



# ESRIC

The European Space Resources  
Innovation Centre

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**esric**

LUXEMBOURG  
INSTITUTE OF SCIENCE  
AND TECHNOLOGY



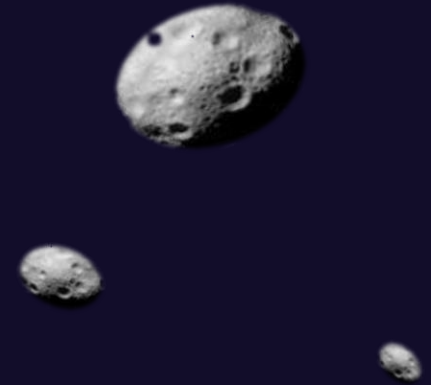
LUXEMBOURG  
SPACE AGENCY



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Luxembourg aims to contribute to the peaceful exploration and sustainable utilization of space resources for the benefit of humankind



## SpaceResources.lu FIVE STRATEGIC PILLARS

### POLITICAL SUPPORT

Ensure national political support and promote international cooperation



### LEGAL FRAMEWORK

Build clear legal framework and engage internationally



### RESEARCH & EDUCATION

Promote long-term public support and workforce engagement by education and R&D



### INNOVATION, R&D

Provide dedicated support for industrial R&D activities

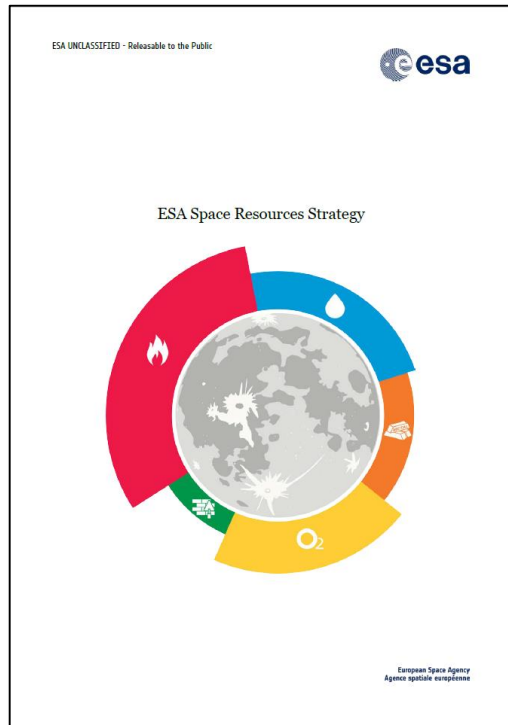


### FUNDING INSTRUMENTS

Develop long-term funding instruments



ESA Space Resources Strategy  
Published in May 2019



## Challenge

Sustained and sustainable Human Presence in Space

## Vision

**Human presence at the Moon, sustained by local resources, by 2040**

The objectives of the ESA Space Resources Strategy, focusing on the Moon, for the period 2020-2030 are:

- Confirm whether space resources can enable **sustainable space exploration** and which resources are of primary interest for this purpose.
- Identify and create **new scientific and economic opportunities** for European industry and academia in the area of space resources and position European science and industry to take advantage of these opportunities should they arise.
- Create benefits in the areas of technology and processes innovation for sustainability in space and on Earth.
- **Engage new industrial actors** in the space endeavor.
- Establish ESA's role as part of a broader community of international, public and private actors and create **new international and commercial partnerships**.

# The European Space Resources Innovation Centre



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ESRIC aims to become the internationally recognised **centre of expertise** for **scientific, technical, business and economic** aspects related to the use of space resources for human and robotic **exploration**, as well as for a future **in-space economy**.

Established by **LSA** and **LIST** as a national innovation centre in the field of space resources.

**ESA** joined as a strategic partner.

Other partners may join ESRIC to develop new ideas and projects.



# ESRIC allows to address objectives of both SpaceResources.lu & ESA's space resources strategy



*ESRIC develops activities in four main areas:*

## Research

Research is at the heart of ESRIC's mission to build a future in-space economy.

