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RESEARCH ON THE PRELIMINARY CONCEPTUAL DESIGN OF ORBIT TRANSFER VEHICLE BASED ON NUCLEAR THERMAL POWER

Abstract

The nuclear propulsion system is an aerospace propulsion system using a nuclear heat reactor as a source of energy for the propulsion system. The system has the advantages of large thrust, high specific impulse, long working time, simple structure, reusable and less fuel consumption. It is an important technology for the development of space technology. An orbit transfer vehicle can transport low orbit load to high orbit or transport loads among different orbits. It can also help spacecraft which are damaged or needed to reduce orbit slow down to lower orbit. So it can be called "space mailman" or "space ferry". In this paper, the preliminary conceptual of the reusable nuclear thermal power orbit transfer vehicle configuration will be studied. To meet the requirements of a variety of tasks, life needs, and economic requirements, Three kinds of orbit transfer vehicles are proposed in this paper. There are cargo spaceship, Manned spaceship and Universal spaceship. Through the investigation of foreign spacecraft and satellites, the basic overall parameters of the nuclear thermal power orbit transfer vehicle are determined in this paper. Based on this these, a dynamic model of nuclear thermo dynamic obit transfer vehicle is established using the theory of orbital dynamics and simulated the transfer process using the commercial software. In the end, the feasibility and advantages of the proposed scheme are compared with the traditional type of orbit transfer vehicle such as chemical power and electric push.