SELENE: Self-monitored Dependable platform for High-Performance Safety-Critical Systems

H2020 Project 871467
coordinated by
UNIVERSIDAD POLITECNICA DE VALENCIA

Project Contributions

- **Time-predictable** and **dependable** heterogeneous RISC-V **multicore platform** with built-in safety features to achieve diverse redundancy in a flexible way.
- **RISC-V**-based implementation of the **Jailhouse** hypervisor for heterogeneous multicore platforms **enabling robust partitioning** of computing resources.
- **AI techniques** and tools **to maximize the energy, reliability, and efficiency** of the SELENE computing platform by adapting the platform to the particular internal and external conditions.
- A set of **low-level software tests and hardware monitors** to validate and monitor the **safety properties** of the SELENE computing platform.

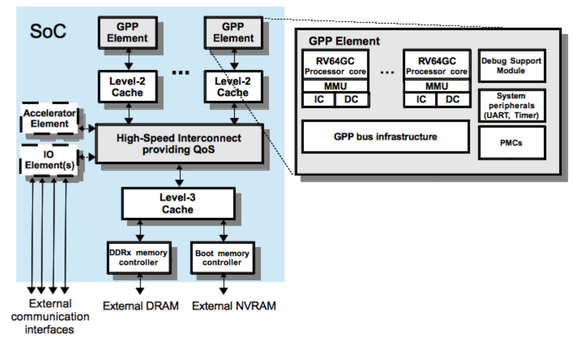
SELENE

WP2 Hardware — HW/SW Co-design — WP3 Software

WP4 Use-cases

RISC-V Hardware Platform

- Scalable **multicore RISCV** RV64GC for **safety-critical** applications
- **Flexible redundant execution** to enable certification
- Including **deep learning acceleration** features

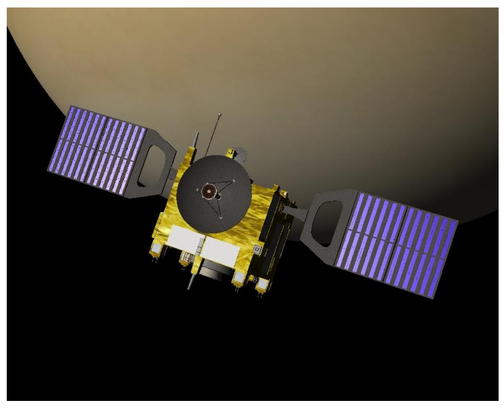


RISC-V Software Platform

- **RISC-V Jailhouse** hypervisor enabling **Linux** for critical applications
- Enabling **multicore and complex processors certification** with appropriate SW interfaces
- Low-level **deep learning libraries** for platform adaptation

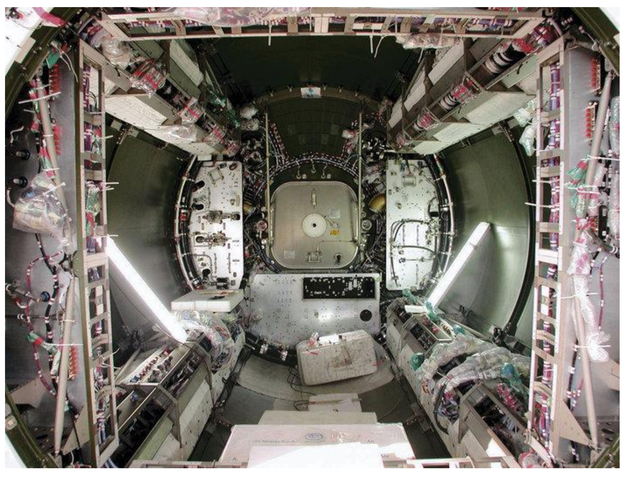
Use-cases

Autonomous Urban Train using **artificial intelligence** and high-performance computational capabilities to increase the **dependability** and the **safety** of the system.



Highly integrated satellite control and data management application using tasks of **different criticality** integrated in a jittery (non-interference free) **high-performance multicore processor**.

Autonomous robot to assess the performance, **safety**, and **security** capabilities of the RISC-V **multicore** platform.



Human Spaceflight platform requiring extensive utilization of **artificial intelligence** techniques to improve the efficiency of the system.