

HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)
Poster Session (P)

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NUCLEAR SPACE PROPULSION MISSION TO THE OORT CLOUD: MISSION POSSIBILITIES AND
CHALLENGES

Abstract

There are many milestones when it comes to creating a space mission that will allow us to travel and explore the far reaches of our solar system. It is essential to make sure that the solar system is thoroughly mapped and explored so that a mission can take place for interstellar flight as well. One of the major destinations that you can reach would be the Oort cloud as it encompasses the far reaches of our Solar System and then it transcends beyond it as well to the Interstellar space. However, a manned mission to the Oort Cloud can be very challenging as there would have to be a fast transportation system that is available for such a difficult and long distance journey. Nuclear Propulsion methods using Gas Core Nuclear Reactors with Uranium Hexafluoride seems to be the best as it would give high specific impulses in the order of several thousands and that can be essential in getting the required exhaust velocity to reach such a distant objective. Furthermore, using a gaseous core rocket would also allow the production of electricity which will power up the main systems of the spacecraft for life support, navigation and for other support systems. The amount of fuel that needs to be kept on the spacecraft will also be very low and this would leave more space in the spacecraft for the astronauts as well as for the required payloads. This paper will do a full mission planning for such a mission by focusing on the aspects of the nuclear reactor. The same principles can also be applied for a robotic mission to the Oort cloud as well for a precursor mission.