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IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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TRANSPORTATION AND MINING ON MOON

Abstract

The aim of this research is to create the necessary transportation system and technologies for the transportation of "Helium-3" element found on the lunar surface to Earth due to the depletion of energy resources on Earth. The most common way of obtaining energy on Earth is fossil fuel energy. However, fuel reserves are gradually depleting and damage the environment both during its extraction and use. The only energy that can provide more energy than fuel energy is atomic energy. Atomic energy is obtained by two methods - nuclear fusion and nuclear fission. Nuclear fusion allows us to get many times more energy than nuclear fission and is much cheaper. Also, since fewer neutrons are vaporized during nuclear fusion, less radiation is emitted and the environment is hardly polluted with radioactive waste. However, the most important element needed for nuclear fusion, "Helium-3", is very scarce on our planet. This is why nuclear fission is used for atomic energy today. Because without enough Helium-3, fusion is very difficult to control. Harrison Schmidt, the only geologist astronaut of the US Apollo program, discovered traces of the element Helium-3 on the lunar surface during the last Apollo mission. According to him, it is possible to synthesize Deuterium with Helium-3 to obtain unlimited, safe and cheap atomic energy. But mining the lunar soil to purify this element, keeping people there and transporting this soil to Earth will cost billions of dollars. One proposed solution is to send remote-controlled robots to the lunar surface for mining. Another is that the processing will be done from orbit, not from the lunar surface. This will allow pure Helium-3 to be delivered directly to Earth instead of heavy lunar soil. The final step, the safe delivery of pure Helium-3 to our planet, will be carried out using reusable Starship space rockets designed to carry cargo and people from the Moon and Mars. Unlike conventional space rockets, Starship rockets can return to their launch platform and make a soft landing. This is also the basis for easier and cheaper transportation of pure elemental material back to Earth without damage. The stages consisted of Miner robots digging up lunar soil and sending it to an orbiting processing facility where the helium would be purified and then transported to Earth by Starship rockets. This transportation system would also avoid future energy problems on Earth.