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INVESTIGATIONS ON SPACE TRANSPORTING SYSTEM SERVED FOR LONG-TERM ON-ORBIT SPACE STATION

Abstract

Space station, which is long-term on-orbit aircraft, is the base for scientific research with human directly involved in low Earth orbit. Two primary functions of space station were concluded: the national lab for scientific experiments, and the platform for technical development. Several space stations had launched since 1986, and only the International Space Station is still on orbit currently. Throughout several decades of developing history, the key technologies on the large-scale space station had been validated enough, and main task of space station turned to be the application task. Such characteristics of experiments developed on space station during operation phase were investigated in this study. The International Space Station, as a typical case for space station, was investigated to find some law for the initial stage for operation, and it was found that the space transporting system played an important role in keeping on-orbit experiments and investigations in order, especially for the reentry transporting system. The International Space Station once faced the shortage of the reentry capability, which had caused belt-tightening in the application task, and upmass and downmass of Expedition 37/38 could describe the circumstances. Considering the transporting capability of the International Space Station, comparison analysis of transporting system and cost-effectiveness was investigated and given in this paper. Requirements of space transporting system were analyzed in this paper. As the space station could last several decades on orbit, and the construction process was a huge cost as well, how to keep the research work of space station in order and make full use of it were the priority among priorities, while the space transporting system was considered as a prerequisite. The reentry space transporting system was emphasized as a key element among the space transporting system of the mission requirements, and perspectives of future reentry space transporting system, which may provide reference for China's space station Program.