ESRIC will establish world-class labs and testing facilities to undertake ground-based R&D along the space resources value chain.

## Knowledge

ESRIC will provide a source of up-to-date information on developments related to space resources utilization.

## Business

ESRIC will support commercial initiatives from established players and start-ups, enable technology transfer between space and non-space industries and encourage public-private partnerships and new initiatives.

## Community

ESRIC will help to connect the space resources community by creating an open and collaborative environment to encourage dialogue and exchange of ideas.

## Planned research infrastructure



© ESA - ESTEC

ESRIC will host key **research infrastructure** required to develop new space resources technologies.

This infrastructure will be **accessible** to European industry and academia, as well as international partners.

During the first phase, key infrastructure will comprise various end to end **oxygen demonstrators** procured by ESA (hydrogen reduction, carbothermal reduction, molten salt) and an optimised **Dirty Thermal Vacuum Chamber** to run space resources experiments.

# Four thematic research areas are implemented in close partnerships with public and private entities



## ISRU Value Chain

Analyze the ISRU value chain; define and lead collaborative end-to-end ISRU projects.

### Prospecting and Mining

Identify, excavate, transport and handle space resources

### Processing and Supplying

Process / transform space resources and produce, store and deliver feedstock and consumables

### Manufacturing and Construction

Manufacture components, repair parts, and build infrastructure using space resources

*Initial focus on enabling sustainable space activities using **H<sub>2</sub>**, **O<sub>2</sub>** and **Metals** on the Moon, in line with ESA's space resources strategy.*



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# • ESRIC Startup Support Programme



ESRIC will develop a **Startup Support Programme** that will support early-stage startups in the space resources sector to refine their business plan, attract their first customers and secure their first investments.

The programme will be run together with **ESA**, **LSA** and **Technoport**, the leading technology incubator in Luxembourg.

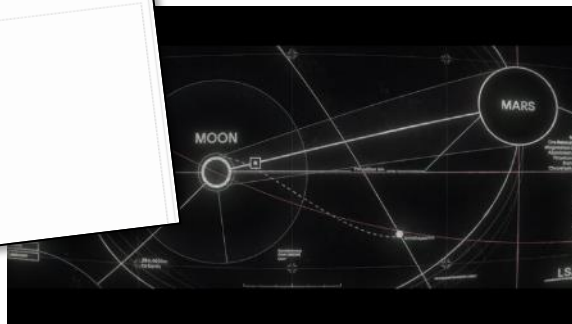
The programme will be organised in three phases building on each other. **A first call is planned towards the end of 2021.**

# • The Space Resources Week 19-22 April 2021



LUXEMBOURG  
**SPACE  
RESOURCES  
WEEK**

- 4 days event around space resources exploration and utilization
- Covers general, legal, scientific, technical, business and economic topics; with a specific focus on cooperation with non-space industry
- Largest event worldwide fully dedicated to space resources
- **>1000 participants from 66 countries**
- 124 speakers in 13 sessions
- 82 posters cumulating 2834 views
- **The next edition will be held in Luxembourg in spring 2022... hopefully in-person!**



Knowledge management and sharing is key for the long-term development of space resources activities.

We strive to federate a space resources community around a common platform, where knowledge will be **gathered, structured and made available.**

This will support the development of new applications, mission-driven research, and private-public partnerships.

**Help us design and develop this future knowledge management platform by participating in our survey!**

 [www.esric.lu/survey](http://www.esric.lu/survey)

# • ESRIC – ESA space resources challenge

ESA and ESRIC are launching the first robotic Space Resources Challenge, conditional to internal final approval.

Robots of all sorts shall be invited to compete in an attempt to map and characterise resources (minerals/rocks) in an analogue terrain near ESTEC in 2021, then in Luxembourg in 2022.

The final announcement shall be given on ESA's platform OSIP on the 3rd of May.



# Thank you

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*ISECG - Future Vision of a Fully Developed Lunar Economy*

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