



EURO2MOON

EURO2MOON Manifesto

Space Resources, enabling sustainable space exploration

Considering growing geopolitical interest; ever evolving technical capabilities; increasing scientific interest; and developing commercial opportunities; lunar exploration and the space sector at large are benefiting from renewed interest. Building on this momentum, Air Liquide, Airbus Defence & Space and ispace Europe have jointly founded EURO2MOON in 2021. The creation of this association is rooted in the belief that Europe must establish a resilient and autonomous position in the developing cis-lunar economy.

*EURO2MOON provides members with a platform to exchange ideas, shape a common vision, and promote it to European stakeholders. Bridging **expertise from public and private partners, the topics of interest include lunar exploration and the use of space resources in an efficient and sustainable way. EURO2MOON aims to position the European industry as a leader in the rising cis-lunar economy, creating a strong industrial ecosystem based on an ambitious vision for space resource utilization. The association will also support the definition of standards for a coordinated approach between all actors involved.***

The members of EURO2MOON will develop recommendations on global roadmaps, demonstration concepts and commercial programs. Topics of interest include lunar surface exploration, life support, energy needs for scientific and commercial applications. These topics are aligned with ESA's Terrae Novae 2030+ Strategy Roadmap. In particular, with its goal for the Moon to increase European strategic autonomy making Europe a reliable and visible partner in sustainable human and robotic exploration.

An increasing momentum for sustainable space exploration

The world has entered a new era of space exploration, with drivers for an efficient and sustainable approach. Multiple common targets and incentives have been identified by international players:

- **Major gaps remain in the knowledge pertaining to the Moon and its resources.** Surface exploration, with both robots and humans, is essential to characterize resources and to ensure permanent human presence on the Moon, as well as economic development. Being an early player in this field will allow Europe to secure a leading position in the space resource economy.
- **Resources from celestial bodies, including the Moon, will be instrumental to various applications,** such as propellant for space transportation (O₂, H₂), construction (regolith), life support systems (O₂, H₂O) and intermittent energy production and storage (O₂, H₂).
- **Sustainability is key in the design of space missions.** Moon systems are being designed for multiple missions, will be maintained, repaired or refueled in space with the use of space resources. This will contribute to the reduction of space debris that are ever growing to the point of becoming a threat to terrestrial space services.
- **Moon based refueling systems** will allow spacecraft to reach geostationary orbit using 3 time less energy than if launching from Earth. The refueling market based on lunar



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produced fuel has a significant commercial potential for both terrestrial satellites and deep space exploration.

- **Historical space powers, alongside a highly competitive private sector,** are investing massively in a race to be the founding actors of the cis-lunar economy.

Europe benefits from strategic capabilities, a leading role in the energy transition, and heritage in space exploration. EURO2MOON is convinced that the European ecosystem has all the means to advance the new space era with transversal and interoperable service capabilities, such as propellant and energy production, and associated space logistics. Additionally, developing the use of space resources and related services will ensure Europe's strategic independence and lead worldwide collaboration, both in space and on Earth.

EURO2MOON's Ambition

ESA's Terrae Novae 2030+ Exploration Strategy highlights resource utilization as an essential and integral part of the Agency's strategy for lunar exploration and strategic autonomy. The ambition of EURO2MOON is to support ESA's vision by creating a strong industrial ecosystem and developing an ambitious and sustainable ISRU implementation plan. To achieve this goal, the association pursues 4 main objectives:

1. **Representing the industrial members of the space and non-space domain** involved in the EURO2MOON association.
2. **Creating a platform for discussion and for the provision of recommendations** on a roadmap common to public & private sectors, for an end-to-end space resources value chain implementation, based on interoperability and standardization.
3. **Advocating to European stakeholders to define dedicated investments**, allowing to develop a new industrial sector and markets via synchronizing development efforts towards new European services, capacities, and usages.
4. **Fostering a European industrial ecosystem** dedicated to the sustainable exploration of lunar resources. This ecosystem must encompass the entire value chain, bringing in complementary expertise from public & private sectors, space & non-space companies, as well as large and small industries.

EURO2MOON's Operations:

In 2022, EURO2MOON created working groups to embody the members' ambition and define the basis for their collaborative work.

- **New business models & markets:** this working group is specifically in charge of the evaluation of the space-resources market demand and of the new business models (propellant, energy, life support, infrastructures and metals).
- **Value chains (H₂O/O₂/H₂ and Power) and technological needs:** these working groups are identifying existing European stakeholders along the value chains (O₂, H₂, power...)



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and state-of-the-art, targeting technological gaps, and will define a common road map for end-to-end implementation and interoperability.

- **Lunar environmental sustainability:** this later aims to perform comprehensive studies on the environmental impacts of lunar resources utilization activities and to provide recommendations to prevent the identified adverse effects.
- **Communication:** these working groups will manage communication efforts aimed at European stakeholders and decision makers, showing the position of the European industry.

Humanity's return to the Moon is the ideal vector to promote Science to the general public and to inspire younger generations. Space has a unique record of creating international cooperation, continuing this legacy will be a conscience effort driven by effective collaboration and a shared vision.

If you share these ideas, join EURO2MOON and start building our common future.

List of members, as of August 2022:

- Founding members : Air Liquide, Airbus Defence & Space, ispace Europe
- Effective Members: ESRIC, Arthur D. Little, CEA, SPARTAN Space
- Honorary Member : Jean-Jacques Dordain

For further information and Points of Contact, please visit: www.euro2moon.com