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ARTIFICIAL GRAVITY SLEEPING STATIONS IN SPACE

Abstract

Long time exposure of human body to microgravity causes various problems such as muscle atrophy, deterioration of skeleton (Spaceflight osteopenia) etc. Possible solution is to produce artificial gravity by rotation of space station, so as to simulate the gravity on earth. This will solve the health problems associated with microgravity. Artificial gravity can be created using a centripetal force. A centripetal force directed towards the centre of the turn is required for any object to move in a circular path. In the context of a rotating space station it is the normal force provided by the spacecraft's hull that acts as centripetal force. Thus, the "gravity" force felt by an object the centrifugal force perceived in the rotating frame of reference as pointing "downwards". Problem associated with rotating space station is if a spacecraft's rotating portion were too small, residents would feel a huge difference in the force imposed on their heads and what they felt on their feet. They'd end up dizzy and lightheaded because blood would be drawn down, away from the brain. For this problem to not exist, spacecraft have to very large (larger than a football field). ISS, in comparison, is basically the size of a small apartment. Since it is not currently feasible to create a rotating space station, it is advised to create small spherical stations in which artificial gravity is present where astronauts can sleep. Small rotating portion will pose a problem of difference in the force imposed on head and feet but this problem will not exist if the person is in sleeping position i.e. if their whole body is at same distance from centre of the rotating sphere. Artificial gravity sleeping station will considerably solve the health problems associated with microgravity. For e.g. Since a astronaut have to sleep at least 8 hours in 1 day, if they sleep sleeping stations then it would decrease the loss of bone density at a rate of 33.3% as compared to a person which is experiencing microgravity at all times. It is not a complete solution to the health problems associated with microgravity but it can be effective in controlling the problem till the time it becomes feasible to create rotating space station. All the parameters, design specification and technology requirement of rotating sleeping station will be provided with supporting data and calculation.