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Space systems — Design guidelines for multi-geo spacecraft collocation

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Foreword

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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

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.

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.