



The Luxembourg Space Resources Week

Highlights and Key Themes

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What is ESRIC ?



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ESRIC is a European innovation centre in the field of space resources and established in 2020 by **LSA** and **LIST**.



ESA joined ESRIC as a strategic partner.



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**.

Research

Business

Knowledge

Community

ESRIC is developing **activities**
in **4 areas** to support the
European Space Resources community



- Space resources activity in Europe gained momentum in 2017/18
- ESA's space resources strategy was published in 2019
- Funding for research is primarily through ESA or through national research programmes
- Growing interest at both academic and industry level

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- Largest event worldwide fully dedicated to space resources.
 - Free to register
 - **350** physical attendees, **650** online participants
 - **>100** presentations, **27** posters
 - **2.5 packed days**
- Organized together by ESRIC, LSA, ESA and LIST
- Covering general, scientific, technical, business, legal and economic topics.

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- Theme of event: Sustainability
 - Sustainable space exploration
 - Sustainable economic activity
 - Sustainable resource extraction and use
- Key trends*
 - A broad range of activity focusing on extraction of value from regolith
 - E.g. oxygen production, additive manufacturing
 - Focus: Moon > Mars > Asteroids
 - Concepts for novel extraction (e.g. biomining)
 - Greater presence of industry

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**in my opinion*



- Key messages*

1. Regolith simulants are a hot topic

- Access to simulants (cost, delivery), repeatability of experiments with different simulants, simulant selection
- Particularly an issue in Europe

2. Inviting the legal experts is important

- It is important for legal teams to be aware of the scientific and technical developments

3. Greater integration is required

- We are still focusing on individual units; but space resources systems are complex
- A proposed ESA terrestrial pilot plant will address this issue

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**in my opinion*

ISRU requires a community effort



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Prospecting Challenge

- Selected 5 team in first field test near ESTEC
- Final round in Luxembourg in September 2022

Presentation at SRW

- Competing to map the Moon; an update on the Space Resources Challenge

*Capability demonstration
by Franziska Zaunig (ESA)*



Research

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Community



KSP

- Platform launch Q2-2022 on www.esric.lu

Presentation at SRW

- A Knowledge Sharing Platform for Space Resources
Research
by Emmanuel Scolan (ESRIC)

The screenshot shows the homepage of the ESRIC Knowledge Sharing Platform. The header includes the ESRIC logo and navigation links for 'Space Resources Ontology', 'About ESRIC', and 'Contact', along with social media icons. The main content area features a 'Welcome to ESRIC Knowledge Sharing Platform' message. Below this, there are three sections: 'Explore our knowledge graph' (search for relevant documents), 'Access the simulants directory' (everything you always wanted to know about regolith simulants), and 'Explore the Space Resources Glossary' (would you like to know more about space resources glossary?). Each section has a 'Find out more' button. A 'Key numbers' section displays three statistics: 'The knowledge base contains 5738 Documents', 'from 3502 authors', and 'and annotated with 68 Domain concepts'. Below this is a 'Start exploring' section with a search bar and filters for '3D printing', 'in situ resource utilization', 'Mars', 'Moon', 'regolith', and 'simulant'. At the bottom, there is a 'The simulants directory' section with a 'Find out more' button.

Research

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SSP

- First call closed
- Selected 5 companies for phase 1
- Next call in summer 2022

Presentation at SRW

- ESRIC Startup Support Programme
Circular economy for commercial sustainability
by Lari Cujko (ESRIC)

