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Space environment (natural and artificial) — Process for determining solar irradiances

Environnement spatial (naturel et artificiel) — Procédé de détermination des irradiances solaires

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Foreword

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ISO 21348 was prepared by Technical Committee ISO/TC 20, *Aicraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Introduction

This International Standard provides guidelines for specifying the process of determining solar irradiances. Solar irradiances are reported through products such as measurement sets, reference spectra, empirical models, theoretical models and solar irradiance proxies or indices. These products are used in scientific and engineering applications to characterize within the natural space environment solar irradiances that are relevant to space systems and materials.

Examples of applications using input solar irradiance energy include the determination of atmospheric densities for spacecraft orbit determination, attitude control and re-entry calculations, as well as for debris mitigation and collision avoidance activity. Direct and indirect pressure from solar irradiance upon spacecraft surfaces also affects attitude control separately from atmospheric density effects.

Solar irradiances are used to provide inputs for

a) calculations of ionospheric parameters,

b) photon-induced radiation effects, and

c) radiative transfer modelling of planetary atmospheres.

Input solar irradiance energy is used to characterize material properties related to spacecraft thermal control, including surface temperatures, reflectivity, absorption and degradation. Solar energy applications requiring a standard process for determining solar irradiance energy include

— solar cell power simulation,

— material degradation, and

— the development of lamps and filters for terrestrial solar simulators.

A solar irradiance product certifies compliance with this process-based standard by following compliance criteria that are described in this International Standard. The compliance criteria in Clause 7 are based upon solar irradiance product types that are described in Clause 5 and solar irradiance spectral categories described in Clause 6. The method for certifying compliance of a solar irradiance product with this International Standard is provided in Clause 8.