BS IEC 62396-3:2013

BSI Standards Publication

Process management for avionics - Atmospheric radiation effects

Part 3: System design optimization to accommodate the single event effects (SEE) of atmospheric radiation

National foreword

This British Standard is the UK implementation of IEC 62396-3:2013. It supersedes DD IEC/TS 62396-3:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/107, Process management for avionics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 3: System design optimization to accommodate the single event effects (SEE) of atmospheric radiation

FOREWORD

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International Standard IEC 62396-3 has been prepared by IEC technical committee 107: Process management for avionics.

This first edition cancels and replaces IEC/TS 62396-3 published in 2008. This edition constitutes a technical revision.

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

a) Reference to IEC 62396-1:2012 included.
b) Some definitions in Clause 3 updated in line with IEC 62396-1:2012.
c) Reference to system level A types I and II removed from 6.3 and Annex C.
d) Replacement in key locations of "may" by a more positive statement.

The text of this international standard is based on the following documents:

FDIS	Report on voting
107/210/FDIS	107/220/RVD

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

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

A list of all parts of the IEC 62396 series, 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 publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This industry-wide International Standard provides additional guidance to avionics systems designers, electronic equipment, component manufacturers and their customers to adopt a standard approach to optimise system design to accommodate atmospheric radiation single event effects (SEE). It builds on the information and guidance on the system level approach to single event effects in IEC 62396-1:2012, considers some avionic systems and provides basic methods to accommodate SEE so that system hardware assurance levels are met.

Atmospheric radiation effects are one factor that could contribute to equipment hard and soft fault rates. From a system safety perspective, using derived fault rate values, the existing methodology described in ARP4754 [1] [1] (accommodation of hard and soft fault rates in general) will also accommodate atmospheric radiation effect rates.

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1 Numbers in square brackets refer to the Bibliography.

PROCESS MANAGEMENT FOR AVIONICS – ATMOSPHERIC RADIATION EFFECTS –

Part 3: System design optimization to accommodate the single event effects (SEE) of atmospheric radiation

1 Scope

This part of IEC 62396 provides guidance and furthermore it provides necessary requirements for those involved in the design of avionic systems and equipment and the resultant effects of atmospheric radiation-induced single event effects (SEE) on those avionic systems. The outputs of the activities and objectives described in this part of IEC 62396 will become inputs to higher level certification activities and required evidences. It builds on the initial guidance on the system level approach to single event effects in IEC 62396-1:2012, considers some avionic systems and provides basic methods to accommodate SEE so that system development assurance levels are met.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62396-1:2012, *Process management for avionics – Atmospheric radiation effects – Part 1: Accommodation of atmospheric radiation effects via single event effects within avionics electronic equipment*

IEC/TS 62239-1, *Process management for avionics – Management plan – Part 1: Preparation and maintenance of an electronic components management plan*

3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 62396-1:2012, IEC/TS 62239-1 as well as the following apply.

3.1
analogue single event transient
ASET
spurious signal or voltage produced at the output of an analogue device by the deposition of charge by a single particle

[SOURCE: IEC 62396-1:2012, 3.2]

3.2
could not duplicate
CND
reported outcome of diagnostic testing on a piece of equipment

Note 1 to entry: Following receipt of an error or fault message during operation, the error or fault condition could not be replicated during subsequent equipment testing.