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LUNAR MINING AND PROCESSING FOR HE 3 POSSIBILITIES AND CHALLENGES

Abstract

It can be well noted that the Moon contains Helium-3 which is deposited by the solar wind and many other resources such as hydrogen, water, nitrogen and other carbon containing molecules, but most of these resources have to be extracted. A fusion of Helium-3 and deuterium can be used to provide massive electrical energy in power plants. Fusion of Helium-3 and deuterium can also be used as rocket propellant, which will enable more deep space mission. In order to gather such valuable resources lunar mining have become essential, but for lunar mining many challenges has to be faced. The moon has no atmosphere for protection making it vulnerable to cosmic radiation, solar wind and micrometeorite impacts. As a result, the moon's surface is covered with a thin layer of fine, charged, reactive dust capable of entering habitats, and vehicle compartments, where it can cause crew member health problems as well as vehicle mechanical problems. This paper has discussed the trajectory of a robotic spacecraft that start revolving the moon, after dropping a container to the Moon surface. The trajectory of the robotic spacecraft is such a way that for each revolution of the moon it goes closer to the moon surface where the container has land. This trajectory of the spacecraft has been calculated using coding. Meanwhile the dropped container will open and eject multiple mini-mining vehicles over a particular square area on the Moon's surface before landing. The trajectory of the ejected mini-mining vehicles have also been calculated using coding. Further the mini-mining vehicles will work in formation over the area as per coding. The mini-mining vehicles from the container will fill the container with resources of Helium-3 and once the container is filled with resources of Helium-3, it is once again picked up by the spacecraft and returned to Earth. In this paper we have also discussed about the possible methods and the challenges faced during the mission. The design of the mini-mining vehicles along with the mining and drilling method used are also considered and discussed here, so that the dust from the Moon does not affect the mini-mining vehicles.