ESROCOS

European Space Robot Control Operating System

Robot Control Operating Software (RCOS) with space-grade Reliability, Availability, Maintainability and Safety (RAMS) properties

The goal of the ESROCOS project is to provide an open source framework which can assist in the development of flight software for space robots. By providing an open standard which can be used by research labs and industry, it is expected that the Technology Readiness Level (TRL) can be raised more efficiently, and vendor lock-in through proprietary environments can be reduced.

Current state-of-the-art robotic frameworks used in robotics research are already addressing some of these key aspects, but mostly fail to deliver the degree of quality expected in the space missions. In the industrial robotics world, manufacturers of robots realize their RCOS by complementing commercial real-time operating systems, with proprietary libraries implementing the extra functions. While this serves the scope of selling robotic systems and applications, it does not provide for a standard for integration of systems and algorithms across multiple vendors.
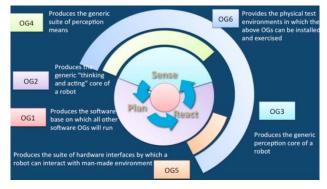
The PERASPERA OG1 activity is devoted to the design of a Robot Control Operating Software that can provide adequate features and performance with space-grade Reliability, Availability, Maintainability and Safety (RAMS) properties.

ESROCOS main objectives

Therefore the ESROCOS proposal aims to develop a system with the following main objectives:
- Develop a space-oriented RCOS: ESROCOS shall target space development needs by including space-grade RAMS attributes and off-line/on-line formal verification, Telemetry and Telecommand (TM/TC) messages.
- Integrate advanced modelling technologies: Include complete model-based methodology supporting the design of the individual components as well as the interfaces for their interaction and integration.
- Focus on the space robotics community: Requirements will be consolidated by actors leading state-of-the-art robotics space missions.

- Allow integration of complex robotics applications: Provide a flexible architecture, which also allows hosting different level of space quality applications over the same on-board computer.
- Avoid vendor lock-in situations: The outcome of the proposal is to be delivered as open-source code, avoiding proprietary solutions.
- Ease the development of robotics systems: Interoperability with other robotics frameworks (e.g. Rock/ROS 3rd party libraries and visualizers/simulator).

Relation to other Operational Grants

Duration: 11/2016 – 01/2019

Partners:
- GMV Aerospace and Defence
- DFKI
- Université Grenoble Alpes
- Katholieke Universiteit Leuven
- Airbus Defence and Space
- Deutsches Zentrum für Luft und Raumfahrt e.V.
- GMVIS SKYSOFT
- INTERMODALICS
- Institut Supérieur de l'Aéronautique et de l'Espace
- VTT Technical Research Centre of Finland

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