



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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Jean-Jacques Tortora
European Space Policy Institute

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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