Paper ID: 69000
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IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Sciences on board ISS and beyond (6)

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MICROGRAVITY SLOSHING FOR MARS HABITAT USING IN-SITU METHOD

Abstract

Reduced gravity is a very important factor on ISS, and under that, we examine the behaviour of liquid inside the container. Therefore, it is essential to understand how propellants behave inside the container to increase the safety and efficiency of future engine designs. As ISS provides a low gravity environment means low acceleration due to which shape of the liquid-gas interface, resonant frequencies for the container and amplitude in response to the motion of liquid in the container varies. Also, if wave amplitude becomes so large, then it creates a problem on ISS or in long term flight missions on deep space gateway. Here in this model Slosh payload includes the slosh avionics box, centre hub, backdrop, frame arm, saddles and cameras due to which we predict the shape of the gas-liquid interface by balancing two forces majorly Surface Tension and acceleration. Here instability problem also reduces. Thereby disturbance in oscillatory during the first half of cycle and other half stabilizes. Key results would be more clearly identifying the fluid motion with the help of CFD that provides function exchange between liquid and gas. To maintain a liquid state and high-pressure conditions Kerosene mixture of hydrocarbons which is obtained from fractional distillation and Liquid Hydrogen would be used. Summarize as Sloshing increases the acceleration level then it can be reduced by installing the system of baffles or it can be Aluminum Foam. So, for future space missions like MARS habitat space exploration, our priority is more towards increasing our safety protection and designing the engine in such harsh temperature conditions accordingly.