

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Space Transportation Solutions for Deep Space Missions (8-A5.4)

Author: Ms. Vanshika Arora
University of Petroleum and Energy Studies, India, vanshikaarora0605@gmail.com

Mr. Hitesh Dhawan
University of Petroleum and Energy Studies, India, hiteshdhawan31@gmail.com

IN-SITU RESOURCE EXPLOITATION OF ASTEROID MINING: ENDEAVOUR TO EXPLORE

Abstract

Asteroid Mining is the eradication of raw materials from asteroids or from Nearby Earth Objects. Since Earth's resources are not illimitable, the abundance of asteroidal ore gives asteroid mining the potential to provide proximately abundant resources, which would essentially eliminate scarcity for extinguishing materials. According to scientific research communities, it is possible that our planet will run out of requisite elements that are needed for modern industry and food production within the next 50 to 60 years. Mining asteroids is not a facile task. Difficulties include the high cost of spaceflight, unreliable identification of asteroids which are congruous for mining, and ore extraction challenges. Thus, the paper discusses the utilization of the Artemis mission which will land the first woman and the next man, on the Moon by 2024. In order to exploit that idea we send a spacecraft to the Lagrange point between the Earth and Moon, where a small object i.e. spacecraft will maintain its position relative to the astronomically immense orbiting bodies. Then, the asteroid is captured by the spacecraft and carried to the lunar orbit. This will open a gateway for Astronauts to perform the mining operations on asteroid. Astronauts can also use water from asteroids, splitting it to liquid oxygen and liquid hydrogen for rocket fuel. In this process, hydrogen fuel mined from asteroids costs less than fuel from Earth due to high costs of escaping Earth's gravity. This paper explores the possibility to perform asteroid mining operations with the help of artemis mission which not only minimizes the cost of spaceflight, but additionally availed to check the feasibility of the mission.