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Human Exploration of Mars (2)

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CIRA PRELIMINARY ROADMAP FOR THE DEVELOPMENT OF MARS RESEARCH PROJECT

Abstract

Human and robotic exploration is foreseen to be one of the next steps in human space colonization, and it is growing the common vision that Moon, on the pathway to Mars, is the outpost to extend human presence in deep space. Moreover, technologies and knowledge derived from space exploration tests, key factors for a more affordable, easier and quicker access to space, will expand our understanding of the Universe, and create economic opportunities.

In this scenario, CIRA intends to support the national community, involved in space colonization project, through the MARS program. MARS is conceived as a technology-driven effort aimed at maturing a number of technologies and engineering tools necessary to enable future space exploration and colonization missions. Indeed, the Program goal is to develop experimental infrastructures and necessary competences for future human and robotic Martian, Lunar and cis-Lunar exploration and colonization missions, supporting industries, universities and national research centers, to meet the challenges of this extremely promising and competitive sector.

The MARS Infrastructure will be an invaluable analogue for future human deep space missions, enabling research to address human health and performance risks as well as serving as a testbed for critical technologies. Moreover, astronauts can perform preparatory activities regarding robotic missions and assess the potential for resource utilization on the lunar and martian surface and techniques for using them to make exploration sustainable.

The new Infrastructure will provide a valuable contribution to the national system in terms of experimentation, integrating the international existing analogues and thus encouraging a natural increase of opportunities in space exploration for both research and industrial companies.

The present paper gives an overview of CIRA development plan related to Moon and Mars Exploration and Colonization, including the design and realization of test analogue facilities, and investigation and development of enabling technologies. Particular emphasis will be given to the technological areas, that we should investigate, and to facilities currently proposed: environmental facility, Robotic laboratory, Aeolic Tunnel and Celss facility.