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Space systems — Design guidelines for multi-geo spacecraft collocation

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms, definitions and abbreviated terms **1**
3.1 Terms and definitions 1
3.2 Abbreviated terms 4
4 Collocation design process **4**
5 Basic contents of collocation design process **6**
5.1 Considerations 6
5.2 Initial collocation strategy design 6
5.2.1 Fundamental principle of separation strategy 6
5.2.2 The available separation strategy 6
5.2.3 Selection of collocation strategy 7
5.2.4 Simulation Evaluation of Collocation Strategy 7
5.3 Final collocation strategy 7
5.4 Collocation agreement 7
Annex A (informative) **Fundamental principle of available separation strategy** **10**
Annex B (informative) **Characteristics of separation strategy** **15**
Annex C (informative) **Fundamental principle of separation strategy** **17**
Annex D (informative) **Sample of collocation evaluation strategy** **19**
Annex E (informative) **Common collocation cases and strategies** **20**
Bibliography **21**

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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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This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

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Introduction

With the wide application of geostationary orbit in spacecraft navigation, spacecraft communication and remote sensing, there comes a dramatic increase in the number of geostationary spacecraft while the orbit position of geostationary spacecraft is limited. In order to solve this problem, it is often necessary for spacecraft operators to collocate their spacecraft with spacecraft operated by other agencies in order to deliver their services.

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Space systems — Design guidelines for multi-geo spacecraft collocation

1 Scope

This document addresses the design process of a collocation and the basic contents of collocation design process which include considerations, initial collocation strategy design, simulation evaluation of collocation strategy, optimal collocation strategy selection and collocation agreement.

This document gives guidelines for multi-geo spacecraft collocation, and it applies in particular to multi-geo constellation.

2 Normative references

There are no normative references in this document.

3 Terms, definitions 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 http://www.electropedia.org/

3.1.1
orbit maintenance
orbit control for maintaining the spacecraft's orbit in certain prediction error around the nominal orbit

3.1.2
inclination vector
vector which points to the ascending node and which is measured from the vernal equinox

Note 1 to entry: The *x* and *y* components of the vector can be expressed as Formulae (1) and (2).

$$i_x = \sin i \cos(\Omega) \tag{1}$$

$$i_y = \sin i \sin(\Omega) \tag{2}$$

where

i is the magnitude of the inclination vector;

Ω is the raan in J2000 *geocentric equatorial coordinate system* (3.1.5);

i_x is the *x* component of the inclination vector coordinate;

i_y is the *y* component of the inclination vector coordinate.

Note 2 to entry: Figure 1 shows the definition of the inclination vector.

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