INTERNATIONAL STANDARD

ISO 14200

First edition
2012-11-15

Space environment (natural and artificial) — Guide to process-based implementation of meteoroid and debris environmental models (orbital altitudes below GEO + 2 000 km)

Environnement spatial (naturel et artificiel) — Lignes directrices pour une mise en oeuvre fondée sur les processus des modèles environnementaux des météoroïdes et des débris (altitudes d'orbite inférieures à GEO + 2 000 km)

Reference number
ISO 14200:2012(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14200 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Introduction

Every spacecraft or launch vehicle orbital stage in an Earth orbit is exposed to a certain flux of micrometeoroids and man-made space debris. Collisions with these particles take place with hypervelocity. The impact risk is evaluated in the design phases of a spacecraft or the launch vehicle orbital stage. Many meteoroid and space debris environment models have been studied and developed which describe populations of meteoroids and/or space debris. These models can be used as interim solutions for impact risk assessments and shielding design purposes. However, there are different methods in existence for reproducing the observed environment by means of mathematical and physical models of release processes, for propagating orbits of release products, and for mapping the propagated environment onto spatial and temporal distributions of objects densities, transient velocities, and impact fluxes. Until a specific standard for the space debris environment is defined, a common implementation process of models should be indicated for impact risk assessment and design of a spacecraft.

Space environment (natural and artificial) — Guide to process-based implementation of meteoroid and debris environmental models (orbital altitudes below GEO + 2 000 km)

1 Scope

This International Standard specifies the common implementation process for meteoroid and debris environment models for risk assessment of spacecraft and launch vehicle orbital stages. This International Standard gives guidelines for the selection process of models for impact risk assessment and ensures the traceability of using models throughout the design phase of a spacecraft or launch vehicle orbital stage.

2 Normative reference

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17666:2003, *Space systems — Risk management*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17666 and the following apply.

3.1
engineering model
environment model that provides clear and concise information that engineers need

3.2
geostationary Earth orbit
Earth orbit having zero inclination and zero eccentricity; whose orbital period is equal to the Earth's sidereal rotation period

[SOURCE: ISO 24113:2011, definition 3.8]

3.3
geosynchronous Earth orbit
Earth orbit with an orbital period equal to the Earth's sidereal rotation period

3.4
gravitational focusing
force of the Earth's gravitational field that attracts meteoroids, changes their trajectories, and therefore increases the flux

3.5
impact flux
number of impacts per unit area and per unit period

3.6
impact risk
risk of impact against meteoroids and debris on spacecraft