

Exploration of Mars (08)  
Poster Session (P)

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## EXPLORATION OF MARS

### Abstract

GLOBAL SPACE EXPLORATION CONFERENCE  
EXPLORATION OF MARS”  
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Human exploration to Mars – a task to accomplish and confirm potential for humans in quest of new hopes and probabilities of life. In order to explore different planets for life, one of which attracts us is Mars, our sister planet but calls for several technical challenges such as leaving Earth with limited return capability.

ISRO has proven its lunar mission. It is on the verge to send humans for lunar missions which can be possible with success of Reusable Launch Vehicle technologies and Human Space Programs. In order to gain expertise and see various possibilities for Mars exploration , various approaches which are technically feasible , assumptions and hypothesis , research development and technology demonstrations are to be carried out. The success of which can be considered as Reference for future Mission.

#### CHARACTERISTICS OF REFERENCE MISSION:

1. Systematic Development
2. Define requirements for Precursor Robotic mission.
3. Requirements for Human missions
4. Continuous open discussion with International partners

The Primary objective of Reference Mission is to develop with new innovative approach to improve effectiveness, reduce risk and reduce cost.

#### IMPROVEMENTS IN REFERENCE MISSION:

- Architectural Levels - Miniaturization in architecture using Smart Materials, Nano technologies. Simplification and reduction of System Elements.
- Mission Levels – Focus on mission objectives by improving technology that reduces mass and power requirement to improve mission.
- System Levels – Effectiveness of individual system and subsystem to be improved. Automatic, smart sensing and correcting capability to be incorporated.

#### MISSION CONCEPTS:

- Dense tributary networks (ref.fig1) of past presence of liquid water were observed on Mars. Key areas of scientific interest are evolution of Martian climate and possible existence of life.
- Orbital Mapping expertise can be used to determine distribution of hydrothermal mineral deposits, surface mineral composition, sample study of rocks and soil found.
- Intelligent Robotic mission with international collaboration. Much can be done robotically to locate resources prior to arrival of first human creature.
- Highly reliable and advance life support system to be developed which should accounts for high reliability factors for crew. Life support system should have self repairing capabilities. Robust and Protective life jackets and suits should be designed based on the simulation study.
- Artificial Gravity needs to be simulated for sustainability of humans on Mars surface.