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Lifetime estimation method of space debris in low earth orbit

低地球轨道空间碎片寿命计算方法

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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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Calculation method of lifetime of space debris in low earth orbit

1 Scope

This document specifies the methods for calculating the on-orbit lifetime of low-Earth orbit

space debris, including the area-to-mass ratio calculation method and the lifetime time calculation method. method.

This document is applicable to the design of space debris mitigation programmes, the design of spacecraft and launch vehicle deorbit trajectories, and the overall space debris environment assessment. Estimation, etc.

2 Normative references

This document has no normative references.

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Low Earth Orbit lowearthorbit;LEO

An Earth orbit with an apogee altitude of less than 2000 km.

3.2

The orbital elements of the instantaneous position and velocity vectors of a space object.

3.3 Mean orbital elements meanorbitelements

The orbital elements of the average orbital motion of space objects obtained by ignoring some changes in periodic terms introduced by disturbances.

3.4 orbitallifetime

From the completion of the space object's operation phase (if any) and post-mission disposal phase-related operations or the formation of space debris to its re-entry into the Earth Time interval at 120km altitude on the surface.

3.5 estimation of lifetime

The orbital lifetime of space debris is predicted using information such as orbital parameters, shape parameters and space environment parameters of space debris.

3.6

The ratio of the equivalent frontal area of space debris relative to the direction of atmospheric motion to the mass of space debris when the space debris is in orbit.

3.7

When space debris is in orbit, the ratio of the equivalent cross-sectional area of the space

debris subjected to the solar radiation pressure to the mass of the space debris.

3.8

The disturbance caused by the deviation effect of the earth's gravity relative to the gravity of the earth's mass.

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