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Space systems — Design, testing and operation of a large constellation of spacecraft

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National foreword

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Contents

Page

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 type 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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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

More than a dozen large constellations of spacecraft are planned to be launched in the next several years. While large constellations can provide societal benefits to humanity, they can also put pressure on the orbital and electro-magnetic environments, introducing mission design, hardware design, launch, operations and disposal challenges to other operating space assets and the long-term sustainability of space activities.

This document provides a set of standard practices throughout the large constellation life cycle to promote safety on the ground from re-entry hazard and long-term sustainability of space operations.

In developing this document, the practices of the existing large constellation programs, consensus in the Space Safety Coalition, "Best Practices for the Sustainability of Space Operations,"[1], the "Statement on Large Constellations"[2] of the "Inter-Agency Space Debris Coordination Committee (IADC)", ISO 24113, which specifies space debris mitigation requirements, the "Guidelines for the Long-term Sustainability of Outer Space Activities" COPUOOS June 2021[3] and other effective documents were consulted.

Technical Specification **ISO/TS 6434:2024(en)**

Space systems — Design, testing and operation of a large constellation of spacecraft

1 Scope

This document provides requirements that are either unique or particularly relevant to large constellations of spacecraft operating in the LEO protected region throughout their life cycle, including planning, designing, testing, operating and disposal activities.

The requirements in this document are applicable to large constellation owners. While some are directly applicable to the constellation owners, others are allocated to the manufactures or operators under the responsibility of the constellation owners.

2 Normative reference

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 19389[1)], *Space data and information transfer systems — Conjunction data message*

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

ISO 26900[2)], *Space data and information transfer systems — Orbit data messages*

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
large constellation of spacecraft
large constellation
system of a hundred or more spacecraft working together

Note 1 to entry: While providing a specific quantity of spacecraft, the size, mass, complexity and function of the spacecraft also have a bearing.

3.2
latitude range
band of geocentric latitude that spacecraft in two constellations may simultaneously occupy

3.3
radial separation
distance between constellation orbits in the radial direction within a common *latitude range* (3.2), irrespective of right ascension of ascending node and timing (nodal regression and in-track motion)

1) Adoption from CCSDS 508.0-B-1.

2) Adoption from CCSDS 502.0-B-2.