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Space systems — Prevention of break-up of unmanned spacecraft

Systèmes spatiaux — Prévention de l'éclatement des navettes sans pilote

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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.

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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

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Introduction

An ever-increasing number of man-made items are orbiting the Earth and bring with them ever-increasing risk of collisions. This can have implications on the operational requirements of both manned and unmanned spacecraft.

One potential source of space debris is the break-up of unmanned spacecraft both during and after the end of their operational lives. This break-up could be due either to external collisions or to internal factors caused by the existence of stored energy sources onboard the spacecraft. A cloud of debris from a single spacecraft having broken up poses a significantly greater threat of collision than the original spacecraft.

This International Standard defines the requirements to reduce the probability of a spacecraft breaking up, both during and after its operational life. It also defines the requirements for passivation of the spacecraft, which is the process by which all sources of stored energy are removed.

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Space systems — Prevention of break-up of unmanned spacecraft

1 Scope

This International Standard defines the requirements to reduce the risk of in-orbit break-up of unmanned spacecraft, both during and after their operational lives. The aim would be met by reducing the possibility of a break-up caused by an unplanned internally caused event and by depleting to a safe level all the sources of stored energy at the end of a spacecraft's life. This International Standard is designed for use in planning, verifying, and implementing the prevention of break-up of a spacecraft.

This International Standard applies only to unmanned spacecraft operating in Earth orbit. It does not apply to manned space vehicles or launch vehicle orbital stages. Additionally, it does not cover nuclear power sources within spacecraft.

This International Standard is not applicable to fragmentation as a result of external particle impacts (which includes fragmentations triggered by external particle impact but powered by internal energy sources).

2 Normative references

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 14623, *Space systems - Pressure vessels and pressurized structures — Design and operation*

ISO 24638, *Space systems — Pressure components and pressure system integration*

ISO 24113:2011, *Space systems — Space debris mitigation requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24113:2011 and the following apply.

3.1
acquiring organization
organization that plans and manages the development and acquisition contracts for the space system

Note 1 to entry: The responsibilities of the acquiring organization include the engineering and technical aspects of the space system's design and operations.

3.2
break-up probability
combined probability of the occurrence of all anomalous events, excluding meteoroid or debris impact, that leads to the generation of orbital debris

3.3
passivation
elimination of all stored energy on a space system to reduce the chance of break-up

Note 1 to entry: Typical passivation measures include venting or burning excess propellant, discharging batteries, and relieving pressure vessels.

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