

# INTERNATIONAL STANDARD



**Process management for avionics – Atmospheric radiation effects –  
Part 2: Guidelines for single event effects testing for avionics systems**



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Part 2: Guidelines for single event effects testing for avionics systems**

INTERNATIONAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PROCESS MANAGEMENT FOR AVIONICS –  
ATMOSPHERIC RADIATION EFFECTS –****Part 2: Guidelines for single event effects  
testing for avionics systems**

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International Standard IEC 62396-2 has been prepared by IEC technical committee 107: Process management for avionics.

This second edition cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition.

- a) improvements and changes to test facilities have been added in Clause 7, which includes new facilities at TSL, TRIUMF and ChipIr,
- b) links with IEC 60749-38 and IEC 60749-44 are made in 7.1.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
107/316/FDIS	107/318/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62396 series, published under the general title *Process management for avionics – Atmospheric radiation effects*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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## INTRODUCTION

This industry-wide international standard provides additional guidance to avionics systems designers, electronic equipment manufacturers and their customers for determining the susceptibility of electronic components to single event effects. It expands on the information and guidance provided in IEC 62396-1:2016.

Guidance is provided on the use of existing single event effects (SEE) data, sources of data and the types of accelerated radiation sources used. Where SEE data is not available considerations for testing are introduced, including suitable radiation sources for providing avionics SEE data. The conversion of data obtained from differing radiation sources into avionics SEE rates is detailed.

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# PROCESS MANAGEMENT FOR AVIONICS – ATMOSPHERIC RADIATION EFFECTS –

## Part 2: Guidelines for single event effects testing for avionics systems

### 1 Scope

This part of IEC 62396 aims to provide guidance related to the testing of electronic components for purposes of measuring their susceptibility to single event effects (SEE) induced by neutrons generated by cosmic ray interactions in the Earth's atmosphere (atmospheric neutrons). Since the testing can be performed in a number of different ways, using different kinds of radiation sources, it also shows how the test data can be used to estimate the SEE rate of electronic components and boards due to atmospheric neutrons at aircraft altitudes.

Although developed for the avionics industry, this process can be applied by other industrial sectors.

### 2 Normative references

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.

IEC 62396-1:2016, *Process management for avionics – Atmospheric radiation effects – Part 1: Accommodation of atmospheric radiation effects via single event effects within avionics electronic equipment*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62396-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 4 Abbreviated terms

ANRA	Atmospheric-like Neutrons from thick Target (TSL, Sweden)
BL1A, BL1B, BL2C	beam line designations at the TRIUMF facility (Canada)
BPSG	borophosphosilicate glass
Chiplr	beam line at the ISIS neutron source facility (Rutherford Appleton Laboratory, UK)
CIAE	China Institute of Atomic Energy
CMOS	complementary metal oxide semiconductor
COTS	commercial off-the-shelf