## SIROM Project Partners

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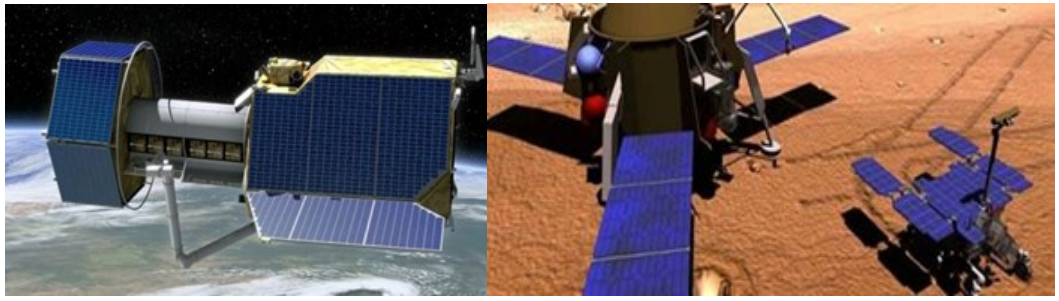
# SIROM

European Commission

# Standard Interface for Robotic Manipulation of payloads in future space missions



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**Project Website and Dissemination** www.h2020-sirom.eu/
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## PROJECT SUMMARY

The main objective of the project is to develop an interface called SIROM, Standard Interface for Robotic Manipulation of Payloads in Future Space Missions. SIROM is designed to connect payloads to a robotic arm or to other payloads; we have an ambition of making it a standard for a wide range of future space missions.

The interface is designed to have 4 main functionalities: mechanics that connects one block to the other, two types of electrical connectors to transfer power and data, and a thermal module for heat regulation. The multifunctional intelligent interface will be considered to interconnect building blocks and also satellites with servicers.

The standard interface will require standardization and modularization of the different functionalities in an integrated form (where mechanical, thermal, electrical, data connections are combined) or in a separated form. The standard interface shall allow building up large clusters of modules.

A secondary objective of the project is to design and manufacture an APM (Advanced Payload Module) for demonstration, validation and verification of all properties of the SIROM. An end-effector for a robotic manipulator will also be produced according to the layout of the standard interface. The SIROM constrains are long mission duration, no logistics support and missions composed of multiple payloads and architectures.

The main benefits of the SIROM compared with the existing state-of-the art will be:

- Improved operational capacity
- Reduced logistics with common and modular spares
- Flexibility, interchangeability and interoperability
- Standard mechanical, data, electrical and thermal interfaces, and maintenance

SIROM will allow developing the SRC end goals. The output of this development will address the future low-cost exchangeable/expandable/extendable satellites, which targets the demonstration of robotics servicing technology.

## SIROM VISION

SIROM's vision for the future is to provide a European capability able to achieve cost savings and higher operational flexibility for spacecraft orbital missions and planetary robotic systems. To promote the productivity of the satellite industry, secure safety of satellites in orbit and planetary operations and to improve the ecological effects of space activities.

The project specifically aims to study innovative concepts of a standard IF for mechanical connection, transfer of power, data and heat load between APM´s and/or a robotic gripper which could support European space companies for their space robotics servicing capabilities in orbit and planetary application scenarios. The realizisation of a standardized modular interface and an active payload module constitute a decisive building block within this development strategy.

## INNOVATION IN SIROM

The project presents an opportunity to demonstrate state-of-the art interface technologies used for repair or reconfiguration of future space systems. Such technologies will be essential for many future missions from servicing applications to robotic exploration missions. It is intended to operate SIROM standard interfaces and active payload modules in a broad range of space environments and missions from LEO to GEO and on different planetary surfaces.

The key innovations to be developed in SIROM include but are not limited to:

- A proposed standard for power transfer and data transmission for both planetary and orbital space robotic missions along with proposed methods for thermal transfer and management
- Development of novel methods supported by associated mechanism for mechanical load transfer and interface latching
- Generation, adoption and proposal of innovative design methods for intelligent interface design and working principles for interfacing
- Holistic consideration of many design parameters using multi-criteria design optimization of requirements through modelling, multi-physics simulation and optimization