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Space objects long-term evolution model

空间碎片环境演化模型

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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 of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

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Space debris environment evolution model

1 Scope

This document specifies the algorithm and computational process of the space debris environment evolution model.

This document is applicable to the prediction of the long-term evolution trend of the space debris environment on a large time scale, as well as satellite launch and post-mission disposal, active Assessment and analysis of the long-term impacts of various mitigation measures, policies, and regulations, such as debris removal, on the space debris environment.

2 Normative references

GB/T 32308-2015

GB/T 34513-2017

GB/T 43223-2023

GB/T 45621-2025

GB/T 45742-2025

3 Terms and definitions

GB/T 34513-2017, GB/T 32308-2015, GB/T 43223-2023, GB/T 45742-2025 and GB/T 45621- For the purposes of this document, the following terms and definitions are applicable.

3.1

The probability of successfully completing the disposal measures that meet the requirements of the mitigation rules after the spacecraft or launch vehicle orbital stage

completes its established mission.

3.2 post-missionlifetimelimit

The limit on the remaining on-orbit life of a spacecraft or launch vehicle orbital stage after successful completion of disposal measures consistent with the requirements of mitigation regulations.

Note. Currently it is generally 25 years, and it may be reduced in the future as the number of spacecraft increases.

3.3 Disposal orbit

The orbital region where a satellite may be retained after successfully completing disposal measures consistent with the requirements of the mitigation rules.

3.4

Based on the mechanism of space debris generation and reduction, the space debris orbit is predicted by considering factors such as space launch, on-orbit collision, disintegration and orbit evolution.

A mathematical model for the long-term (centennial) evolution of the environment.

Note. It is mainly used to evaluate the effect of space debris mitigation and is the basis for formulating relevant rules and policies on space environmental protection.