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Guideline for technology readiness assessment in aerospace engineering

航天工程技术成熟度评价指南

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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 of Standardization Documents" Drafting. Please note that

some of the contents of this document may involve patents. The issuing agency of this document is not responsible for identifying patents. This document was proposed and managed by the National Aerospace Technology and Application Standardization Technical Committee (SAC/TC425). Drafting organizations of this document. China Institute of Aerospace Standardization, China Manned Spaceflight Office, National Defense Science, Technology and Industry Bureau Lunar Exploration and Aerospace Engineering Center, China Satellite Navigation System Management Office, China Academy of Launch Vehicle Technology, China Academy of Space Technology, Chinese Academy of Sciences Space Application Engineering and Technology Center, Beijing Special Engineering Technology Research Institute, Beijing Tracking and Communication Technology Research Institute. The main drafters of this document. Li Yuesheng, Hu Yun, Xu Dongyan, Li Yingliang, Zhang Zhe, Feng Jianguang, Liu Guoning, Wang Nanhua, Wang Junwei, Guo Yongqiang, Zhu Enyong, Guo Xiaohui, Chen Lei, Bai Fan, Zhang Di, Jiao Shuhan. Guidelines for the Evaluation of Aerospace Engineering Technology Maturity

1 Scope

China's national guideline for assessing technology readiness in aerospace engineering. It specifies the terms and definitions, the general provisions and the determination of readiness. Technology readiness levels are a scale from a basic principle observed to a system proven in operation, and they exist to answer a question that wrecks aerospace programmes when it is answered optimistically: is this technology ready to be committed to a project. The failure mode is well documented. A promising technology is assessed as more mature than it is, a programme is planned around it, and the development that should have happened beforehand happens instead inside the programme - late, expensively, and on the critical path. Formalising the assessment does not make the judgement easy, but it makes it explicit and reviewable, and it obliges someone to state what evidence supports the claimed level.

This document provides the general rules of the aerospace engineering technology maturity evaluation, the determination of the evaluated technology and its sub-technology, and the determination of the technology maturity level. The engineering stage corresponding to the technical maturity level, the technical maturity evaluation procedures and methods, and the relevant parties in the technical maturity evaluation work Guidance in terms of responsibilities, implementation points of technical maturity evaluation and other aspects. This document is applicable to the various stages of aerospace engineering in project demonstration, engineering development, flight test and on-orbit operation, and is aimed at launchers and spacecraft. Hardware and software technology, aerospace manufacturing technology, space test and application technology, aerospace test launch and recovery technology, aerospace measurement and control and operation control Technology, etc., the evaluation of technological maturity carried out. The technical maturity evaluation of other projects in the aerospace field or other types of technologies can also

be implemented by reference.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to This document.

GB/T 19000 Quality Management System Foundation and Terminology

3 Terms and definitions

The following terms and definitions defined in GB/T 19000 apply to this document.

3.1 Technologyreadiness The maturity of the technology through research, development, verification and application.

3.2 Technologyreadinesslevels The division and degree of a technology from the discovery of the basic principles, through the mature process of technical research, test verification and engineering application The quantity is used to indicate the state of the technology, the degree of mastery and the level of engineering application.

3.3 Technology readinessassessment By pre-setting the technology maturity level, the evaluated technology is based on the basic principle, application plan, technical research, model (prototype) Technical management activities of objective, independent, systematic and standardized evaluation in aspects of research and development, test verification, technical appraisal, and engineering application.

3.4 Launch vehicle; launcher A vehicle that sends a spacecraft into orbit in space.

Note. Such as launch vehicles.

3.5 Spacecraft In the outer space (space) outside the earth's atmosphere, an aircraft that performs specific tasks such as exploration, development, or use of space.

Note. Such as artificial earth satellites, manned spacecraft, space stations, space probes, etc.