



# WHAT STRATEGY FOR EUROPE FOR THE MOON?

International Workshop on  
“Space Law and Policy Strategies for Building Moon Bases  
and Exploiting its Space Natural Resources”

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# THE EUROPEAN SPACE POLICY INSTITUTE (ESPI)

## Mission Statement

The European Space Policy Institute (ESPI) provides decision-makers with an informed view on mid- to long-term issues relevant to Europe's space activities.

In this context, ESPI acts as an independent platform for developing positions and strategies.

ESPI provides decision-makers and the global space community with:

- Arguments underpinning the “Case for Space”
- Policy concepts for international, regional and national activities
- Analyses for mid-term visions
- Platforms for expert exchanges
- Source for cutting-edge information



## This is not an obvious decision to make

- ***Limited appeal for the Moon in Europe***
- ***Mars still more attractive to many member States***
  - Remains the ultimate destination (Continuation of Exo-Mars)
  - Manned and robotic
- ***Finally agreed that this is the next logical target***
  - After the ISS
  - Already contributing with the ORION European Service Module

## International Cooperation

- ***A necessary condition***
  - No plan for a Europe-led initiative
  - No one will get there alone
- ***Settled by a robust agreement***
  - Example of the Inter-Governmental agreement for the ISS
    - ➔ *Problem: Nobody wants that again...*
  - What kind of Government-to-Government agreement?
    - ➔ *Signatory on European side?*

# CONDITIONS FOR A EUROPEAN PARTICIPATION

## to an international cooperation

- ***Technologically rewarding contribution***
  - Visible
  - Self-sufficient
  - Challenging
  - Innovative
- ***To be on the critical path***
  - To be able to weigh on the decisions

- ***Integration of Human and Robotic capabilities***
  - Avoid to oppose them
- ***International & Commercial partnerships***
  - Becoming a strong requirement
- ***Integration of Space Exploration with Society***
  - How?
- ***Innovative Capabilities for Operations in Space***
  - Key technological challenge
  - Unprecedented Intensity and Complexity of Operations in Space

- ***GNC, Energy, Robotics and AI***
  - in Challenging Applications
- ***High Power Electric Propulsion***
  - for Flexibility and Efficiency
- ***Radiation protection***
  - for Van Allen Belts
- ***In-situ resources utilisation***
  - to Live “Off the Land”
- ***Closed-cycle life support***
  - to Minimise Logistics for Distant Missions

## These are Transverse Technological Needs

- ***What technology policy among partners***
  - Will Everybody Develop Everything?

## Cornerstones

- **LEO Exploitation of ISS**
  - Commercial Partnerships beyond 2024
- **Early Human Missions Beyond LEO**
  - European Service Module and Deep Space Gateway
- **Sample Return**
  - Moon, Phobos, Mars
- **Human Lunar Surface Exploration**
  - Robotic Precursor Mission

## Technology Demonstrators

- Guidance Navigation & Control / Rendez-Vous / Robotics
- In-Situ Resources Utilisation

## Missions of Opportunity

- Contribution to Commercial or Chinese missions?

**Decisions to be made at ESA Ministerial Council in 2019...**



## Commercial exploitation of the ISS

- **Ice-Cubes**
  - Small, quick payloads
- **Bartolomeo (Airbus)**
  - External Payload Platform
- **IBDM: International Berthing and Docking Mechanism**
  - First Exploration product PPP

## Further steps

- **Transport to Lunar orbit and telecoms relay** (SSTL/Goonhilly)
- **Transport to Lunar surface** (PTScientists)
- **Dreamchaser for Europe** (OHB Consortium)
- Announcement of Opportunities for **post-ISS LEO ideas**
- Study of **Lunar ISRU** technology demonstrator

## Greater Role for Industry

- ***Is Expected to Improve Efficiency***
  - Relaxation of Public Procurement Constraints
- ***Might Even become a Requirement***
  - New risk-Sharing Schemes
- ***Should be anticipated***
  - How to favour direct industry-to-industry cooperation?

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