

Robotic Manipulation Standard Interface for Space applications

Summary

Profile type	Company's country	POD reference
Technology offer	Spain	TOES20240327015
Profile status	Type of partnership	Targeted countries
PUBLISHED	Commercial agreement with technical assistance	• World
Contact Person	Term of validity	Last update
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General Information

Short summary

A Basque company looks for satellite builders or space missions' promoters to implement integrated optimized interfaces via a technology called SIROM. It's for mechanical, electrical and thermal connectivity allowing reliable and robust coupling of payload to robot manipulators. The company aims to further develop these technologies for common building block connectors enabling demonstration of autonomous robotic systems as key elements for on-orbit satellite servicing and planetary exploration.

Full description

The technology offered is available in three basic configurations:

- Active-Passive (X), which can mate with any other configuration
- Active (A), which can only mate towards a P or X configuration
- Passive (P), which can be mated by an A or X configuration

Each configuration presents different characteristics in terms of internal mechanisms and electronics and thus results in a different mass, volume, and cost. This allows to optimize your system design. SIROM is designed as an androgynous interface allowing easy mating/demating with other SIROMs. Its high capture-range latches are based on the docking system for the International Space Station (ISS).

This, combined with its guiding petals, provides SIROM a self-aligning capability tolerant to very large misalignment conditions. The docking system keeps the locked position without the need of friction brakes or power consumption. Also, this technology features a capture switch independent of illumination conditions, that gives information once two SIROMs are within the latching capture range.

Once mechanically latched, SIROM deploys its connectors board to establish a physical plug for data, electrical power transmission and fluid transmission (optionally). One of the data lines is for CAN (Controller Area Network) protocol and is managed by its electronics. The other data lines are fully customizable and typical uses are high-speed data transmission such as Spacewire or Gigabit Ethernet. These lines directly bypass SIROM electronics and thus, signal attenuation is minimal. In terms of electrical power each SIROM is provided with at least two lines:

- Regulated/switchable, bi-directional, power transfer at 28V used for SIROM power supply.
- Unregulated power transfer bypassing SIROM electronics allowing high power transfer

The resupply interface allows the transfer of propellant (Xenon, Hidrazine, etc.) or coolant, among others, without the need of flexible hoses.

Advantages and innovations

The technology offered allows defining different and wide applications for different features of:

- Data protocols and number of data lines
- Electrical power transfer (number of lines, electrical performances)
- Active-Passive (X), only Active (A) or Passive (P) versions
- Integrated electronics or distributed electronics to allow the control of several SIROMs with a single and modular electronics module
- Visual servoing system

SIROM is a multifunctional interface combining in a single and integrated form:

- Mechanical interface for capture and hard docking
- Electrical interface for power transmission
- Data interfaces for high-rate data transfer
- Telemetry and telecommand control interface
- Optionally, a resupply interface for refuelling or heat regulation

Its main benefits are the following:

- Reduced logistics with common and modular spares.
- Common maintenance standards.
- Interface architecture flexibility: common infrastructure needed to support the modular design.
- Mission flexibility (configuration changes).
- Standardizes mechanical, data, electrical, thermal interfaces.

Potential applications are:

- On-orbit servicing
- Refuelling, resupply
- In-orbit assembly
- Assembly of large structures or antennas in space
- Payload upgrade or replacement for satellites
- Robot tool exchange
- Active debris removal

Technical specification or expertise sought

Stage of development

Available for demonstration

IPR Status

Secret know-how

Sustainable Development goals

• **Goal 9: Industry, Innovation and Infrastructure**

IPR Notes

Partner Sought

Expected role of the partner

The partners sought should integrate SIROM product in their satellite/spacecraft concept. Potential co-development to fulfil with the specific requirements of the satellite launcher company.
Any on-ground applications may also be considered for potential collaborations.

Type of partnership

Commercial agreement with technical assistance

Type and size of the partner

- **Big company**
- **SME 11-49**
- **SME 50 - 249**

Dissemination

Technology keywords

- **01003008 - Data Processing / Data Interchange, Middleware**
- **01001001 - Automation, Robotics Control Systems**
- **01003005 - Computer Hardware**

Targeted countries

- **World**

Market keywords

- **01005001 - Satellite services/carriers/operators**
- **01005002 - Satellite ground (and others) equipment**

Sector groups involved

- **Aerospace and Defence**