



Political and economical drivers for lunar and planetary exploration

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Fifty year after the beginning of the “space age”, solar system exploration is still a very debated topic, not so much for its scientific value, which is widely recognized, but for its cost in the overall framework of societal support for science & technology. In other words: what is the right level of relative and absolute funding for solar system exploration? This question is particularly acute for ambitious robotic projects, like Mars Sample Return missions, with cost in the multi-billion USD range, and human exploration endeavours, with cost in the tens of billions of USD. Could such cost be justified just for scientific reasons?

For robotic projects, this could be possible, due to the “unique” capabilities of space missions to address fundamental questions like the origin of life in the universe, even if the issue of the relative priorities of space sciences and other researches conducted in Earth laboratories is far from being clear. For human lunar and planetary missions, even if the “uniqueness” factor plays a role too, the scientific value is usually recognised as not sufficient to justify the effort. Other justifications must come into play: political and/or economical rationales.

Geopolitical rationales have always been decisive factors in the development of human spaceflight by the Soviet Union (and her successor state Russia), the United States and the partner states which joined them in ambitious international programmes like the ISS. Which of these factors are still at work in the currently developing international strategies for establishing an outpost on the Moon and aiming towards Mars, involving not only the USA, but the ISS partners as well as new space powers? Are they really shared, or defined differently, by the new emergent human spaceflight powers: China and possibly India? Could human space exploration of the solar system become a

global political rationale, reflecting the recognition of exploration as a common value shared by most people and cultures on the Earth?

The economical rationales must be considered in various timeframes. In the short and medium term, the economic impact of space exploration would be mainly indirect: fostering scientific education and technical innovation. It can also include direct effects through the development of service activities, provided by private entrepreneurs and companies to space agencies. It is however in the long term that human space exploration could lead to the emergence of a real “space economy”, relying on the use of extraterrestrial resources (material, energy) and able to generate profits, in the perspective of what some “pioneers” like Gerald O’Neill have called “space industrialisation”. But what are the real prospects and timeframes for such an evolution?

This paper addresses all these issues, trying not to fall into two traps identified by the great writer and visionary Arthur C. Clarke: overestimating short term changes but underestimating long term realisations.