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THE DEVELOPMENT PROSPECT AND KEY TECHNOLOGY OF SPACE NUCLEAR PROPULSION SYSTEM

Abstract

Beijing S-Motor Aerospace Innovation Co., Ltd. is the first China private national high-tech enterprise focusing on providing overall solutions for commercial aerospace power systems. Its business covers the propulsion systems of commercial launch vehicles and commercial satellite, and other advanced aerospace propulsion technologies, including nuclear propulsion technology.

Nuclear propulsion have become a study hotspot in aerospace industry for a long time because its high energy and high performance. Recently, more and more related researches and tests for various aerospace systems are emerging, especially in US and Russia. In this paper, the nuclear propulsion technologies are classified and introduce at first, then the related international studies are summarized, including recent Russia nuclear propulsion cruise missile, and the key technologies and corresponding solutions for each nuclear propulsion type are analyzed. The application prospects of each nuclear propulsion type in various space missions in the future are analyzed, and relevant suggestions are given.

Finally, the propulsion system analysis of the interstellar transfer vehicle for human Mars exploration is carried out, and the chemical propulsion technology, nuclear electric propulsion technology, nuclear thermal propulsion technology and nuclear fusion propulsion technology are comprehensively compared and analyzed. The system technical scheme and nuclear engine scheme of the interstellar transfer vehicle are given, which can meet the needs of future manned Mars exploration missions.