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HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)
Human Exploration of Mars (2)

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IAA STUDY GROUP 3.16: ALTERNATIVES FOR HUMAN MARS EXPLORATION MISSIONS

Abstract

The International Academy of Astronautics has set up a Study Group (SG 3.16) to produce a Cosmic Study dealing with human Mars missions. The first results of this work were summarized in a White Cosmic Study presented at the Heads of Space Agencies meeting in Washington D.C. (USA) in January 2014 and now the final draft is ready. The study, focused on a truly international mission, is not aimed to study in detail a 'reference mission' in alternative or to complete other studies performed in the past, but to discuss some important points which need to be clarified before embarking in a detailed mission design. Some alternatives remain open, and the present paper is focused on these points which were raised in the study. The following points are summarized in the paper:

- What are the main risks for the crew?
- What is the minimum number of people which must participate?
- What is the best duration of the stay on Mars?
- How is it possible to strike a trade-off between the scientific goals and the goals aimed to exploration and colonization?
- Is it possible to define an affordable roadmap for a manned mission to Mars as soon as 2031?
- What kind of propulsion (chemical, NTR, NEP, SEP) should be used for the interplanetary journey?

In particular, the last tradeoff is still open and deserves a throughout discussion.