

2021

**2021**  
**LUXEMBOURG**  
**IN SPACE**



LUXEMBOURG  
SPACE AGENCY



ROVER

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GROUND STATION

# LUXEMBOURG SPACE AGENCY

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SPACE FUNDING

SPACE INNOVATION

SPACE EXPERTISE

SPACE SKILLS

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## A NEW ERA FOR SPACE DEVELOPMENT



LUXEMBOURG  
SPACE AGENCY

For more than three decades, Luxembourg has been at the forefront of commercial and cooperative initiatives that have shaped a vibrant space economy.

Fostered by the creation of space-related companies in the eighties, and the accession to the European Space Agency in 2005, an entire space industry has raised in Luxembourg, in the very heart of Europe.

In today's booming space sector, the next generation of space technologies is being designed and built by a steadily growing community of entrepreneurs, scientists, researchers and engineers. These space entrepreneurs need to be supported: in Luxembourg, they find a favorable environment to develop their projects. And if support is essential, it goes hand in hand with cooperation.

More than anything, today's space entrepreneurs need to be connected with one another at an international level.

**Building bridges between businesses is the way towards new and rewarding projects that will lead to the next generation of space technologies.**

Luxembourg Space Agency strongly believes it has a major part to play in that story. A mission to achieve by providing support to strong commercial ideas, by fostering talent development and helping to connect potential partners from around the globe, here, in Luxembourg, the place for space development in Europe.

### The Luxembourg Space agency oversees:

- The national space strategy and policy implementation through the national programme LuxIMPULSE, and the European Space Agency programmes.
- The SpaceResources.lu initiative launched in 2016 with the aim to promote the peaceful exploration and sustainable utilization of space resources, offering a complete framework for the development of such activities.
- International relations, including bilateral relations with partner countries, the representation of Luxembourg within the European Space Agency and space-related programmes of the European Union; and the United Nations activities relating to space matters, especially regarding the SpaceResources.lu initiative.
- Space research and development programmes at a national scale.
- Talent development and STEM activities through partners such as Uni.lu and ESERO Luxembourg.
- The relations with public and private stakeholders in all matters relating to the space sector development.



# COMPANIES

In 2021, the Grand Duchy was home to approximately 70 companies and research labs, with a space sector's contribution to the nation's GDP among the highest ratios in Europe.

The way the Luxembourg space ecosystem has evolved over the past couple of years is directly reflecting the **strategic support and commercial space focus** which has been given through the national space policy implemented by LSA. Since 2012, the number of space actors in Luxembourg increased **3 times** and their numbers are steadily growing.

The country's space sector includes private and public bodies, and is driven by a dynamic, multilingual and international workforce. Its players, active and acknowledged in the international space community, benefit from a **strong network** of partners and suppliers facilitated by the proximity of local actors at the national level, and by Luxembourg's positioning on the international space stage.

## x3

The number of space actors in Luxembourg tripled, and the ecosystem is still steadily growing.

# 70

The Grand Duchy was home to approximately 70 companies and research labs

Number of companies  
→

16

0.1%

2012

18

0.1%

2013

18

0.1%

2014

19

0.1%

2015

22

0.1%

2016

30

0.1%

2017

32

0.1%

2018\*

53

0.1%

2020

70

0.1%

2021

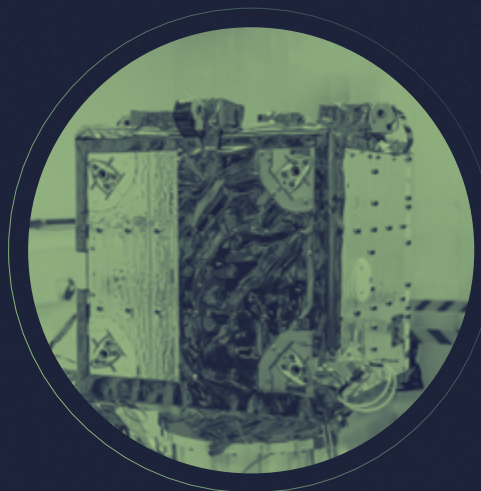


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The Space industry in the Grand Duchy has been constantly diversifying with three identifiable segments: the space segment, the ground segment and the service segment.

