



**International
Standard**

ISO 27852

**Space systems — Estimation of orbit
lifetime**

Systèmes spatiaux — Estimation de la durée de vie en orbite

**Third edition
2024-02**

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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 document 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 third edition cancels and replaces the second (ISO 27852:2016) edition, which has been technically revised.

The main changes are as follows:

- clarified that this document does not apply to non-LEO protected regions (e.g. GEO);
- harmonized terms and definitions with those in ISO 24113;
- updated to harmonize with IADC ^[1] and United Nations ^[2]–^[3] guidelines;
- added a subclause on the use of the recommended solar forcing dataset for the Coupled Model Intercomparison Project 6.

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

Constraining estimated orbit lifetime of human-made objects is increasingly important as space debris continues to increase (as documented in [Annex A](#)) and as such is one of the central tenets of the global space debris mitigation strategy. This document is a supporting document to ISO 24113, its derivative spacecraft disposal standard ISO 23312 and launch vehicle upper stage disposal technical report ISO/TR 20590. The purpose of this document is to provide a common, consensus-based approach to determining orbit lifetime, one that is sufficiently precise and easily implemented for the purpose of demonstrating conformity with ISO 24113. This document offers standardized guidance and analysis methods to estimate orbital lifetime for all LEO-crossing orbit classes. This document only deals with orbit lifetime issues (orbit decay out of orbits crossing the LEO protected region); for other important requirements related to how long a space object will, or will not, cross or occupy a protected region, the user is directed to ISO 24113 and its derivative ISO 23312.

Space systems — Estimation of orbit lifetime

1 Scope

This document describes a process for the long-duration orbit lifetime prediction of orbit lifetime for spacecraft, launch vehicles, upper stages and associated debris in LEO-crossing orbits after mission phase (including any mission lifetime extensions).

The document also clarifies:

- a) modelling approaches and resources for solar and geomagnetic activity modelling;
- b) resources for atmosphere model selection;
- c) approaches for spacecraft ballistic coefficient estimation.

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 24113, *Space systems — Space debris mitigation requirements*

3 Terms, definitions, symbols and abbreviated terms

3.1 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/>

3.1.1

disposal

actions performed by a *spacecraft* (3.1.22) or *launch vehicle orbital stage* (3.1.9) to permanently reduce its chance of accidental break-up and to achieve its required long-term clearance of the *protected regions* (3.1.17)

Note 1 to entry: Actions can include removing stored energy and performing post-mission orbital manoeuvres.

3.1.2

disposal phase

interval between the *end of mission* (3.1.5) of a *spacecraft* (3.1.22) or *launch vehicle orbital stage* (3.1.9) and its *end of life* (3.1.4)

3.1.3

Earth orbit

bound or unbound Keplerian *orbit* (3.1.14) with Earth at a focal point, or Lagrange point orbit which includes Earth as one of the two main bodies