

IAF SPACE EXPLORATION SYMPOSIUM (A3)
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DESIGNING A MIE PROBE (MARS IMPACT AND EXPLORE) FOR STUDY OF MARTIAN CAVES
AND LAVA TUBES.

Abstract

With our currently technology it will take around 2-3 years to reach mars. Thus before attempting for human missions we must be sure about the place we are choosing as our new home. The place should be full of resources supporting the astronauts on their mission. The resupply mission would take around 3 years thus the astronauts would be able to produce the basic resources for themselves like oxygen and water. The presence of water or ice would solve half of the problems. Hence presence of ice, a suitable temperature and a radiation free region is very important to harbour life. The MIE project is aimed at looking for resources in yet unexplored martian caves and lava tubes which maybe host to various resources, measure temperature variations and radiations on that particular location.

Purpose of the Project:

Design a Mars Impact and Explore probe capable of controlled maneuvers. The probe will be allowed to crash at the mars surface on a predefined location. Just before the crash the probe will split in two parts into the Impacter and the Explorer. The impacter will crash at martian surface at very high speed resulting in an explosion that will allow the soil from the inner layers of mars surface to come on the surface. The impacter will soon be followed by the explorer probe descending at low speeds compared to the impacter which will analyse the composition of the materials ejected from the surface. After reaching the surface the explorer will analyse the region near the impacter for preferable signs of water or any other resources. The impacter will consist of an Altimeter and an impact resistant Neutron Residual Mapper to map the nearby surface and inner layers of mars enclosing an area in a sphere of radius 10km. The Explorer will consist of a mass spectrometer to map various elements present on the martian surface, thermal probe to measure temperature variations, an analog CCD camera, X-Ray diffuser spectrometer and a radiation meter.

Expected Outcome of the Project:

This probe will go to currently unexplored areas of mars which are very likely to support life. It will look for traces for water and other resources which will complement the future human missions on mars. It will verify a landing site as suitable for human missions.