

ICS 49.140
CCS V75



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 42634-2023

**Space data and information transfer systems - Design
requirement of onboard data monitoring and control**

空间数据与信息传输系统 星载数据管理监控设计要求

Issued on: May 23, 2023

Implemented on: September 1, 2023

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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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: Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents: This document is proposed and managed by the National Aerospace Technology and Its Application Standardization Technical Committee (SAC/TC425): This document was drafted by: National Space Science Center of Chinese Academy of Sciences, Beijing Space Vehicle Overall Design Department, China Aerospace Standardization Research Institute Research Institute, Beijing Institute of Tracking and Communication Technology, Guangdong Ruizhou Technology Co., Ltd., Zhongguancun Spatial Information Industry Technology Alliance: The main drafters of this document: Lu Liangqing, Fan Zuowei, Xu Haitao, Zhou Yuxia, Liu Chonghua, Xue Changbin, Huang Yonghui, He Xin, Huang Lei, Zhao Xunfeng, Guo Huazhong, Ma Guanghao, Ouyang Ling, Tang Xiaoxiao: Space Data and Information Transmission System Design requirements for on-board data management and monitoring

1 Scope

GB/T 42634-2023 specifies how a spacecraft watches itself. A satellite generates far more housekeeping data than its downlink can carry, and the ground can only look at it when there is a pass. So the monitoring has to happen on board: parameters checked against limits as they are produced, conditions combined so that a meaningful event is reported rather than a thousand individual readings, and only the significant part sent down. Designed loosely, this either floods the link with noise or misses the one anomaly that mattered. This document specifies the monitoring design requirements for onboard data management in space data and information transfer systems, covering the description of

the monitoring service, the design of monitoring management, the design of individual parameter monitoring, the design of combined or comprehensive monitoring, and the data requirements underlying all of it. Under ICS 49.140 and CCS V75, it is written for spacecraft data handling and avionics designers, for the ground segment teams who have to interpret what comes down, and for the mission assurance function that has to be satisfied the vehicle will report its own trouble.

This document specifies the monitoring design requirements for space data and information transmission system spaceborne data management, including monitoring business description, monitoring management The design requirements of management, the design of parameter monitoring, the design of comprehensive monitoring, the data requirements of monitoring reports and design verification, etc: This document applies to the monitoring and control processing design for data management on spacecraft (satellites, probes, spacecraft, space stations, etc:), other spaceborne Application and ground operation control management can be used for reference:

2 Normative references

The content in the following documents constitutes the essential provisions of this document through normative references in the text: Among them, dated references, Only the version corresponding to the date applies to this document; for undated references, the latest version (including all amendments) applies to this document document:

GB/T 42041 Terminology for Space Data and Information Transmission in Aerospace

3 Terms and Definitions

The terms and definitions defined in GB/T 42041 apply to this document:

4 Description of monitoring business

1 General requirements 4:1:

1 On-board monitoring is the autonomous response and management of on-board data management to the status of the monitored object, that is, to monitor the parameters according to the specified conditions: If the specified conditions are met, the corresponding countermeasures will be automatically taken: The purpose of spaceborne monitoring is to reduce the ground The cost and difficulty of monitoring and operation can improve the accuracy and timeliness of the spacecraft's handling of specific situations: 4:1:

2 The conditions of the monitored parameters include three types: range, expected value, and variation:

a) Range type: There are 3 cases: the upper and lower limit values of the parameter ($a \leq x \leq b$), only the upper limit value ($x \leq b$) or only the lower limit value ($x \geq a$): Among

them, x represents the parameter value, and a and b represent the value of the parameter range:

b) Expected value type: analog value and its error range (that is, $x \pm \Delta$, Δ represents the deviation range of the parameter value), 1 or 0 of the switch value, digital The fixed value of the quantity, etc:

c) Variation type (Δx): the upper and lower limits of the offset of analog or digital quantities ($\Delta_1 \leq \Delta x \leq \Delta_2$), only the upper limit ($\Delta x \leq \Delta_2$) Or only the lower limit value ($\Delta x \geq \Delta_1$) a total of 3 cases: Among them, Δ represents the deviation range value of the offset value, and the subscript identifies different deviation range values: displacement: 4:1:

3 The design of spaceborne monitoring does not exist in isolation: It needs the necessary supporting capability mechanism provided by the spaceborne data management structure: Service design is determined:

a) Instruction acquisition mechanism: support on-board monitoring to obtain the required external commands, and configure and manage on-board monitoring: main form of expression is data injection: