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

**GB/T 43223-2023**

**Space object orbital data specification**

空间物体轨道数据规范

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### 1 Scope

China's national specification for space object orbital data. The data in question describes where an object in orbit is and where it will be, and the specification fixes how that is expressed and exchanged. It matters because the orbital environment has become crowded enough that collision avoidance is a routine operation: an operator receives a conjunction warning, assesses it against their own knowledge of their spacecraft's position, and may manoeuvre. Every step of that depends on orbital data being exchanged in a form both parties can use, with its accuracy and its epoch stated - a prediction without an uncertainty is not actionable, since it cannot be judged against a miss distance. China operates a large and growing share of active satellites and its own space surveillance network, and a national specification aligned with the international data formats is what allows its data to enter that exchange.

This document specifies the elements, format and description of orbital data of space objects. This document applies to the characterization of orbital data of artificial space objects such as spacecraft, launch vehicles, space debris orbiting the Earth, and of natural space objects such as near earth asteroids orbiting the Sun. The characterization of orbital data of other spacecraft orbiting a celestial body in the solar system can also refer to this document.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 7408, Data elements and interchange formats - Information interchange - Representation of dates and times

GB/T 29079, Classification and parameter symbols for orbits and trajectories of spacecraft

GB/T 32296, General coordinates for space vehicle

GB/T 34513, Space debris mitigation requirements

### 3 Terms and definitions

For the purpose of this document, the following terms and definitions, as well as those given in GB/T 7408, GB/T 29079 and GB/T 34513 apply.

3.1 astronomical unit; AU A unit of length for measuring distances within the solar system, equal to the average distance between the Sun and the Earth, with a specific value of 149 597 870.7 km.

3.2 near earth asteroid; NEA Asteroids orbiting the Sun in the solar system, whose perihelion is within

1.3 astronomical units of the heliocenter.

### 4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply. CCSDS: Consultative Committee for Space Data Systems GCRS: Geocentric Celestial Reference System IAU: International Astronomical Union ICRS: International Celestial Reference System MPC: Minor Planet Center OEM: Orbit Element Message OMM: Orbit Mean-element Message OPM: Orbit Parameter Message UTC: Coordinated Universal Time

### 5 Artificial space objects orbital data specification

5.1 General The artificial space objects orbital data is used to describe the state parameters of the orbit of the corresponding artificial space objects around a certain central celestial body, usually including orbital data and related dynamic parameters.

5.2 Space-time reference system The time reference system uses UTC; the space reference system is defined according to GB/T 32296 and is based on ICRS: the coordinate origin is the center of mass of the central gravitational body, and the coordinate plane and coordinate axis point in the same direction as ICRS.

Note: Taking an artificial space object orbiting the Earth as an example, the corresponding coordinate system is GCRS. For the calculation of parameters such as precession and nutation related to the coordinate system, it is recommended to use the IAU1980 and newer models.

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