

TECHNICAL REPORT



Process management for avionics – Highly severe stress tests for operating margins identification and robustness improvement of avionics equipment – Application guidelines

INTERNATIONAL
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HIGHLY SEVERE STRESS TESTS FOR OPERATING MARGINS
IDENTIFICATION AND ROBUSTNESS IMPROVEMENT OF AVIONICS
EQUIPMENT – APPLICATION GUIDELINES**

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

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- withdrawn, or
- revised.

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INTRODUCTION

In an increasingly harsh economic context (higher performance requirements, shorter development cycles, reduced cost of ownership, etc.), consideration is given to rapid equipment maturity, preferably from its entry into service (EIS).

It is with a view to remedying shortcomings that "highly severe stress" tests for margins research and robustness improvement are considered in equipment design and development methods. The main underlying principle behind this type of test strategy is as follows: rather than reasoning in terms of conformity with a specification and applying tests in line with the specification requirements, it is on the contrary attempted to push the equipment to its operating limits by applying environmental stresses or stimuli, whose levels are higher than the specification requirements.

PROCESS MANAGEMENT FOR AVIONICS – HIGHLY SEVERE STRESS TESTS FOR OPERATING MARGINS IDENTIFICATION AND ROBUSTNESS IMPROVEMENT OF AVIONICS EQUIPMENT – APPLICATION GUIDELINES

1 Scope

This technical report considers the targets assigned to highly severe stress tests for operating margins research and robustness improvement of avionics equipment, their basic principles, their scope of application and their implementation process. It is primarily intended for avionics programme managers, electronic equipment project managers, designers, test managers, and dependability team.

This document provides guidance which can apply to all avionics programmes and is of primary interest to the original equipment manufacturers (OEMs) in charge of designing, developing and producing equipment built for these programmes, for obtaining early equipment maturity.

NOTE 1 Highly severe stress tests approach is often an industrial will in a global lifecycle cost effective approach (see the Introduction) and it is not required at certification level. Moreover, customers can potentially define, in contract clauses, in-service availability requirements, for example, from the entry into service (EIS) or in operation.

This highly severe stress tests approach is part of the avionics equipment design and development stage, and it can address stresses in mechanical, climatic, electrical, etc., domains.

NOTE 2 The principles and objectives described in this document can apply to all types of equipment used in systems developed in avionics programmes, whatever their nature (electronic, electromechanical, mechanical, electrohydraulic, electro-pneumatic, etc.) and whatever their size, from "low-level" subassemblies (circuit card assemblies (CCAs), mechanical assemblies, connectors, etc.) up to system level groups of equipment.

This document can be used in conjunction with IEC 62429, IEC 62506, or both, with regard to dependability aspects related to equipment consisting of hardware with embedded software.

NOTE 3 This document can provide an aid in an equipment definition justification process (see CEN-CENELEC prEN 9215) which can address:

- the development of a definition justification dossier (DJD) by bringing data related to equipment margins and to decisions; or
- the justification of potential future changes made at equipment definition, for example when processing cases of electronic component obsolescence.

For the purpose of this document, if the term "deficiency" is used alone afterwards, it is stated as "built-in deficiency" or "weak point" and encompasses the concept of "deficiency and associated potential malfunction or failure" (see 3.1.1).

Although developed for the avionics industry, this document can be used by other industrial sectors at their discretion.

2 Normative references

There are no normative references in this document.