

Commercialization

ESRIC Start-up Support Programme *From **Lab** to **Market***

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Start-up Support Programme Lead

Webinar SSP#5

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Luxembourg

Introduction



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Director



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ESRIC
Start-up Support Programme Lead



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Technoport
Head of Business Development & Innovation

Agenda

1 About ESRIC

People making it possible

2 Our structure

Our core activities as an innovation and center of excellence

3 Commercialization

Our main commercial oriented activities

4 Start-up support

Our space resources unique worldwide programme

5 Portfolio

Our portfolio and strategic commercial support towards ISRU early-stage projects

6 ISRU Cluster

Description of the first operating ISRU cluster

7 Benefits

Advantages and assets to go to market

8 Technoport

Our main partner in the Start-up Support Programme, a Leading Business and technology Incubator

Luxembourg Institute of Science & Technology (LIST)

Research and Technology Organization



► ENVIRONMENT

► INFORMATICS

► MATERIALS

► SPACE (RESOURCES)

European Space Resources Innovation Centre (ESRIC)

ESRIC Overview



FOUNDED IN 2020

Mission to become an internationally recognised **Centre of Expertise for Space Resources Utilization** and a **Commercial Gateway** as market expert in Lunar Commercial Services and robotic exploration, as well as for a future in-space economy.



HQ IN LUXEMBOURG

Headquartered in Luxembourg with a **worldwide outreach** in terms of activities



22+ RESEARCHERS

ISRU leading researchers, engineers and business talent. Expertise in many fields including **lunar** and **terrestrial geology**, planetary sciences, material sciences, resource extraction and beneficiation, chemical engineering, manufacturing, business and commercial services



20+ ACTIVE PROJECTS

Projects with **ESA**, **FNR** corporate industrials (CVC) including **Air Liquide**, **Airbus** or **Manaa Electric**

European Space Resources Innovation Centre (ESRIC)

Mission



RESEARCH

DEVELOPING EXTENSIVE RESEARCH CAPABILITIES

Industry-relevant R&D
State-of-the-art facilities
Training the next generation



COMMERCIALIZATION

INITIATIVES TO SUPPORT AN EMERGING ISRU SECTOR

ESRIC Start-up Support Programme
Space Resources Accelerator



COMMUNITY

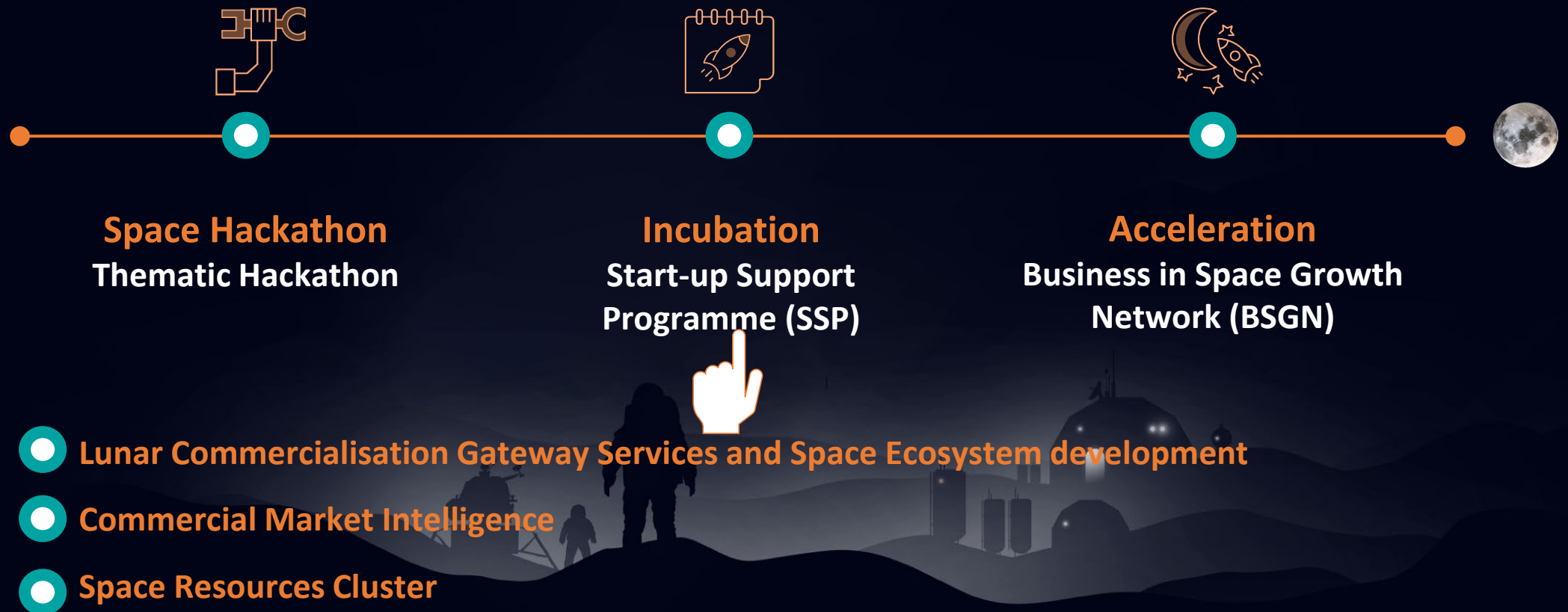
CONNECTING RESEARCHERS, ENTREPRENEURS & INDUSTRY

Space Resources Week
ESA & ESRIC Challenges
Resourceful podcast

To be a world-leading centre of excellence in the science, technology and business of space resources,
support human and robotic space exploration and a future in-space economy

European Space Resources Innovation Centre (ESRIC)

ESRIC Commercialisation



ESRIC Commercialisation

Value Proposition



TECHNICAL EQUIPMENT & SUPPORT

- Access to **facilities** at **ESRIC/LIST** & technical support from **ESA**
- Global facilitation access provided to start-ups
- Part of **ESA Space solution network** and robotic exploration



FUNDING OPPORTUNITIES

- Access to a program strongly **connected** to **ESA** and **LSA** in space resources utilization
- Potentials to further **private** and **public funding**



LUXEMBOURG, A KEY SPACE RESOURCES PLAYER

- Access to the **space ecosystem** and an (inter)national **network** of partners from the key driver of **Space Resources Initiatives**

ESRIC Start-up Support Programme

Three phases Programme



ESRIC Start-up Support Programme

Phase 1: Three sets of Deliverables



Phase 1: Pre-Incubation

Scouting stage to **qualify** and **validate** early-stage venture's potential – Idea generation



2. Business Deliverables

- ii. Specified addressable market strategy
- iii. Competition and existing alternatives are identified
- iv. Formalised business model
- v. Identified business risks
- vi. Advanced Business Plan



1. Technical Deliverables

- i. Valid technical concept:
(formalizing an alpha technology base / technical development plan/feasibility analysis/milestones planning)















3. Strategic Communication Deliverables

- vi. Product & company fact sheets
- vii. Concept teaser video
- viii. Investors/Partners deck

