
**Space systems — Requirements for
small spacecraft**

Systèmes spatiaux — Exigences relatives aux petits engins spatiaux

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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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*.

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

Since 2013, the number of small spacecraft built and launched has shown explosive growth. These small spacecraft are often built by universities, or by newcomers to the space sector, employing untraditional development philosophy.

One particularity of small spacecraft is their need to be launched either with a main payload or in a grapple, which implies specific requirements.

Besides requirements regarding mission success or other goals, which are beyond the scope of this document, there are minimum requirements every small spacecraft complies with regardless of its size, mission, value, capability or any other nature. The purpose of this document is to clearly state those minimum requirements.

This document provides references to existing standards and documents that elaborate on those requirements, especially for the benefit of those who are entering the space sector through small spacecraft development and utilization.

The document was originally proposed as an International Standard. Although the committee draft for voting obtained enough support from P-member countries to proceed to the draft international standard stage, a unanimous agreement was not obtained about the need of publishing the document that referenced the existing standards and documents as an International Standard. Considering the need of having a normative document describing the requirements for small spacecraft, however, the document was resubmitted as a Technical Specification. By the time of review in three years from now, other small spacecraft related standards may be proposed and definition of small spacecraft may advance further. Depending on the situation surrounding small spacecraft then, the decision will be made on whether the document will be upgraded to an International Standard or not.

Space systems — Requirements for small spacecraft

1 Scope

This document describes minimum requirements for small spacecraft.

Small spacecraft may employ untraditional spacecraft development and management philosophy. These spacecraft projects are usually budget-limited or mass-limited, which makes a single (exclusive) launch unaffordable.

The scope of this document encompasses different categories of small spacecraft — so-called mini-, micro-, nano-, pico- and femto-, as well as CubeSat, spacecraft. Therefore, for the sake of convenience, the term “small spacecraft” is used throughout this document as a generic term.

Regardless of the development philosophy, there are minimum requirements every spacecraft complies with. This document explicitly states those requirements and also refers to existing applicable standards. In that sense, this document serves as the top document to cover the minimum requirements for various stages of small spacecraft system life-cycle — with emphasis on design, launch, deployment, operation, and disposal phases. In this way, (1) safety, (2) harmlessness to co-passengers and launcher, and (3) debris mitigation, are all assured.

This document is addressed to small spacecraft developers, as well as dispenser providers and/or the launch operators.

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 17770, *Space systems — Cube satellites (CubeSats)*

ISO 19683, *Design qualification and acceptance tests of small spacecraft and units*

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

ISO 14620-1, *Space systems — Safety requirements — Part 1: System safety*

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

cubeSat

picosatellite measuring 100 mm cubic and weighing 1,33 kg or less

Note 1 to entry: Variations on the basic form factor are also considered CubeSats.

[SOURCE: ISO 17770:2017]