INTERNATIONAL STANDARD

ISO 22010

Second edition
2022-11

Space systems — Mass properties control

Systèmes spatiaux — Contrôle des propriétés de masse

Reference number
ISO 22010:2022(E)

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Published in Switzerland

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 22010:2007), which has been technically revised.

The main changes are as follows:

— the reference to ANSI/AIAA S-120-2015 has been changed to ANSI/AIAA S-120-2015 (2019);

— the reference to "SAWE Recommended Practice Number A-3 (RP-A-3), Mass Properties Control for Space Systems" 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

This document establishes the minimum requirements for providing adequate control of the mass properties of space systems to meet mission requirements. In addition, many recommended practices that add value to the mass properties monitoring tasks are presented. Throughout this document, the minimum essential criteria are identified by the use of the key word “shall.” Recommended criteria are identified by the use of the key word “should,” and while not mandatory, are considered to be of primary importance in providing timely and accurate mass properties support for contracts. It is advisable that deviations from the recommended criteria only occur after careful consideration and thorough evaluation have shown alternative methods to be satisfactory.

The requirements can be tailored for each specific space programme application.

Space systems — Mass properties control

1 Scope

This document describes a process for managing, controlling and monitoring the mass properties of space systems. The relationship between this management plan and the performance parameters for mass properties to be met throughout the mission is described. Ground handling, dynamics analysis and test set-ups that rely on accurate mass properties inputs are identified. This document covers all programme phases from pre-proposal through to end of life.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 22108, *Space systems — Non-flight items in flight hardware — Identification and control*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
basic mass
best engineering estimate based on an assessment of the most recent baseline design, excluding *mass growth allowance* (3.8)

3.2
calculated properties
mass properties (3.9) determined from released drawings or controlled computer models

3.3
contractor limit
predicted mass (3.13) plus a *contractor margin* (3.4) to allow for uncertainties during the design cycle

3.4
contractor margin
system margin
difference between the *contractor limit* (3.3) and the *predicted mass* (3.13)

3.5
customer reserve
allowance defined by the customer according to the agreements of the contract

3.6
estimated properties
mass properties (3.9) determined from preliminary data, such as sketches or calculations from layout drawings