technoport®
technology business incubator

esa



Research

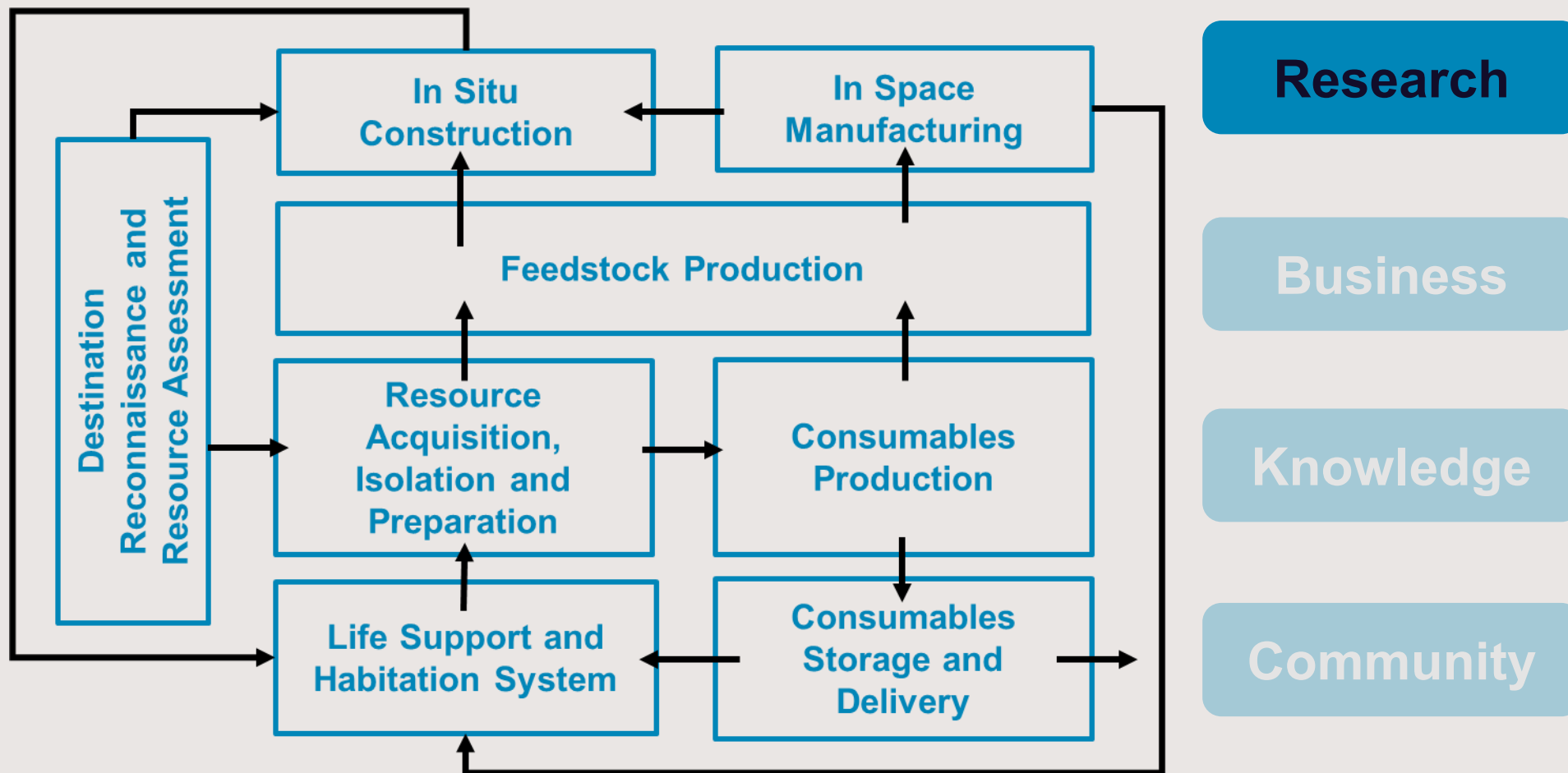
Business

Knowledge

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Research Activity is growing

We are building research capability across the ISRU value chain focusing on novel technologies and integrated systems



- ISRU laboratory supporting research projects and collaborations
- Platforms procured by ESA (FFC, DTVC) are **open** to European Academia and Industry
- A pilot plant facility will be hosted at ESRIC



Producing and using oxygen on the lunar surface

- Plasma-enhanced hydrogen reduction
- Molten Salt Electrolysis
- Oxygen purification

Producing and using metals on the lunar surface

- Molten Salt Electrolysis
- Metal 3D printer
- Plasma-enhanced additive manufacturing

Processes for lunar infrastructure

- Energy storage and production
- Microwave sintering of regolith
- Additive manufacturing for construction

In partnership with:



