

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 2 (3B)

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CONCEPT OF SAMPLE RETURN ROVER FOR MARS EXPLORATION

Abstract

The ongoing global quest to explore Mars in search for life on the Red Planet and the prospective human habitation on the Red Planet reflects the need of development of new technology and systems to explore Mars in a better way. Much before humans could go to Mars, there is a great need of studying the Martian features in order to explore about the possibility of human survival there. Today when manned mission to Mars remains our primary objective, there is a great need of studying the Martian soils and rocks in physical condition on Earth to check whether the current Martian conditions are habitable for life or not. Sample return mission can be a prospective road map to check whether humans can survive there or not as well as the mission can also be a success in determining the potential locations on Mars where future human colonies can be established. In this direction there is a great need of transporting the Martian samples on Earth to allow their physical analysis. The paper focuses the concept of development of a SAMPLE RETURN ROVER to carry out sample collection on Mars. The design of the Rover is such that it collects the samples using its robotic arm and stores them in the specifically designed sample storage compartment. Once necessary amount of sample has been stored in the compartment, the compartment is closed down in order to prevent any contamination to move inside. The development of this technology can be a great success in our quest to carry out sample return mission to Mars and if the mission is successful, several other similar missions using this technology can be carried out to collect samples from different locations on Mars. Considering the fact that the whole Martian locations are not favorable for human survival and hence collecting samples from different locations on Mars and their physical analysis on Earth can help us in understanding the features of the Martian environment at different locations thus determining the potential locations on Mars which are fit for human survival and human colonies could be established in the near future.