

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 1 (3A)

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ROBOTIC EXPLORATIONS AS PRECURSORS TO MANNED MISSIONS

Abstract

NASA's Space Exploration Programs along with the interests shown by ESA and China indicate a significant interest in large scale space explorations in the recent years. The International Space Exploration Coordination Group (ISECG) was established with the aim of preparing for human space explorations. Such space explorations are a gradual process where the primary steps are directed at obtaining basic information about the target planet. This paper analyses the importance of Robotic Explorations as precursors to Manned Missions. Such robotic precursors have become particularly relevant in outer space with respect to Exploration of Mars and Near Earth Objects (NEO's) such as 1999 AO10. The NEO's are large in number and each is a small world to explore. The characteristics of one may significantly differ from others and hence an individual database for each is essential before a manned mission. Robotic Explorations are a part of Mission Risks Reduction Strategy (MRRS). Robotic exploration is considered as an integral part of these programs to ensure that adequate information is obtained before a Manned Mission is undertaken and also to reduce the risks to astronauts. Joint missions between robotic and human missions highlight the NEO approach. The 1999 AO10 program includes an automated vehicle to arrive at the asteroid several years prior to the human mission. Prior to sending a piloted mission to Mars or NEO's, additional characterization of the target planet is required. The advantages of sending such precursors are manifold and include an assessment of the nature of surface, hazards to the crew and vehicle and will enable man to be better equipped. Assessment of the Martian surface will be instrumental in preparing a database for all future human missions to Mars. High Resolution cameras for surface identification and mapping; LIDAR (topographical mapping and gravitational field survey); small lander (APXS, micrometeorite counter, dust collector, solar wind/particle collector, imager, radiometer, etc.) may form a part of Robotic Missions. This paper presents profound arguments for making Robotic Missions a precursor to Human Missions as part of Space Exploration Programs.