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CAPTURED COMET NUCLEI AS SPACE RESOURCE FOR INTERPLANETARY FLYING

Abstract

Nearly 40000 objects at least 3 meters in diameter move through Near-Earth space every year. In the majority, they are the asleep fragments of long ago destroyed comet nuclei. Sometimes they collide with Earth or Moon and produce powerful explosions in an earthly atmosphere or on the surface of Moon (this was the base of their abundance estimations). Their average velocity relative to the Earth is about 20 km/s. Among 100 bodies that daily move through the sphere with radius 1500 thousand kilometers surrounding the Earth, it is possible to find the one that moves in the desired direction. If we will deliver a small ramjet on such comet nucleus, then it can work on solar energy and use the substance of comet for the propulsion. It is possible to warm the vapor by means of a concave mirror (solar concentrator), up to the temperature 1300 in a chamber before the nozzle of the ramjet. Changing orientation of the nozzle it is possible to steer the direction of ramjet traction and to use it for the stop of rotation of comet nucleus. As a mass of such comet nucleus is many tons, and solar energy is an ever-living source, a proposed comet engine will interestingly use as a tug for interplanetary flights. A resource of comet engine will be sufficient not only for the processing of all substance of the trapped comet but also for the use of the same engine after its delivery on other comet nuclei. Thus, a comet tug can be repeatedly used for towage of space vehicles in an interplanetary environment. Those comet nuclei that fly through the Near-Earth space are comparatively shortly above-ground bodies. They must be evaporated by solar radiation on a few tens of thousands of years. Therefore the existence of a large number of fragments of comet kernels in the area of the orbit of Earth must be supported by an inflow from more distant areas of the Sunny system. Consequently, the use of present comet nuclei will not inflict damage to the space environment