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THE RESEARCH STATUS AND STRUCTURAL KEY TECHNIQUES OF SPACE STATION AND MANNED SPACECRAFT

Abstract

With the success of the launch mission of the Long March-5-Y3 rocket, three missions will be planned for the Long March-5 in 2020, including the new manned spacecraft mission, the Mars probe mission, the Chang'e-5 sampling and return mission, and the construction of the Tian-gong space station will be fully launched. Starting from the development of space station, the functions, scale and characteristics of four generations of space stations are analyzed, and the composition, operation mode and cooperation relationship of Tian-gong space station which will be constructed soon in China are introduced. Because of manned spacecraft closely related to the space station, the Orion manned spacecraft designed by Lockheed Martin of the United States, the SpaceX Dragon spacecraft, the Boeing CST-100 starship and the China Shenzhou series manned spacecraft are compared and analyzed, and the design, test and operation of the current advanced spacecraft are introduced. The latest achievements of foreign advanced structural design and testing institutions in space structure are investigated. The application requirements of the advanced materials, such as high strength aluminum, carbon fiber composites, ceramic material, and the advanced structural styles, such as lattice structure, sandwich structure, corrugated plate structure, mesh reinforced structure, in space station and manned spacecraft are obtained.