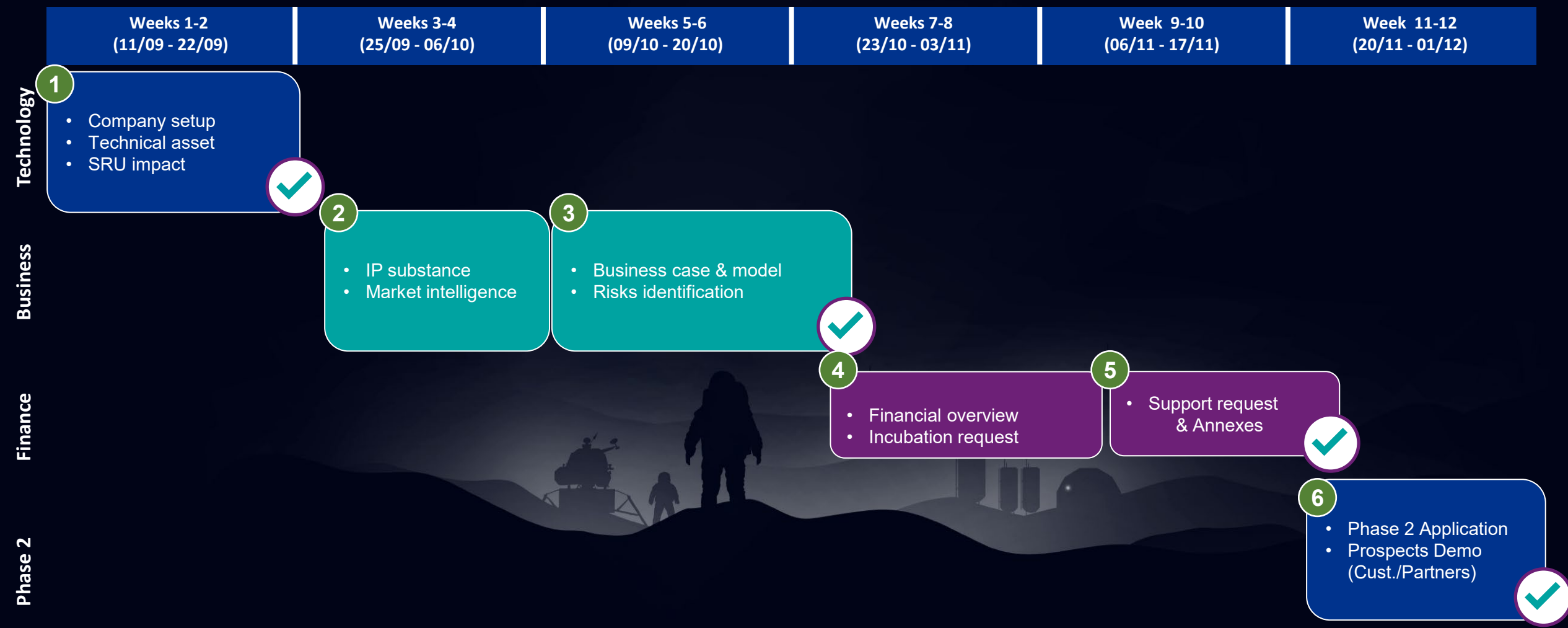
ESRIC Start-up Support Programme

Phase 1: Working sessions

Work Package 1 (Weeks 1 & 2)	Work Package 2 (Weeks 3 & 4)	Work Package 3 (Weeks 5 & 6)	Work Package 4 (Weeks 7 & 8)	Work Package 5 (Weeks 9 & 10)	Work Package 6 (Weeks 11 & 12)
<div><div>KICK-OFF</div><div><ul style="list-style-type: none">Company & Team setupTechnical proposal & SRU match</div><div></div></div>	<div><div>Review WP1</div><div><ul style="list-style-type: none">IP substanceMarket intelligence</div></div>	<div><div>Review WP2</div><div><ul style="list-style-type: none">Business case & modelRisks identification</div></div>	<div><div>Review WP3</div><div><ul style="list-style-type: none">Financial overviewIncubation request</div></div>	<div><div>Review WP4</div><div><ul style="list-style-type: none">Support request & Annexes</div></div>	<div><div>Validation of Deliverables</div><div><ul style="list-style-type: none">Phase 2 Application preparation</div><div><div>Cover Letter</div><div>ESRIC Application Request</div><div>ESRIC Incubation Contract</div><div>Rental Agreement</div></div><div><div>Support company setup in Luxembourg</div></div></div>
<div><div>Technical Support:</div><div>Colorado School of Mines</div><div>ESA</div><div>LIST</div><div></div></div>	<div><div>IP Strategy Support:</div><div>IPIL</div><div>Themis Lex</div><div></div></div>	<div><div>Business Support:</div><div>Helix Space</div><div>BlackSwan Space</div><div></div></div>	<div><div>Communication Support:</div><div>SpearLight</div><div></div></div>	<div><div>Q&A with ESRIC, ESA and Technoport</div><div></div></div>	