01

**The space segment** focuses on systems, sub-systems and technology flying in Earth orbit and beyond. In Luxembourg, the space segment's players are active in manufacturing of satellite and instrument structures, system integration of micro-satellites, electric propulsion for satellites, robotic payloads, in-space manufacturing, composites, Radio frequency payloads or Field - Programmable Gate Array (FPGA) for example.

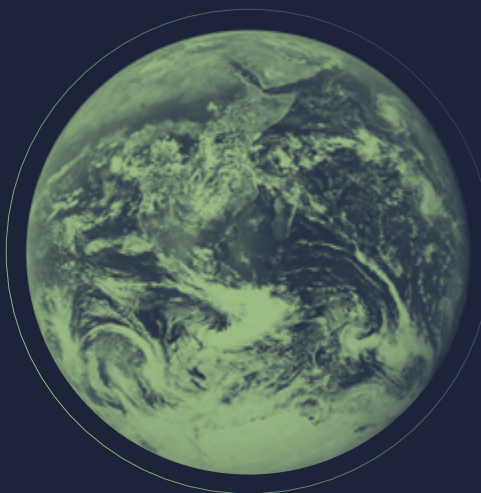


02

**The ground segment** gathers actors specialized in ground stations development, mechanical and electrical ground support equipment, communication networks and operations.

03

**The service segment** provides services developing applications based on upstream research and technology developments. In Luxembourg, this segment represents more than half of the space players and ranges from teleport services, satellite-based media and telecommunications services, risk management services, data analytics, environmental applications and services to aeronautical information services and analytics platforms.

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# SPACE RESOURCES

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SPACI



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## PIONEERS IN SPACE

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**Space resources will drive the future of space exploration and trigger the creation of an in-space economy.**

Launched in 2016, the SpaceResources.lu initiative is a flagship of the country's space policy, led by LSA. It focuses on **enabling private investors and companies to sustainably explore and use space resources for the benefit of humankind**. This pioneering initiative allowed the Grand Duchy to take positions in the space industry and to be recognized worldwide for its ambition in this specific field and in the Newspace industry in general.

The agency's efforts over the past years included the development of the European Space Resources Innovation Centre (ESRIC) in partnership with ESA and the LIST. 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.

A dozen of actors based in Luxembourg are today developing applications in this field.

Luxembourg is strongly committed to **progressing together with other nations** on a future international framework for the utilization of space resources. In 2021, LSA took part in dedicated discussions at the United Nations Committee on the Peaceful Use of Outer Space (COPUOS), with the aim of advancing potential legal models for the exploration, exploitation and use of space resources.

**Private public partnerships** are also **to play a key role** in accelerating crucial technologies. An example of such partnership is the letter of intent signed in 2021 by CNES, LSA, ESRIC and Air Liquide to develop research and technology activities focused on exploration and space resources.



**More about  
Space Resources**



**In 2021, the ESRIC launched the world's first start-up support programme dedicated to Space Resources, further positioning Luxembourg as the European hub in the utilization of space resources.**



# HIGHLIGHTS



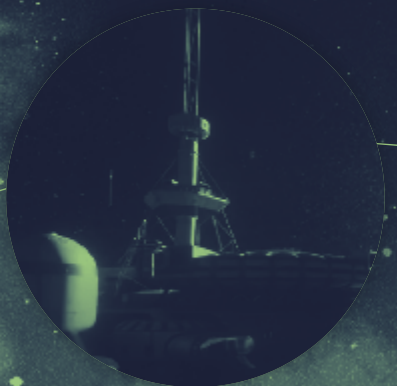
## JANUARY

**TEAM**  
Juliette Pertuy joins the team as Head of Communication



## APRIL

**EVENT**  
**Space Resources Week (19 - 22 April)**  
The Space Resources Week, organized by ESRIC, is the annual European meeting bringing together actors from the space and terrestrial industry to initiate scientific, technological, and financial cooperation. In 2021, it gathered more than 1000 participants and 124 speakers from 66 countries over 4 days. It is the largest world conference dedicated to this theme.



## MARCH

**PRESS**  
The Luxembourg Space ecosystem is featured in the German television program Galileo, on ZDF. (<https://youtu.be/s1n-2PyZhTXU>)



## MAY

**WORKSHOP**  
National consultation in the framework of ENTRUSTED, a European research project in the area of secure satellite communications (SatCom) for EU governmental actors.



