

# Space strategy for Europe and the International Lunar Decade

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## Abstract

The International Lunar Decade (ILD) is a framework for international cooperation to achieve a self-sustaining space economy through lunar and cislunar development. At present space exploration is funded totally by governments and is subject to political decisions that are determined more by election cycles than by logical resource allocation to meet long term objectives. In a self-sustaining space economy wealth generated from space resources becomes the primary source of funding for further space exploration and development. At present, no wealth is generated from space resources. There is no feasible business case for any space venture beyond Earth orbit. Even how to achieve this in the foreseeable future is not clear. However, a megatrend is emerging marked by advances in many technologies promising significant reductions in the cost of operations in space as well as of a broadening range of opportunities engaging a widening circle of billionaires like Musk and Bezos in ventures to mine asteroids, and build reusable spacecraft that promise to drive down costs and risks while widening the range of space business opportunities.

This paper addresses the implications of a self-sustaining space economy and how Europe can benefit from taking a leading role in the ILD process from 2020 to 2030.

The EU Commission is planning a Joint Technology Initiative for cutting-edge space projects under the EU's next multiannual financial framework (MFF) for 2021-2027. JTI's are focused on a specific technical challenge. The Clean Sky JTI objective is "To develop environmentally-friendly and cost efficient aircraft." The ILD can provide a unifying theme for a JTI focused on achieving permanent European presence on the Moon.

A challenge facing the E.U. space sector for activities beyond communications satellites is that it has been

largely the realm of government with some contracting to select private industry. Horizon 2020 and the SME instrument as well as ESA BIC and other instruments are having welcome change, but the 450 billionaires in the E.U. do not include highly visible people like Bezos, Musk, and others that are committed to space settlement. Reusability and other innovations by these space pioneers are driven by the necessity to drive down costs and create revenue generating opportunities to fund greater capacity to permanently reach space.

Thus far the dominant factor in the space sector has been space launch. For various reasons Europe has not developed rockets that can launch human crews or very large payloads into space. Ariane is not a competitor to the American SLS. However, as asteroid mining and lunar development get underway numerous other technologies will come into play. Here the EU will be on a more even playing field with its extensive R&D and industrial capabilities.

The EU space JTI needs a theme that provides comparable motivation for the European space sector as Bezos and Musk for their companies that can drive relentless reduction of costs and widening of opportunities to create a booming, self-sustaining space economy.

The resources of the Moon, asteroids and beyond vastly exceed that of the Earth. But the cost of using these resources has been so high that private industry has had no role. Dramatic reductions in costs can open up space opportunities to industry, but governments need to be involved to provide the incentives to guide pre-commercial development. The ILD can provide the framework to drive this process through competitive international projects through Horizon 2020 and its successor FP9. An ILD framework for the space JTI can drive the E.U. space sector to be among the leading competitors in space in the coming decades. The EU has the human, technical and financial resources to be a

global leader in space development beyond large rockets that will become relatively less important space mining, ecological engineering and other domains grow in importance. The EU as a union of sovereign states has unrivalled capacity to engage international partners.

This paper will present a European space strategy for beyond 2020 and how this can mesh with the International Lunar Decade.