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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Planetary protection requirements for deep space probes

深空探测器行星保护要求

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1.Structure and drafting rules for standardization documents" Drafting is required. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed and coordinated by the National Technical Committee for Standardization of Aerospace Technology and Its Applications (SAC/TC 425). This document was drafted by: Beijing Space Vehicle General Design Department, China Academy of Space Technology, China Aerospace Standardization Institute, Beijing Satellite Environment Engineering Institute. The main drafters of this document are. Wen Bo, Xu Kanyan, Peng Jing, Zhang Yinan, Zou Leyang, Quan Haofang, Meng Fanwei, Jin Shengyi, Dong Jie, Zhang Wangjun and Zhang Ningkang.

Planetary protection refers to a set of policies and practices that protect future science by limiting biological contamination of the Earth during planetary exploration. In addition, measures are taken to prevent the return vehicles from deep space exploration missions from causing harmful biological contamination to the Earth's biosphere. In space exploration, the exploration of whether there is extraterrestrial life is of great significance to mankind and is the main scientific research subject of deep space exploration in various countries. To ensure the effectiveness and scientificity of scientific exploration results and prevent biological cross-contamination between extraterrestrial bodies and the Earth, Planetary protection is of great importance. Article 9 of the United Nations Outer Space Treaty states that "each State Party shall, when conducting research and exploration in outer space, protect it from any harmful effects." harmful pollution, and to prevent adverse effects on the earth's environment caused by foreign matter"; Articles 10, 11 and 12 of the Outer Space Treaty The provisions in this document are also related to planetary protection. Commissioned by the United Nations, the International Council for Science (ICSU)'s Space Research Committee COSPAR is responsible for formulating international policies on planetary protection. COSPAR has set specific requirements for different exploration targets and mission forms. The planetary protection requirements of different types of missions are

continuously developed and improved based on the actual conditions of deep space exploration missions of various countries. International planetary protection policy. This document refers to the policy requirements of COSPAR and combines the actual development of my country's spacecraft to propose planetary protection requirements for deep space probes. The formulation of this document can fill the gap in the top-level standards for planetary protection in my country and provide relevant information on planetary protection for my country's deep space exploration activities. to provide norms and guidance to facilitate relevant international exchanges and cooperation. Planetary protection requirements for deep space probes

1 Scope

China's national planetary protection requirements for deep space probes. Planetary protection is the discipline of not contaminating other bodies with terrestrial life, and of not contaminating Earth with anything returned. It is an obligation under the Outer Space Treaty and is administered internationally through categories: a flyby of a body with no possibility of life needs little, an orbiter or lander at Mars or Europa needs its bioburden reduced and its trajectory biased so that it cannot impact accidentally, and a sample return needs containment on the way back. The scientific argument is straightforward - a mission searching for life that carries its own would produce a result nobody could interpret - and the practical requirement is severe, since spacecraft assembly cleanrooms are not sterile and the organisms that survive them are precisely the ones selected for surviving hostile conditions. China's lunar and Mars programmes make these requirements operational.

This document specifies the categories and requirements of planetary protection for deep space exploration missions, the goals and principles of planetary protection for deep space probes, As well as the planetary protection work projects, technical requirements and management requirements that need to be carried out at each stage of deep space probe development. This document applies to planetary protection work throughout the entire cycle of unmanned deep space probe development and on-orbit operation.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies. in this document.

GB/T 30114 (all parts) Terminology of space science and its applications

3 Terms and definitions

The terms and definitions defined in GB/T 30114 (all parts) and the following apply to this document.

3.1 Targeted body Extraterrestrial objects such as planets, dwarf planets, satellites, asteroids and comets that are targets of deep space probes.

3.2 Planetary exploration Detection and sampling research of planets, dwarf planets, satellites, asteroids and comets other than the Earth in the solar system and interplanetary space Activity. Examples. Mars exploration, exploration of solar system planets. [Source: GB/T 30114.1-2013, 3.1.2]

3.3 deep space probe A spacecraft composed of fully functional scientific instruments and platforms, with clear observation objects and planetary exploration research goals.

3.4 planetary protection In space activities, certain prevention and control measures are taken to avoid cross biological contamination between the Earth and the target celestial body.

3.5 forward contamination prevention Destination Pollution Prevention In space activities, protection measures are taken to avoid contamination caused by the introduction of Earth life and other organic matter into other planets. [Source: GB/T 30114.5-2014, 6.8, modified]