => not S.Full;
```

Interfacing Ada/SPARK with C/C++

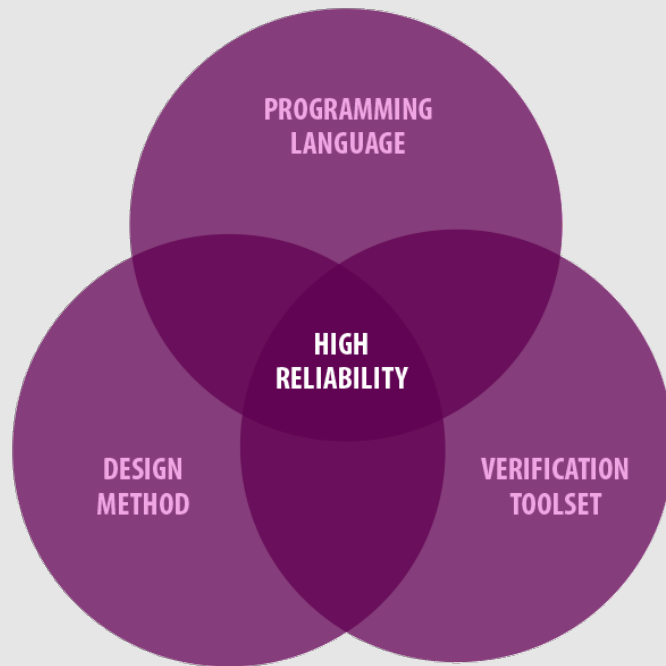
```
function My_C_Function (A : int) return int  
  with Pre => A /= 0;
```

```
pragma Import (C, My_C_Function, "my_c_function");
```

```
function My_Ada_Function (A : int) return int;
```

```
pragma Export (C, My_Ada_Function, "my_ada_function");
```

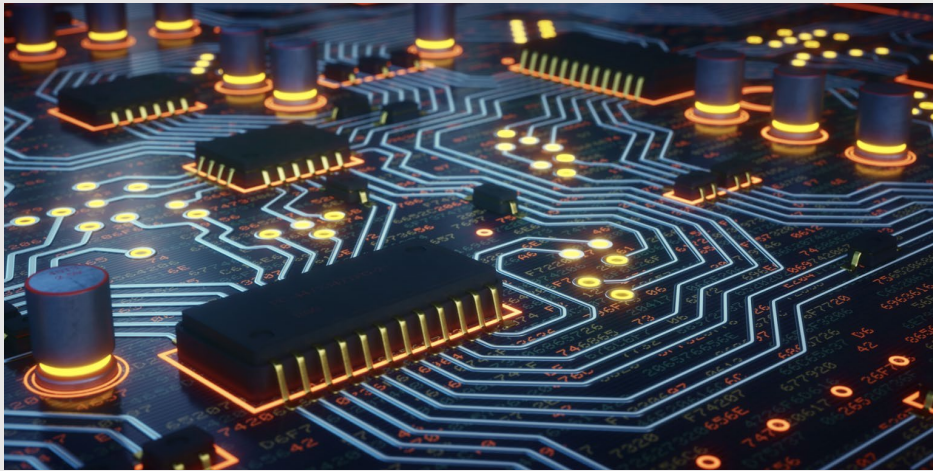
SPARK - The Ada Subset



Formal verification

- **A formally-defined programming language supporting static analysis**
- **Suite of tools to perform analysis**
- **Based on statically provable contracts and testing**

Ravenscar - Real-Time Multitasking



Features

- **Real-Time tasking support**
- **Priority-based preemptive scheduling**
- **Protected Objects**
- **Multicore support**

<https://blog.adacore.com/theres-a-mini-rtos-in-my-language>

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