ESRIC Start-up Support Programme

Phase 1: Working sessions



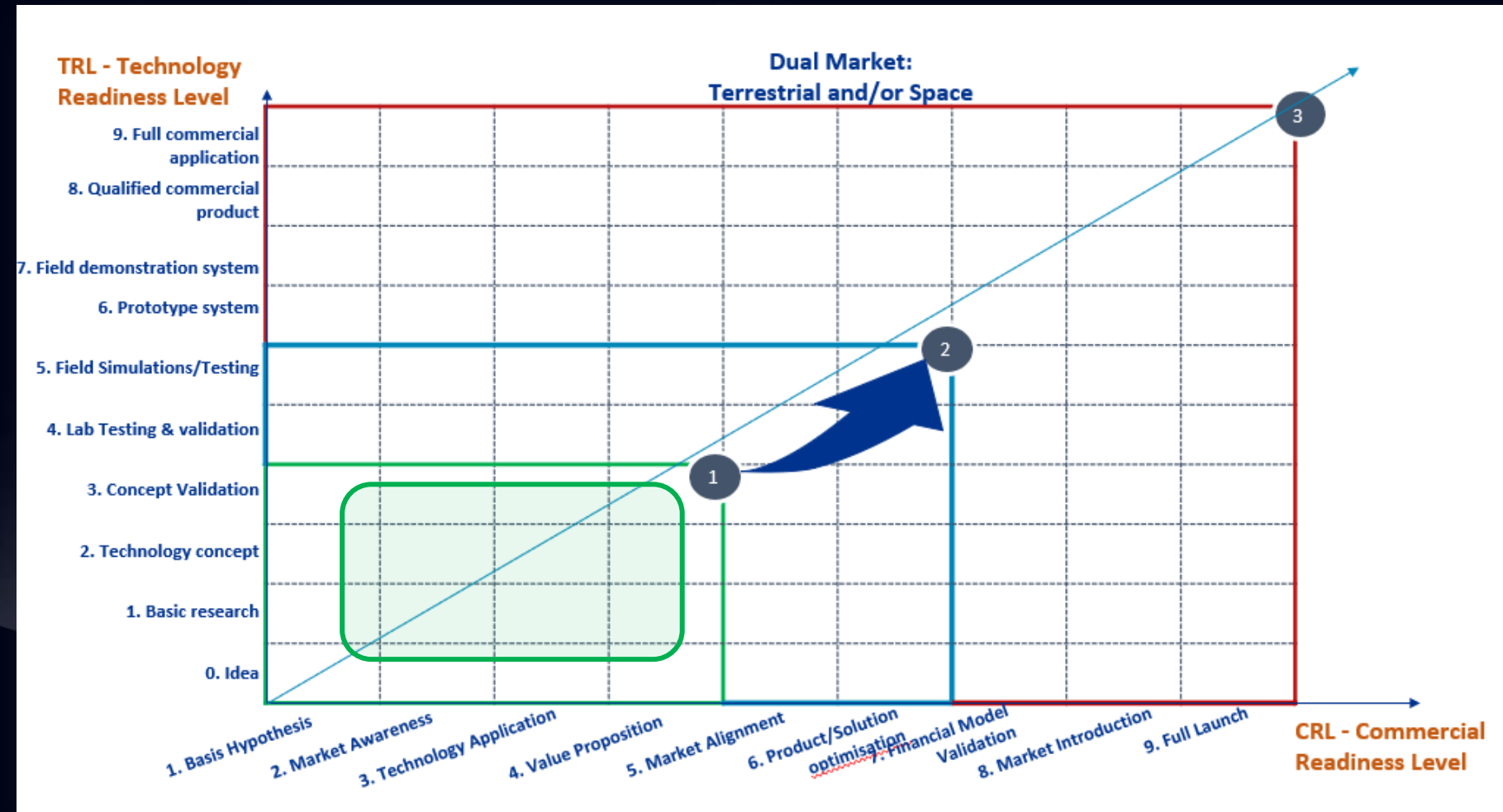
ESRIC Start-up Support Programme

Technology (TRL) & Commercial (CRL) Readiness Level

Consolidate
technological
proposal into a
Technology
Business Solution

What do you need to
proof & start your
Project

Who are the
Targeted
Customers / End
users



Target Audience

Dual Challenge: DeepTech & SpaceTech Players

- **Technology providers:** Having existing market applications being **Terrestrial** or **Space**



TERRESTRIAL

- Mining
- Agriculture
- 3D Printing
- Marine
- Other



SPACE

- LEO / MEO / GEO
- Satcom services
- Earth Observation
- Space Debris use
- Other



CIS-LUNAR

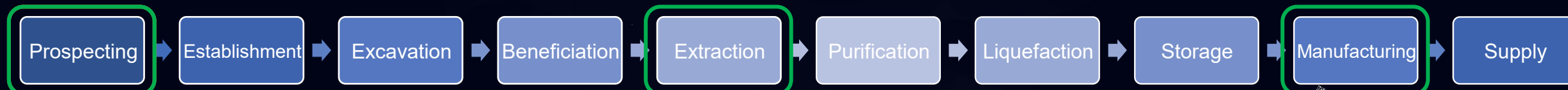
- Communications
- Infrastructure
- ISRU Applications
- Transportation
- Other



LUNAR & OTHER

- Infrastructure
- Exploration & Prospection
- Mining & Extraction
- Refining & Processing
- Manufacturing & Supply
- Power
- Transportation

Primary Activities



Transversal Activities

(Autonomous) Transportation



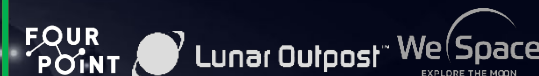
Waste Management/Recycling



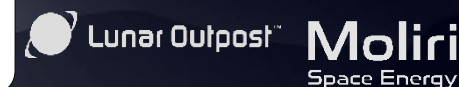
Communication & System Navigation

Spacebackend

Robotic Systems

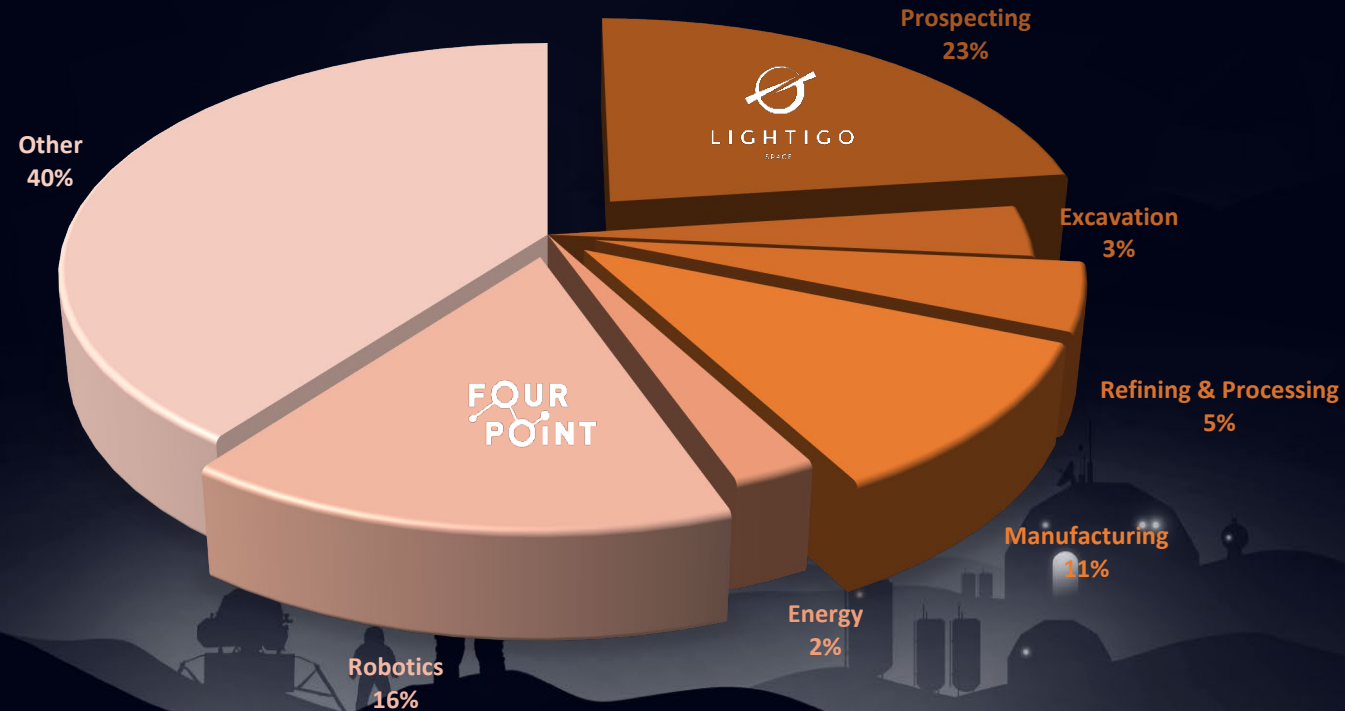


Energy & Power



ESRIC Commercialisation

Space Resources Value Chain Consolidation



Worldwide Incubation Programme



ESRIC SSP Selected Project (Phase 2)

