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ARTIFICIAL GRAVITY SPACE VEHICLE USING LARGE LIQUID LOOP WITH CYCLIC ELECTROMAGNETIC DRIVE

Abstract

In recent yearsmore and more astronauts have visited to the space station for scientific experiments with the rapid progress of aerospace science and the technology. But long-term exposure to weightlessness leads to a chain-reaction of undesirable physiological adaption, which can have a big influence on astronauts' health. One solution to overcome the weightlessness problem is to provide an artificial gravity environment. This paper gives an introduction to the artificial gravity space vehicle, which uses large liquid loop with cyclic electromagnetic drive. Artificial gravity arises from centripetal acceleration in the rotating space vehicle, which is drived by the large liquid loop where the fluid (e.g. ionic liquid) flows under the electromagnetic field. The various principles of it are given in the paper. Based on the research of bioastronautics about the artificial gravity, the structure and the material of the space vehicle is designed. The paper also presents the process of the space vehicle's work. Compared with other artificial gravity equipment, the space vehicle in the paper can produce continuously an artificial gravity environment for more astronauts with lower power consumption, and it doesn't need a large bearing to provide the rotation. At last, significance and challenge faced in future research on the artificial gravity space vehicle are discussedand we believe that it offers a potential avenue to live in space permanently.