

LEON software support

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Software needs for Leon

- The software elements are:
 - Compilers environments (C, Ada, Java)
 - Operating systems (VxWorks, RTEMS, Linux)
 - Software Validation Environment (SVF) pure software or hardware in the loop
- There is a validated basis on Erc32, to be ported on Leon (few instructions more, different board support package, cache)
- The general policy for Leon software tools is to have two sources, ideally
 - a commercial off-the shelf product
 - an Open source product

Compiler environments

C: open source supported by Gaisler [available]

- C/erc32 compilers used by Aeolus, Lisa, Proba1, Smart1, H/P, Galileo...
- C/Leon compiler used on Proba2

Ada: Raven, proprietary supported by Aonix [ongoing /end2006]

- Aonix Ada/erc32 compilers used by: ATV, ERA, MSG, Envisat, Cryosat, Goce, etc.

GnatPro, open source supported by ACTCore [CCN issued /end2006]

- gnatPro/erc32 compilers used by Terrasar
- gnatPro/Leon to be used by Alcatel in ASSERT

Java: AeroVM, Aïcas, distributed by Astrium [on going]

Perc/JRTK, proprietary supported by Aonix [on going /2007 + to be planned /end2007]

Other tools

Standard compiler test suite
[ERB available on some environments/Leon/2007]

Impact of cache on schedulability analysis
[on going /2006 + to be planned]

Operating systems

VxWorks: proprietary, ported on Leon by Gaisler, support status unknown

Less and less used since it has been banned by Astrium.
VxWorks/erc32 used in Proba1, Smart1.

RTEMS: open source, supported in general by OAR but re-qualified on erc32 by each project in a particular version. Ported on Leon by Gaisler.

Attempt to concentrate the Leon support with Edisoft (Saab contribution) [on going /2007]

RTEMS/erc32 used on Aeolus, Lisa, H/P, Galileo, etc

RTEMS/Leon used on Proba2

Linux: open source, ported by Gaisler, and **realtime-Linux**, open source under port to Leon by Critical Software (Xluna) [on going /2007]

Intended use of realtime-Linux/Leon on payloads.



Software Validation Facility Policy

- Several areas of utilisation
 - Software validation (white box testing (SVF) non-real time)
 - System qualification (black box testing, integrated in a (EGSE) simulator, real-time)
 - Operations simulator (black-box, (soft) real time)
- Except for real-time performance and timing fidelity all other req's can be served by the same product
- Two types of products needed
 - Software Emulators: non-real time
 - Hardware emulators: real-time

Software Validation Facility

Software target simulator:

- TSIM sold by Gaisler,
Widely used, the only Leon solution for the moment (Proba2)
- SpaceBel target simulator (port of ERC32 techno to
Leon): [on going /2007]
SpaceBel sold some tenth of ERC32 license

Hardware in the loop:

- TSIM+HW acceleration [on-going/2007]
- HIL target emulator (Astrium, Saab, Terma) in view
of SoC simulation: Leon2 FPGA + debug + API system
simulators + API COCOS simulators
[on going /2007]