IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations - IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (IP)

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CONCEPTUAL DESIGN OF MARTIAN HABITAT AND LIFE SUPPORT SYSTEM USING IN-SITU RESOURCES

Abstract

The new space race is trying to settle into the interplanetary zone. To survive in the long run, we must settle beyond Earth. Humanity has explored Mars since 1960, and we've never been closer. The next logical step for Mars exploration is the permanent settlement, where crews that go to Mars stay and build a new society. We are taking the first steps now, but there are major problems. It seems to believe that mankind is worth saving and the best way to do that is by spreading ourselves out rather than relying on one planet that could kill us all if we're not careful also if we can terraform mars then it'll teach us how to restore the earth to a friendlier state. A critical element of planning human settlement missions on Mars involves life support systems. The requirements for air, food, water, and waste disposal materials total well over 100 metric tons and possibly as much as 200 metric tons. Recycling and possibly in-situ utilization of indigenous resources on Mars and therefore enabling critical capabilities for self-dependence. Our report is based on a design of a preliminary Martian base as a permanent colony for 110 people and its subsystems as efficient, economical, and practical as possible with current technologies known to mankind. The purpose of this study is to find out the solutions to the problems faced by encouraging colonization on Mars. The first manufactured item I see as interesting is heat shields for domes. Building an entire settlement from Mars-sourced materials is a great goal, and we see the heat shields as being one of the earlier game-changers. The life-support system playing a vital role in colonization has various major problems. Using a cross-sectional analysis, this study analyzed methods to collect water, farm (using hydroponics, aeroponics, and opaline silica harvesting), and generate oxygen from different sources.

Today we implement our knowledge of stars and planets not only in the educational field but in life space science. If the results of this paper are confirmed by further research, a herculean task requiring monumental effort will instead become a difficult but surmountable engineering challenge. In this paper, all these methods will help in creating a great impact to solve the problems faced during the colonization of Mars.

Keywords: Space Life Science, Future Exploration, Mars Settlement, Domes, Life Support System, Colonization