Three projects

SSP1

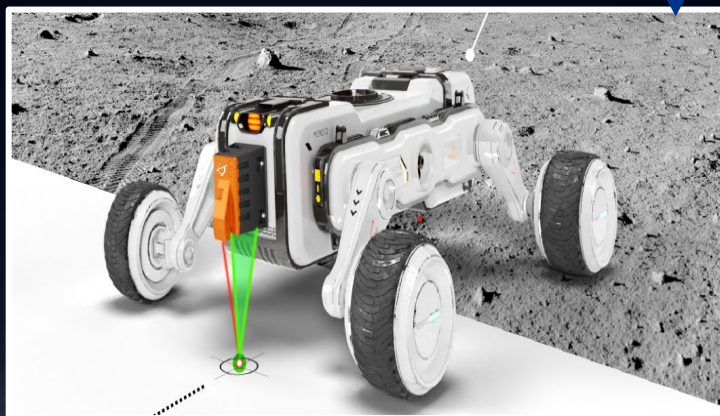
Four Point Space (03 2023)



- Autonomous Transport Platform
- SWARM technologies
- Operations on Earth and Space
- EO – TerraEye solutions

SSP2

Lightigo Space (05 2024)



- Prospecting & Characterization
- ISRA – In-Situ Resource Analyser
- Laser spectroscopy payload for lunar exploration
- Laser-Induced Breakdown Spectroscopy

SSP3

Spacebackend (06 2024)



- Space Communications
- On-Board SW - Assets Connectivity
- Payload Integrity, Accessibility, scalability



Anisoprint, SSP1 | Providing 3D manufacturing for terrestrial applications is expanding its activities in China and creating partnerships with Indian research centres.

Orbit Recycling, SSP1 | Continuation of research on waste recycling and development of several activities (customer based) like testbed located at Airport Rostock (Germany) with 90m² of “moon dust” simulant.



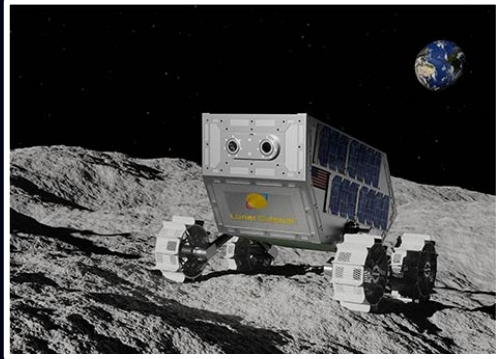
Astroport Space Technologies forms European Subsidiary in Luxembourg



XArc / Astroport Announce \$1.3 Million in Multiple NASA SBIR/STTR Awards for 2023

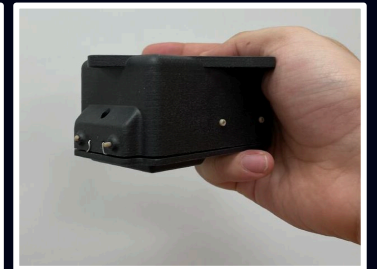
Astroport, SSP1 | Following their implementation in Luxembourg, they received a combined \$1.3M in NASA SBIR/STTR (Phase 1 and Phase 2) awards for development of extreme environment landing pad technologies.





Lunar Outpost, SSP2 | Strong Growth trajectory. Continuing their growth in Luxembourg (Foetz) having a TVAC, a new prototype and are currently collaborating with ESRIC.

Aurora Connect, SSP2 | Dustproof solution for electrical and data connectors (GDPPC) capabilities is under development. Part of the **Orbital Space Lunar Mission (UAE)** via **Lunaris** payload project.



Above Space, SSP2 | Above was Launching Tests to ISS in **March, 2024**. Testing the performance and durability of its proprietary materials in low orbit, aboard the ISS as part of the **MISSE-19 mission** flown by **SpaceX**.



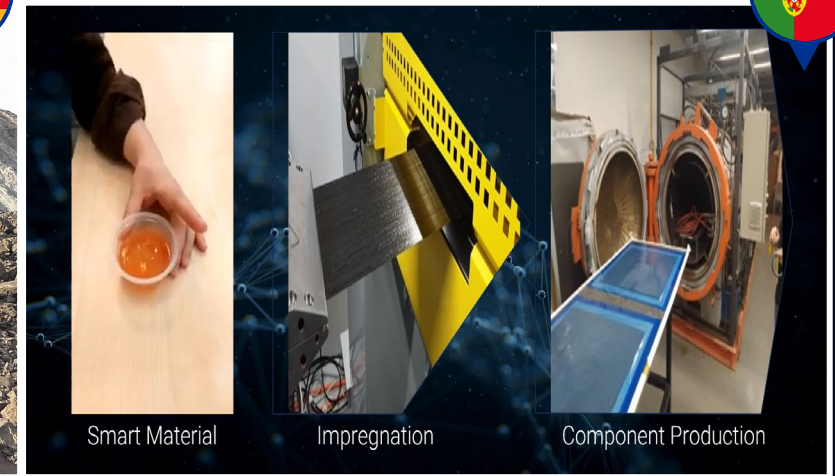
1. Neamine: France
Oxygen extracted from regolith



2. Neurospace: Germany
Communication and Navigation



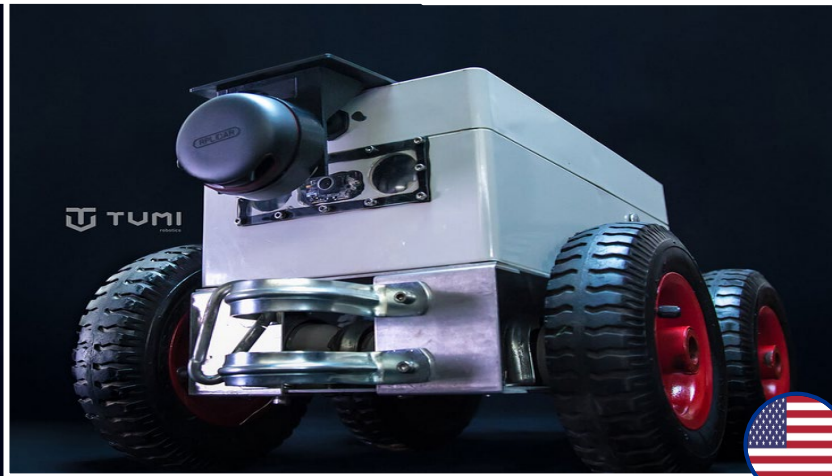
3. Space Engineer: Portugal
Composite for space applications