## JUNE

**EVENT**  
**Participation of LSA to the Virtual Space Forum**, co-hosted by Seoul Economic Daily & KARI on **June 9<sup>th</sup>**.

**FUNDING**  
The Orbital Ventures fund, based in Luxembourg and focusing on early-stage, space-related companies, closes at €120M.

## SEPTEMBER

**EVENT**  
**ICT Spring (Space Forum) (14-15 september)**  
LSA participates in the Space Forum organized in conjunction with ICT Spring and more specifically in the pitching session dedicated to space, aiming at highlighting promising start-ups in the field.

**WORKSHOP**  
**Industry Day South Africa**  
Organization with the South African Space Agency of an "Industry Day" gathering private and public players from both countries.

**PUBLICATION**  
**Space Directory 2021**  
Publication of the updated "LSA Space Directory". The 2021 space directory comes with a cartography which visualizes the field of action of the Luxembourg-based space actors and gives an overview of the ecosystem of the Grand Duchy.



## JULY

**EVENT**  
Participation to Asteroid Day live, dedicated to educating the public about asteroid science, research, missions and the emerging new-space economy.



## NOVEMBER

**EVENT**  
**New Space Europe (24 november)**  
Organized in Esch Belval, the 4<sup>th</sup> edition was placed under the central "Finance & Space" theme and the conference benefited from a media partnership with the Financial Times. The format of the event was completely revised and allowed to gather more than 500 people on a hybrid basis.

National Pavilion on **Space Tech expo Europe Bremen** - the continent's major dedicated supply-chain and engineering event for manufacturing, design, test and engineering services for spacecraft, subsystems and space qualified components.

**Drawing contest with Esch2022 Capitale européenne de la Culture**  
Co-organization of a drawing contest for children aged 6 to 12 years in the framework of Esch2022 European Capital of Culture. The

## OCTOBER

**LSA**  
**LSA becomes a foundation**

**TEAM**  
**Marko Lukovic**, Project Manager, Finance and Budgets;  
**Gaëlle Jiménez**, Project Manager – Telecommunications and Navigation;  
**Barbara Fischer**, Assistant Office  
**and Muriel Hooghe**, Senior Project Manager – Space Safety join LSA's team

**EVENT**  
National Pavilion on the world's premier space event - the International Astronautical Congress (IAC) in Dubai.

**INTERNATIONAL RELATIONS**  
Economic mission in United Arab Emirates, in parallel of the IAC and in the presence of the Minister of the Economy Franz Fayot.

The IAC was the occasion for the Minister of the Economy to formally meet Mrs Pam Melroy, NASA Deputy Administrator and HE Sarah bint Yousef Al Amiri, Ministry of Industry and Advanced Technology for the UAE.

The congress set the stage for the signing of two MoUs, with the Italian Space Agency and the CNES (France)



## DECEMBER

**TEAM**  
**Estelle Badie** joins as Project Manager – International Affairs



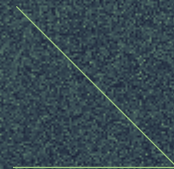
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04.

# FUNDING & LEGAL

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FUNDING  
& LEGAL



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# TOOLS TO POWER THE NEWSPACE INDUSTRY

As a leading global financial centre, Luxembourg offers a **range of resources** for the creation of new space businesses. It is a hub for venture capital and private equity groups that operate under a **regulated European framework**, as well as alternative investment sources such as business angels.

Together with public and private partners, the Luxembourg government and LSA have been participating in the establishment of a space fund as standalone investment instrument capable of investing directly into promising space tech ventures. The fund, named **"Orbital Ventures"** closed in June 2021 at 120M. It has been presented during the IAC in October 2021, and is an excellent example of a **dedicated funding tool to support the development of the commercial space industry**.

On the legal side Luxembourg became, in January 2021, the **70th country to sign the "convention on registration of objects launched into outer space"**. A national registry of space objects has been established as of 1st January 2021 by LSA, which has actively been working on the implementation of the Law of 15 December 2020 on Space Activities the whole year long.

