

European Space Policy Institute

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 midto 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

QUEST FOR SYNERGIES

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





TECHNOLOGICAL CHALLENGES

- 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?

ESA PROGRAMMATIC APPROACH



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...



INVOLVEMENT OF THE PRIVATE SECTOR

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

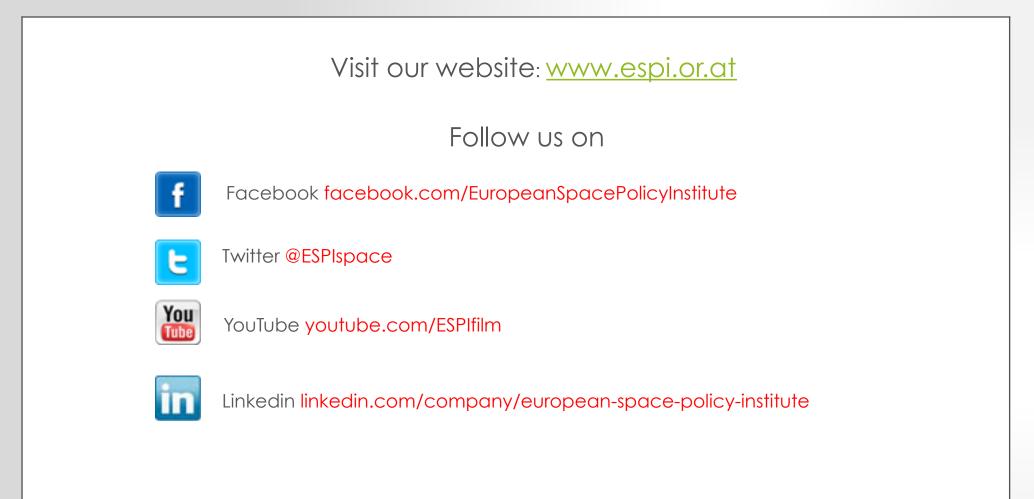


Greater Role for Industry

- 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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