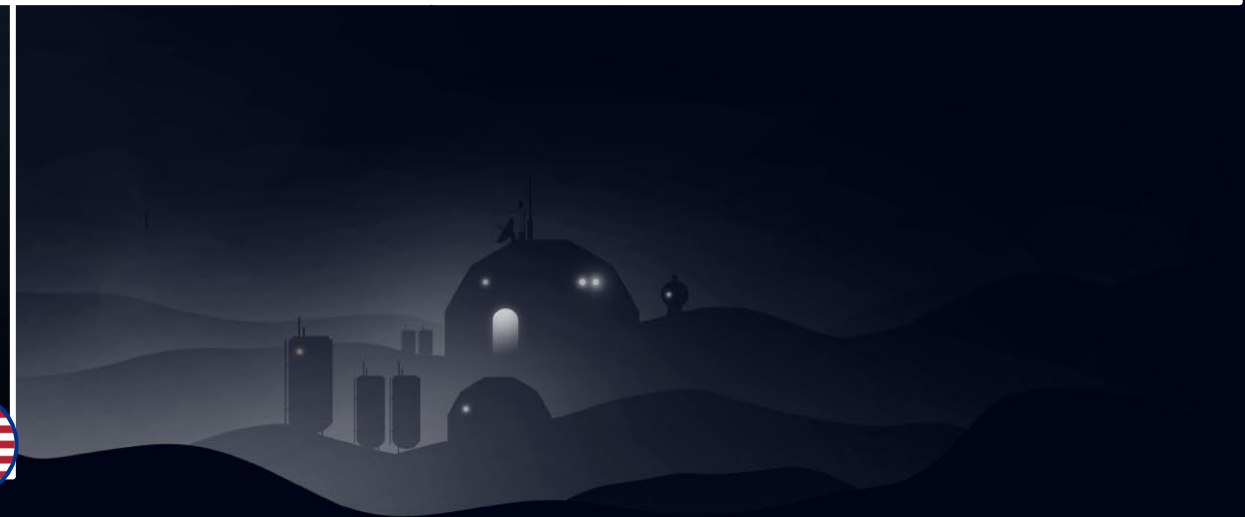
Smart Material

Impregnation

Component Production

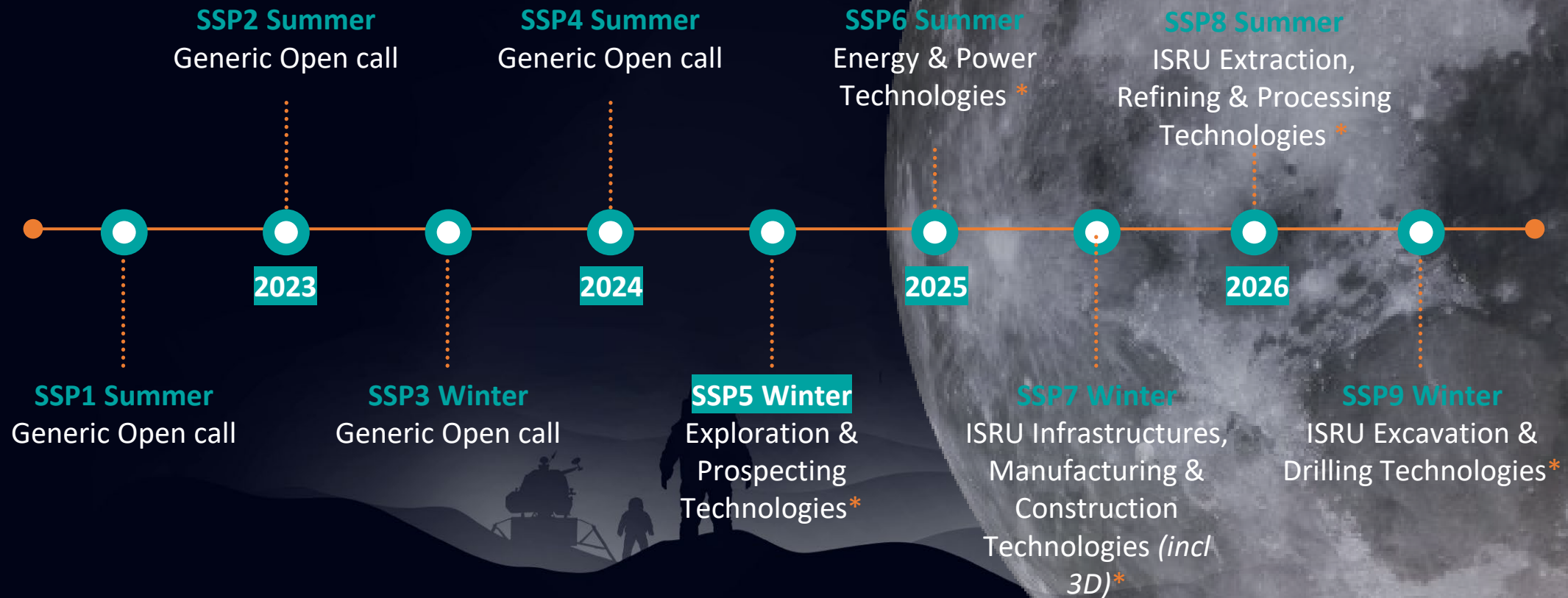


4. Tumi Robotics: USA
Autonomous mobile and aerial robots for exploration



ISRU Thematic Calls

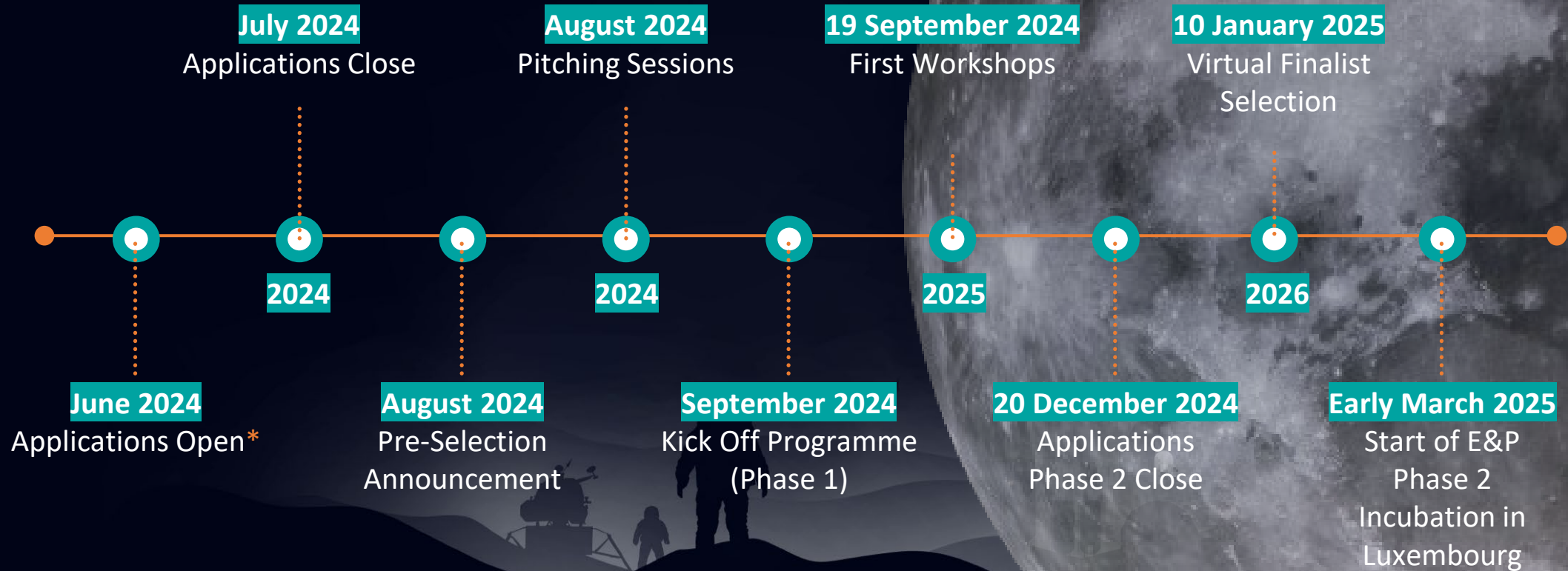
Start-up Support Programme Roadmap



*Generic application in other space resources segments are authorized.

ISRU Thematic Calls

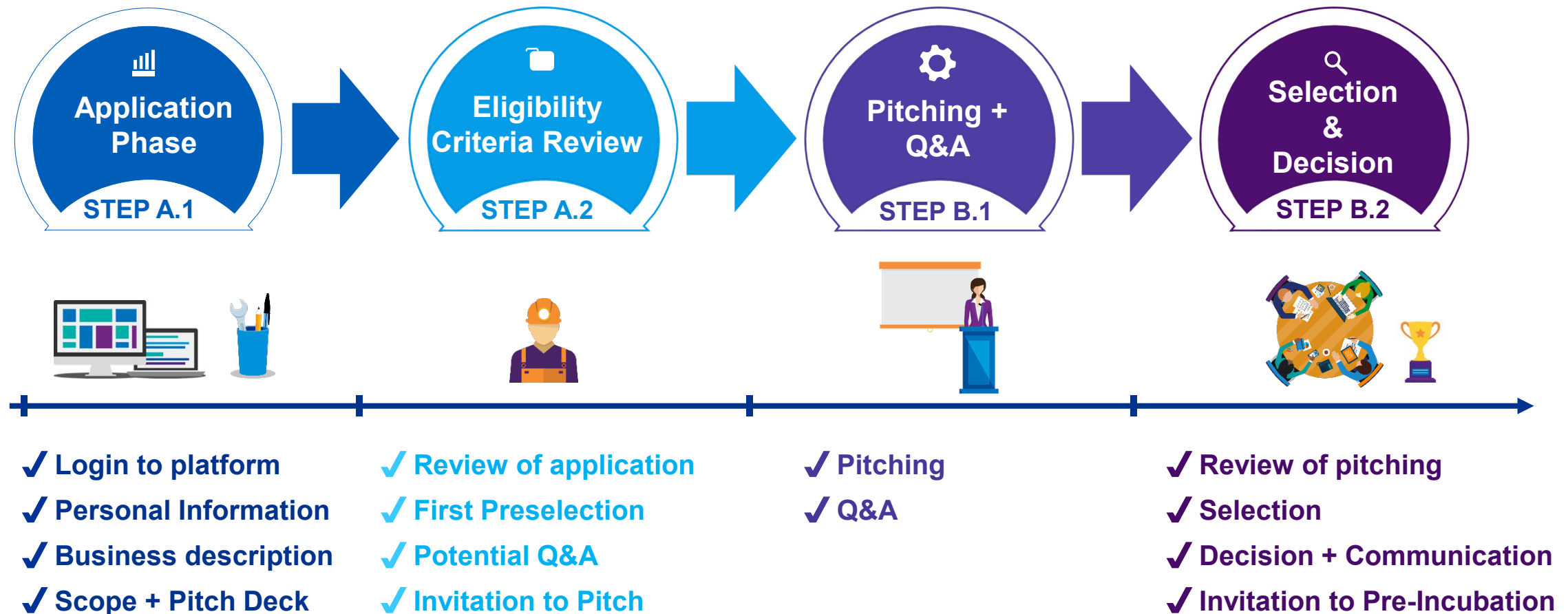
Space Exploration & Prospecting Technologies (SEPT) - Applications



*Exact dates subject to change.

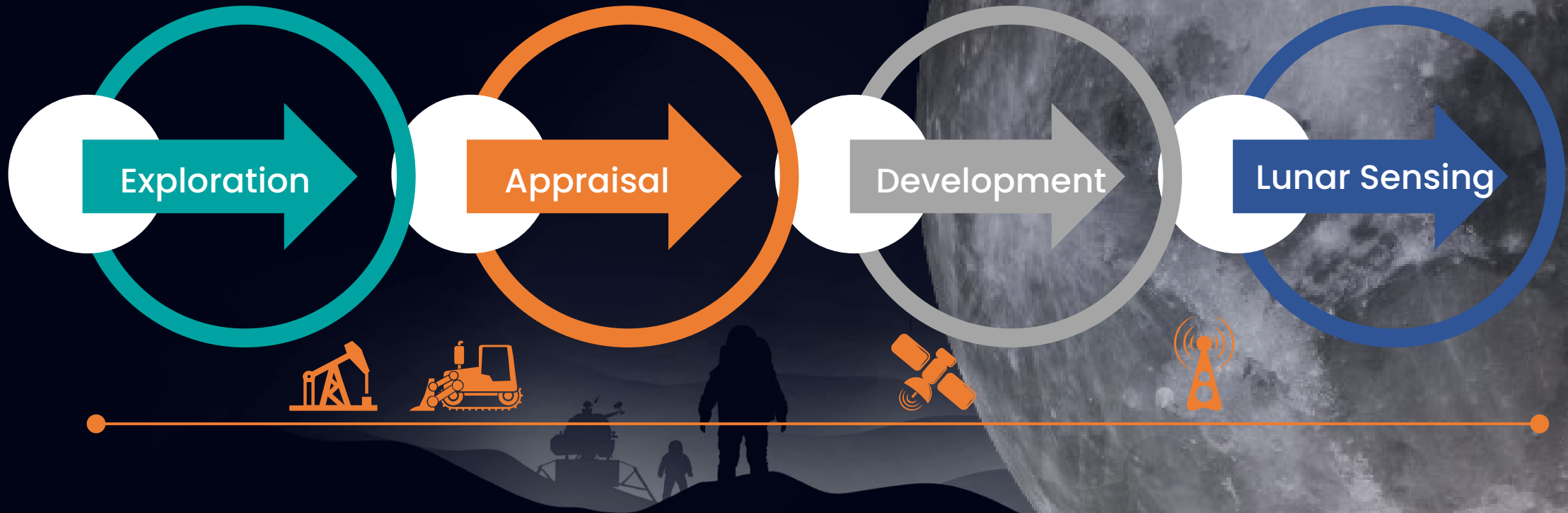


Application Process for Phase 1: Pre-Incubation



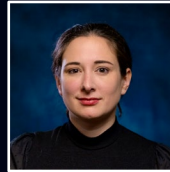
ISRU Thematic Calls

Space Exploration & Prospecting Technologies (SEPT) - Topics





ESRIC Experts (Research & Innovation Lab)



