
**Space systems — Space environment
(natural and artificial) — Model of the
earth's magnetospheric magnetic field**

*Systèmes spatiaux — Environnement spatial (naturel et artificiel) —
Modèle du champ magnétique de la magnétosphère de la terre*



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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.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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Introduction

This International Standard describes the main requirements to the earth's magnetospheric magnetic field model. The model satisfying the set of requirements is described in Annex A as example calculations. The model can be used in scientific and engineering applications and is intended to calculate the magnetic induction field generated from a variety of current systems located on the boundaries and within the boundaries of the earth's magnetosphere under a wide range of environmental conditions, quiet and disturbed, that are affected by solar-terrestrial interactions stimulated by solar activity such as solar flares and related phenomena, which induce terrestrial magnetic disturbances such as magnetic storms.

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Space systems — Space environment (natural and artificial) — Model of the earth's magnetospheric magnetic field

1 Scope

This International Standard describes the main magnetospheric large-scale current systems and the magnetic field in the earth's magnetosphere and provides the main requirements for a model of the magnetospheric magnetic field. Ionospheric currents are not considered in this International Standard. Annex A of this International Standard gives a worked example of the model and establishes the parameters of magnetospheric large-scale current systems that change according to conditions in the space environment. This International Standard can be used to develop new models of the magnetospheric magnetic field. Such models are useful in investigating the physical processes in the earth's magnetosphere as well as in calculations associated with developing, testing and estimating the results of exploitation of spacecrafts and other equipment operating in the space environment.

The main goals of standardizing the concepts of the earth's magnetospheric magnetic field are to provide

- an unambiguous presentation of the magnetic field in the earth's magnetosphere;
- compatibility for the results of the interpretation and analysis of space experiments;
- less labour-intensive calculations of the magnetic field of magnetospheric currents in space at geocentric distances of 1,0 to 6,6 earth radii, R_E ;
- the most reliable calculations of all elements of the geomagnetic field in the space environment.

The magnetic field model presented in Annex A of this International Standard can be used to predict the radiation conditions in space, including the periods of intense magnetic disturbances (magnetic storms), when developing systems of spacecraft magnetic orientation and when forecasting the influence of magnetic disturbances on transcontinental piping and power transmission lines.

2 Terms and definitions

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

2.1

internal magnetic field

⟨main magnetic field⟩ magnetic field produced by the sources inside the earth's core

NOTE It can be presented in the form of a series of spherical harmonic functions. The expansion coefficients [International Geomagnetic Reference Field (IGRF) model] undergo very slight changes in time. The International Association of Geomagnetism and Aeronomy (IAGA) is responsible for IGRF model development and modifications and approves its coefficients every five years. Internal magnetic field is not addressed by this International Standard.

2.2

external magnetic field

⟨magnetospheric magnetic field⟩ magnetic field produced by magnetospheric sources of magnetic field