

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Radiation Fields, Effects and Risks in Human Space Missions (4)

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ANALYSIS OF RADIATION EFFECTS ON ASTRONAUTS FOR A MANNED MISSION TO MARS  
USING NUCLEAR SPACE PROPULSION

**Abstract**

In the advancements of propulsion techniques using nuclear space propulsion methods, one of the main objectives of the scientific community lies in a manned mission to the mars. The effective design of the mission needs various safety systems in place along with the measures for the protection of astronauts. In this view the crew chamber, reactor core, radiation shield and reflectors need to be designed with higher expectations as compared to a non-nuclear propulsion system. The life support systems to the astronauts will be more specific to the mars environment. In this paper, we describe the mission design with six manned crew with a gas core reactor designed to work with uranium hexafluoride. Material aspects of the mission, internal radiation due to microgravity fission reaction, radiation to the space environment will be considered. The operation of the spacecraft under critical conditions will be presented as a case future mission planning. The total radiation allowed in protecting astronauts from the risk, as well as effective measure that can be a possibility in reducing total amount of radiation exposure is the major concentration in the paper. The experiences in the planetary exploration will result in development of future missions in solar system exploration, deep space missions and Interstellar travel. Most research to date has been generated towards concepts that offer tremendous performance improvements over current systems. The only problem today is that virtually all of these technologies like electrical propulsion, nuclear thermal propulsion, and plasma propulsion and anti matter beamed- energy sales have very fundamental scientific issues that need to be addressed in the near future. The efforts of this work will be one its kind in addressing radiation effects to the crew in a view manned mission to the mars, regardless of the method of propulsion, as well as specific case of gas core reactor utilization. The necessary external as well as internal shielding will be calculated with keeping the overall mission parameters in mind. The paper will also make projections on other manned missions to further destinations in the solar system using the same shielding system