And more

Partners



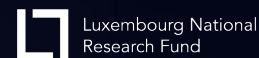
THEMIS

LEX

And more to come



AIRBUS



Stakeholders



Cluster/ Start-ups

FOUR
POINT



Spacebackend

Moliri
Space Energy



Benefits & Support Provided

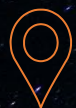
ESRIC Services / <i>incubatee</i>	Phase 1 : Pre-Incubation (3 months)	Phase 2 : Incubation (24 months)	Phase 3 : Post-Incubation (36 months - Optional)
Technical Support <i>(Upon request and up to)</i>	<ul style="list-style-type: none"> 30 hours + 10 hours* 	<ul style="list-style-type: none"> 100 hours (ESRIC) 144 hours**(*) (ESA) 	<ul style="list-style-type: none"> Remaining advisory hours
Business Support <i>(Upon request and up to)</i>	<ul style="list-style-type: none"> 48 hours 	<ul style="list-style-type: none"> 140 hours (ESRIC + Technoport) 	<ul style="list-style-type: none"> Preferential access
IPR/Legal Advice <i>(Upon request and up to)</i>	<ul style="list-style-type: none"> 2 hours 	<ul style="list-style-type: none"> 10 hours 	<ul style="list-style-type: none"> Preferential access
Access to facilities <i>(Including equipment's and experiments at ESA)</i>	<ul style="list-style-type: none"> Upon specific requests and needs 	<ul style="list-style-type: none"> ESRIC LIST ESA Partners 	<ul style="list-style-type: none"> Preferential access
Commercial / Media outreach	<ul style="list-style-type: none"> Together with media experts we build business teasers, commercial brochures and a communication plan 		
Financial	<ul style="list-style-type: none"> 200.000 € (non-equity and non-refundable) 		

* ESA Advisory support

** ESA Advisory support. Remaining ESA Advisory support not provided during Incubation phase, can be postponed in Post-Incubation phase.

*** If the expertise is not available in-house, upon agreement, the budget might be used for external experts, equipment, experiments.

Commercial Gateway toward the Moon



Up to **two** years of business **incubation** at ESRIC



Legal and **IPR** Advice



Workshops and **Trainings**



Technical support from leading experts from ESA and ESRIC



Access to business partners **capabilities**, **Labs** and **networks**



€200 000 funding for product and IP development*



Business support from leading experts from ESA and ESRIC



Fundraising **guidance** and opportunities

LUXEMBOURG START-UP ECOSYSTEM

Dynamic, fast growing and data driven



FUNDING

Financing start-ups during their growth

▶ YOUNG INNOVATIVE ENTREPRISE

Support for high growth start-ups matching equity investments from private investors up to €800K

▶ R&D AND INNOVATION

Financial aid in the form of subsidies for R&D and Innovation projects

▶ SNCI

Focus on the mid and long-term financing of Luxembourgish companies by providing loans to foster investment and innovation

▶ ORBITAL VENTURES €120 M

Investing in space-related companies



▶ DIGITAL TECH FUND

Public-Private seed fund financing start-ups
€20M (2016) + €14M (2023)

▶ EUROPEAN SPACE AGENCY (ESA)

3 modes of funding in open calls including co-sponsored research, systems studies and technology development

- ESA Open Space Innovation Platform (OSIP)
- ESA Open Invitation To Tender (ITT)

▶ LUXEMBOURG FUTURE FUND



Investing in international technology focused SMEs and VC Funds developing activities in Luxembourg

- Luxembourg Future Fund 1 €150M
- Luxembourg Future Fund 2 €200M (launched in March 2023)

LUXEMBOURG START-UP ECOSYSTEM

ISRU Cluster

The ISRU Cluster associated to the R&D and Innovation Excellence Center in Luxembourg focus on advancing In-Situ Resource Utilization technologies and commercial oriented activities to support a sustainable space economy

Corporates/start-ups (B2B)

Companies and technology entities that develop, manufacture, and operate space technologies and/or services

Institutionals (B2G)

Governments, space agencies and international organizations that set policies, provide funding, and oversee regulatory compliance



Research Centers & Academics

Entities conducting fundamental or applied research developing new R&D and technologies with commercial outcomes.

Funding/Financial

Providing funding and capital to support space ventures and research initiatives.

Dust Mitigation

Dust in enclosed spaces



Purification

Processed H_2O and O_2
Indigenous H_2O



Recycling

Recycling of lunar debris



Construction

Microwave sintering
and melting

O_2 and metals from regolith

Demonstrator: H reduction

Demonstrator: Molten salt electrolysis

Plasma-enhanced H reduction

Metals produced by molten salt electrolysis



Prospecting

Genetic models of ilmenite
Water ice prospecting

Beneficiation

Size classification



Large **infrastructure** will be made available for use by **Researchers, Start-ups** and **Industrial Partners**
Advanced ISRU capabilities: Lab as a Service (LaaS)



Beneficiation Zone



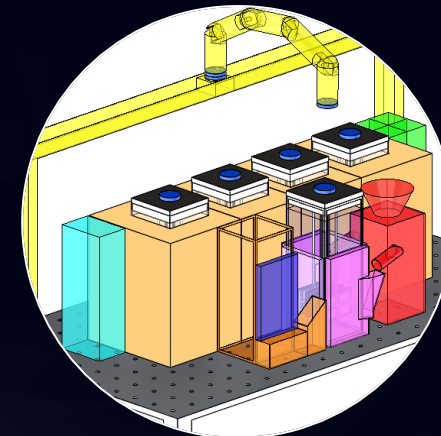
O₂ Extraction Zone



Purification Zone



Dusty Thermal Vacuum Chamber
Manufacturing completion
expected in 2025




Ground-Based Pilot Plant
Scoping and design study
ongoing

EXISTING FACILITIES

FUTURE INFRASTRUCTURE


ESA's Commercialisation Network

 **Φ LAB NETWORK**
(coming soon)

ESA-wide coverage in multiple Member States

Ground-breaking research, driving commercial technologies

For PhDs and researches



BUSINES INCUBATION

25 Centres
>80 locations

200 new startups p/y


1250 startups selected



TECHNOLOGY BROKERS

7 Technology Brokers

404 Technology Transfers



PARTNERSHIPS

For Entrepreneurs, Corporates, Institutes, and Business Schools

Supports startups, alumni and newcomers

Connecting to current & future decisionmakers





Cornelis J.J. Eldering
Head of ESA BIC & Φ-LabNet Office (CIP-CB)
ESA Commercialisation Department



