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Space systems — Space debris mitigation design and operation manual for launch vehicle orbital stages

Systèmes spatiaux — Lignes directrices de conception et de manœuvre des étages orbitaux de lanceurs pour réduire les débris spatiaux

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Contents

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO/TR 20590:2017), which has been technically revised.

The main changes compared to the previous edition are as follows:

— text has been updated to be aligned with ISO 24113:2019;

— information has been added that the total number of structural elements and orbital stages is limited according to the number of payloads;

— information has been added that the ejection of slag debris from solid rocket motors is limited newly in low Earth orbit in addition to GEO previously;

— information relating to collision avoidance against catalogued space objects has been improved;

— corresponding to the new requirement limiting the total probability of successful disposal to be at least 0,9, the state of the art to confirm the compliance with that taken in the world space industries and national agencies has been added;

— other information relating to the changes in ISO 24113 has been added.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Coping with debris is essential to preventing the deterioration of the orbital environment and ensuring the sustainability of space activities. Effective actions can also be taken to ensure the safety of those on the ground from re-entering objects that were disposed of from Earth orbit.

Recently, the orbital environment has become so deteriorated by debris that it is necessary to take actions to mitigate the generation of orbital debris in design and operation of both spacecraft and the launch vehicle orbital stages.

ISO 24113 and other ISO documents, introduced in Bibliography, were developed to encourage debris mitigation activities.

In Clause 5, information about the major space debris mitigation requirements is provided.

In Clause 6, information about life-cycle implementation of space-debris-mitigation-related activities is provided.

In Clause 7, the system level aspects stemming from the space debris mitigation requirements are highlighted; while in Clause 8, the impacts at subsystem and component levels are detailed.

This document provides comprehensive information on the requirements and recommendations from ISO documents for the design and operation of the launch vehicles.