LSA has also been presenting the **space national legal framework during several technical missions organized in 2020 and 2021 in Chile, for the "Space Law for New Space Actor" project**. This project, on which UNOOSA & Luxembourg have been collaborating since 2019, contributes to the development of a space ecosystem at a global level by raising awareness and fostering capacity building in emerging countries.

# 70<sup>th</sup>

Luxembourg became, in January 2021, the 70th country to sign the "convention on registration of objects launched into outer space"





6

candidates have been  
selected to be part of  
the YGT programme.



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# 05.

## TALENT DEVELOPMENT

### TALENT FOR A BOOMING SPACE SECTOR

The space sector is growing fast and **expertise & skills are a cornerstone of the further development of the Newspace economy.**

Luxembourg is firmly committed both to the commercialisation of space and the development of the broad range of skills needed to create an attractive ecosystem for space companies.



In 2021, **156 applications** were received for the “Interdisciplinary Space Master” curriculum launched by the University of Luxembourg. The students enrolled in 2021 come from different countries including Columbia, Algeria, Italy, India, Kenya, Luxembourg, Spain, Mexico, Iran, Tunisia, Korea, and France.

**The very first students from the 2019 cohort graduated in September 2021. The next students, still finishing their Master thesis project, are expected to graduate in February 2022.**

The Luxembourg Young Graduate Trainee (Lux-YGT) programme offers each year a wide range of **internships at the European Space Agency** for Luxembourg students. In 2021, **6 candidates** have been selected to be part of the programme. 5 of them are currently working at the European Space Research and Technology Centre (ESTEC) in the Netherlands and 1 is working at the European Space Operations Centre (ESOC) in Darmstadt, Germany.

The year 2021 is also marked by the launch of the “**Überflieger 2**” competition run by the German Space Agency (DLR) and the Luxembourg Space Agency. Students from universities based in Germany and Luxembourg had the opportunity to submit their own experiment ideas in the contest with the aim of potentially sending it to the International Space Station in the near future. The selection process of the winning teams took place at the end of August 2021.

As part of the talent development activities initiated in Luxembourg, several projects & events have been organized by LSA along with its partners, such as **ESERO**’s first CanSat competition, the “Space Goes to School” program, the Esch2022 Space drawing contest or the space resources professional development course organized with ESRIC, ESA, the International Space University and the Colorado School of Mines.



# 156

applications  
for the master



# 06.

## INTERNATIONAL RELATIONS

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### JOINING FORCES IN SPACE

Josef Aschbacher,  
ESA Director General



Giorgio Saccoccia,  
ASI President



Pam Melroy,  
NASA Deputy Administrator



Her Excellency Sarah  
bint Yousif Al Amiri,  
Minister of State for  
Advanced Technology, UAE



Philippe Baptiste,  
CNES Chairman and CEO







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## The fundamental pillars of Luxembourg's strategy for developing the Space : **we are convinced that joining forces is key to bring forward the Newspace industry.**

As a consequence, the Luxembourg Space Agency plays a significant role in promoting Luxembourg internationally and **strengthening international collaboration**. LSA represents Luxembourg in the European Space Agency (ESA) and space-related programmes of the European Union. It contributes to and supports United Nations activities relating to space matters, especially with regard to the SpaceResources.lu initiative.

**In 2021, International relations between Luxembourg and other countries on space activities and space resources have materialized at several levels.**

Two Memorandum of understanding have been signed by LSA with the French and Italian Space Agencies, aiming at strengthening and deepening cooperation in the space sector. Several events have been organized, including an economic mission in Dubai, during which the Minister of Economy had the opportunity to meet with Pam Melroy, NASA Deputy Administrator, and HE Sarah bint Yousef Al Amiri, Minister of Advanced Technology in the UAE, and President of the UAE Space Agency.

On the European Space Agency side, the collaboration has continued in the context of the support it offers to Luxembourg for the implementation of its national programme. The Grand Duchy today counts **among the top five per capita contributors to ESA** and is participating in several ESA programmes.

LSA also carried out, in the context of the Entrusted project, a national survey aimed at identifying user needs and use cases for EU GOVSATCOM services. The survey's results will provide user requirements for EU GOVSATCOM.

The Luxembourg Space Agency has finally been representing Luxembourg during several UN level Committees and subcommittees and has been actively involved in international working groups in 2021.



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