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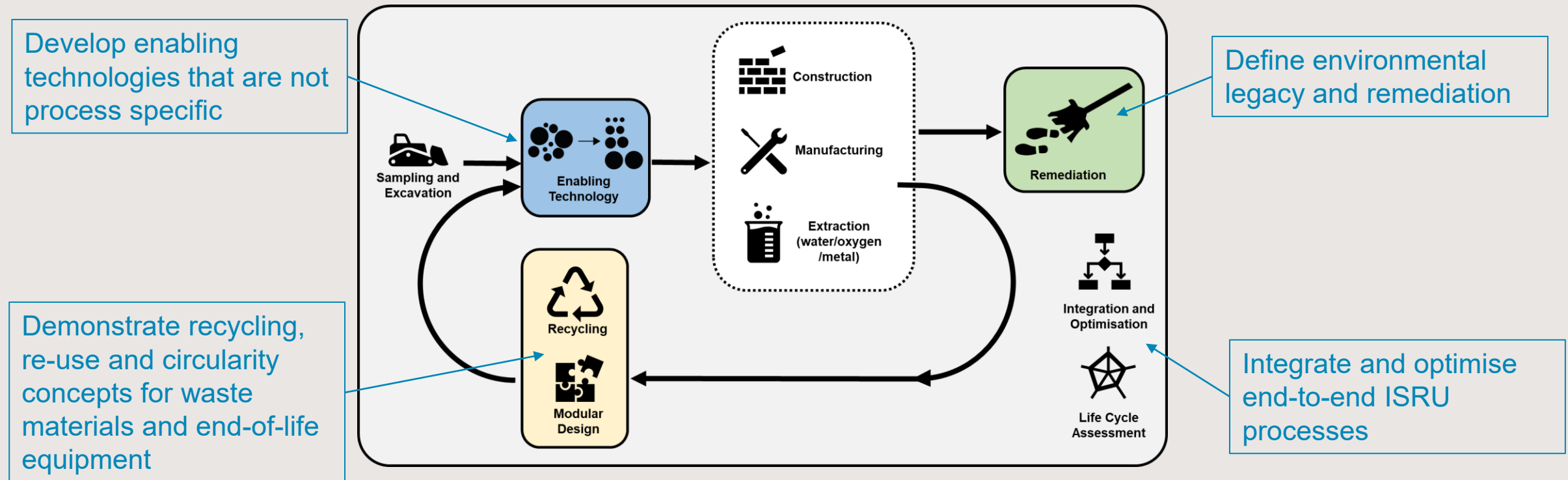


AIRBUS



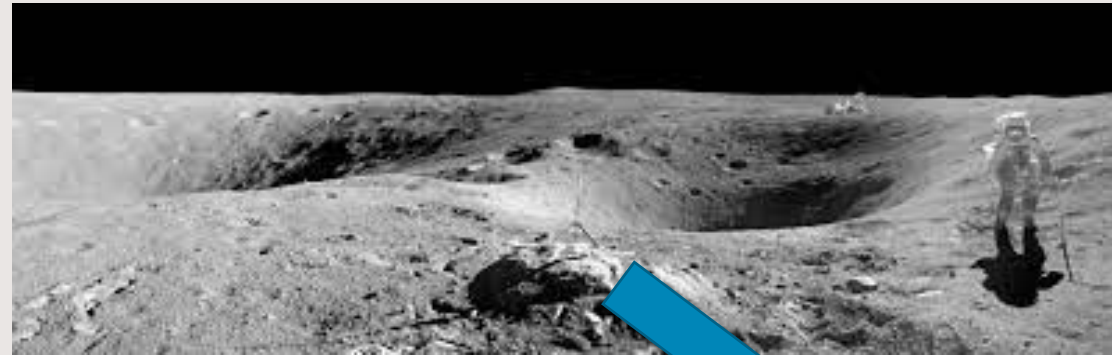
SoISR: Solutions for the Sustainable and Responsible use of Space Resources

Funding will create a new research group. ***We are recruiting!***



ISRU = Resource extraction and use in a resource-scarce, hostile and pristine environment

We have an **opportunity** and **responsibility** to demonstrate how space resource use systems can be achieved in a way that minimises environmental impact and legacy



Thank you



ISECG - Future Vision of a Fully Developed Lunar Economy

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