ESA UNCLASSIFIED - For ESA Official Use Only



THE EUROPEAN SPACE AGENCY



technoport[®]

technology business incubator

Supporting creativity, innovation & entrepreneurship
for over 25 years





OUR INCUBATOR

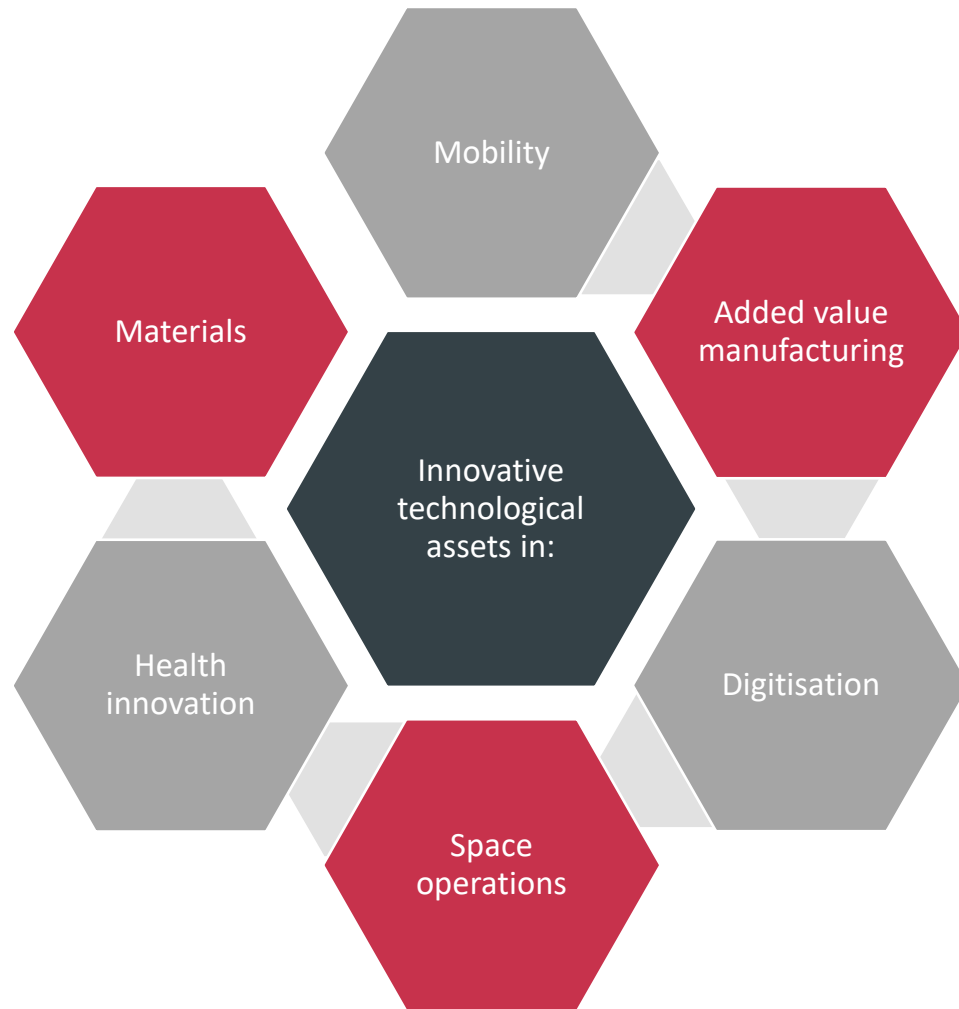
supports the launch and development of
innovative and **technology-oriented** companies in Luxembourg
with the right network, expertise and infrastructure

STARTUPS

SPIN-OFFS

R&D CENTERS OF FOREIGN COMPANIES

HOSTED COMPANIES



OUR STRATEGIC LOCAL PARTNERS

Research & Academic



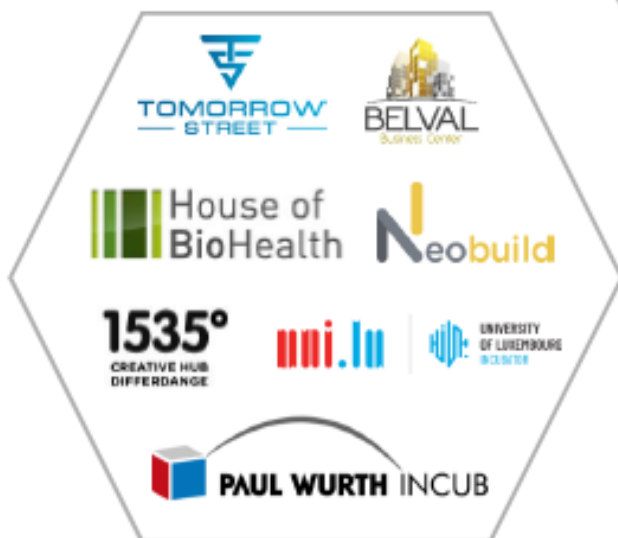
Institutional



Financial



Innovation Hub



Corporate



Media



and many more...

Space Resources Utilization (SRU)

<5 years Incorporation

Entrepreneurial & Innovative
consolidated teams

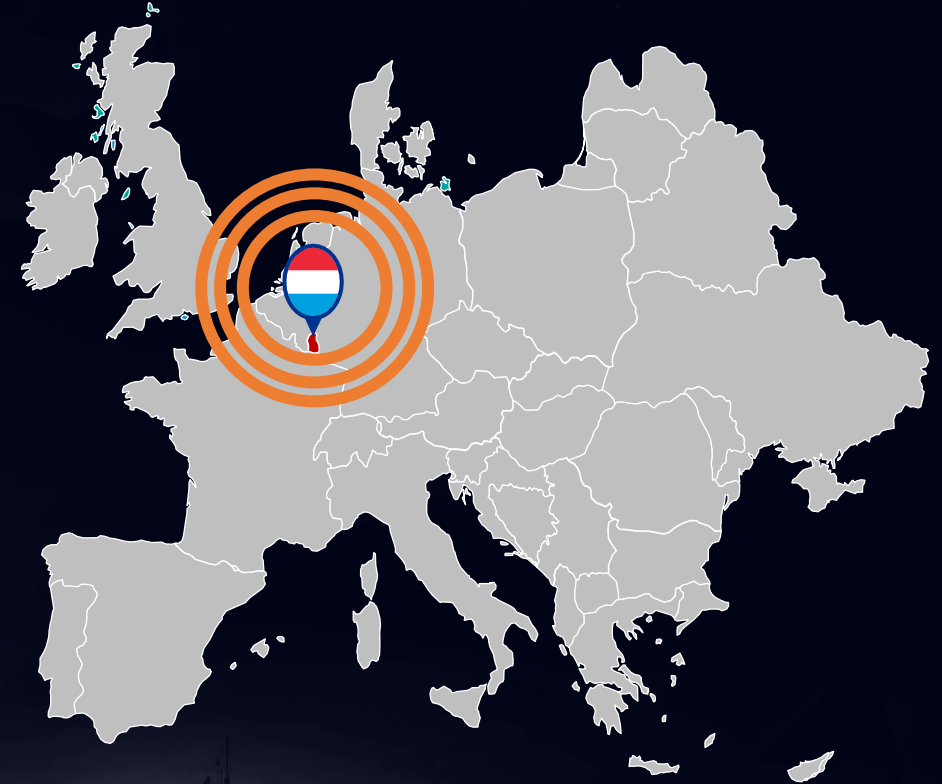
Apply to ESRIC SSP



Mid-term sustainable business

Business in Luxembourg (Phase 2)





Upcoming ESRIC SSP5 in June 2024
Space Exploration and Lunar Prospecting Technologies

→ www.esric.lu

Thank you

www.esric.lu

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