

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Process management for avionics – Management plan –  
Part 1: Preparation and maintenance of an electronic components management  
plan**

**Gestion des processus pour l'avionique – Plan de gestion –  
Partie 1: Préparation et maintenance d'un plan de gestion des composants  
électroniques**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2018 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

---

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### Recherche de publications IEC - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 21 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



---

**Process management for avionics – Management plan –  
Part 1: Preparation and maintenance of an electronic components management  
plan**

**Gestion des processus pour l'avionique – Plan de gestion –  
Partie 1: Préparation et maintenance d'un plan de gestion des composants  
électroniques**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 03.100.50; 31.020; 49.060

ISBN 978-2-8322-6033-3

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms, definitions and abbreviated terms .....	8
3.1 Terms and definitions.....	8
3.2 Abbreviated terms.....	12
4 Technical requirements .....	14
4.1 General.....	14
4.2 Component selection .....	14
4.2.1 General.....	14
4.2.2 Application conditions for use .....	15
4.2.3 Availability and durability .....	15
4.2.4 Additional performance .....	15
4.2.5 Component identification .....	15
4.3 Component application .....	16
4.3.1 General.....	16
4.3.2 Electromagnetic compatibility (EMC).....	16
4.3.3 Derating and stress analysis .....	16
4.3.4 Thermal analysis.....	18
4.3.5 Mechanical analysis.....	18
4.3.6 Testing, testability, and maintainability.....	19
4.3.7 Avionics radiation environment .....	19
4.3.8 Management of lead-free termination finish and soldering.....	19
4.3.9 Counterfeited, fraudulent and recycled component avoidance .....	20
4.3.10 Moisture and corrosion .....	20
4.3.11 Additional customer related application requirements .....	20
4.4 Component qualification.....	20
4.4.1 General.....	20
4.4.2 Minimum component qualification requirements .....	21
4.4.3 Original component manufacturer quality management .....	21
4.4.4 Original component manufacturer process management approval .....	21
4.4.5 Demonstration of component qualification.....	22
4.4.6 Qualification of components from a supplier that is not qualified .....	23
4.4.7 Distributor process management approval .....	24
4.4.8 Subcontractor assembly facility quality and process management approval .....	24
4.5 Continuous component quality assurance .....	25
4.5.1 General quality assurance requirements .....	25
4.5.2 Ongoing component quality assurance.....	25
4.5.3 Plan owner in-house continuous monitoring .....	25
4.5.4 Component design and manufacturing process change monitoring .....	26
4.6 Component dependability.....	26
4.6.1 General.....	26
4.6.2 Component availability and associated risk assessment .....	26
4.6.3 Component obsolescence .....	27
4.6.4 Proactive measures .....	27

4.6.5	Component obsolescence awareness .....	27
4.6.6	Reporting.....	27
4.6.7	Semiconductor reliability, wear out and lifetime.....	28
4.6.8	Reliability assessment .....	28
4.7	Component compatibility with the equipment manufacturing process .....	28
4.8	Component data .....	29
4.8.1	General.....	29
4.8.2	Minimum component data requirements.....	30
4.9	Configuration control.....	30
4.9.1	General.....	30
4.9.2	Alternative components.....	30
4.9.3	Alternative sources .....	30
4.9.4	Equipment change documentation .....	31
4.9.5	Customer notifications and approvals .....	31
4.9.6	Focal organization .....	31
5	Plan administration requirements.....	31
5.1	Plan organization.....	31
5.2	Plan terms and definitions.....	31
5.3	Plan focal point.....	31
5.3.1	Primary interface .....	31
5.3.2	Plan focal point responsibilities.....	32
5.4	Plan references.....	32
5.5	Plan applicability.....	32
5.6	Plan implementation .....	32
5.6.1	ECMP compliance.....	32
5.6.2	Plan objectives .....	32
5.6.3	Plan owner's subcontracted activities.....	33
5.7	Plan acceptance .....	33
5.8	Plan maintenance .....	33
	Annex A (informative) Requirement matrix for IEC 62239-1 .....	34
	Annex B (informative) Typical qualification requirements and typical component minimum qualification requirements .....	50
	Annex C (informative) IEC 62239-1 cross-references to SAE EIA-STD-4899 for guidance.....	53
	Annex D (informative) Guidelines for environmental protection techniques and for comparison of components specifications .....	56
	Bibliography.....	70
	Figure 1 – Suspect components perimeter .....	20
	Table A.1 – Requirements matrix .....	34
	Table B.1 – Typical qualification requirements and typical component minimum qualification requirements .....	50
	Table C.1 – Cross-reference overview between IEC 62239-1 and SAE EIA-STD-4899, for guidance.....	53
	Table D.1 – Environmental protection techniques to be considered during the avionics design process .....	56
	Table D.2 – Guidelines for the comparison of internationally available component specifications – Microcircuits <sup>a</sup> .....	61

# INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

## **PROCESS MANAGEMENT FOR AVIONICS – MANAGEMENT PLAN –**

### **Part 1: Preparation and maintenance of an electronic components management plan**

#### FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62239-1 has been prepared by IEC technical committee 107: Process management for avionics.

IEC 62239-1 cancels and replaces IEC TS 62239-1 published in 2015.

This first edition cancels and replaces the first edition of IEC TS 62239-1 published in 2015. This edition constitutes a technical revision.

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

- a) added references to SAE EIA-STD-4899, IECQ OD 3702, IECQ OD 3407-1, IEC TR 62240-2, IECQ component schemes, SAE AS6081, SAE AS6171, GEIA-STD-0005-1 GEIA STD 0008;

- b) replaced Annex C (which was transferred into IEC TR 62240-2) with a cross-reference table to SAE EIASTD4899 rev C clauses/subclauses for guidance purposes only;
- c) added the analysis of component technical erratum in 4.8.2;
- d) updated Bibliography and reference documents.

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

CDV	Report on voting
107/320/CDV	107/333/RVC

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 the parts in the IEC 62239 series under the general title *Process management for avionics – Management plan*, 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
- amended.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## INTRODUCTION

This document provides the structure for avionics equipment manufacturers, subcontractors, maintenance facilities, and other aerospace component users to develop their own electronic component management plan (ECMP), hereinafter also referred to as 'plan'. This document states objectives to be accomplished. The plan does not describe specific requirements and those who prepare plans in compliance with this document will document processes that are the most effective and efficient for them in accomplishing the objectives of this document. In order to allow flexibility in implementing and updating the documented processes, plan owners are encouraged to refer to their own internal process documents instead of including detailed process documentation within their plans.

NOTE The equipment manufacturer, often called in the industry the original equipment manufacturer (OEM) is in general considered as the plan owner.

This component management document is intended for aerospace users of electronic components. This document is not intended for use by the manufacturers of electronic components. Components selected and managed according to the requirements of a plan compliant with this document may be approved by the concerned parties for the proposed application, and for other applications with equal or less severe requirements.

Organizations that prepare such plans may prepare a single plan and use it for all relevant products supplied by the organization or may prepare a separate plan for each relevant product or customer.



## **PROCESS MANAGEMENT FOR AVIONICS – MANAGEMENT PLAN –**

### **Part 1: Preparation and maintenance of an electronic components management plan**

#### **1 Scope**

This part of IEC 62239 defines the requirements for developing an electronic components management plan (ECMP) to guarantee to customers that all of the electronic components in the equipment of the plan owner are selected and applied in controlled processes compatible with the end application and that the technical requirements detailed in Clause 4 are accomplished.

In general, the plan owner of a complete electronic components management plan (ECMP) is the avionics original equipment manufacturer (OEM).

NOTE SAE EIA-STD-4899 can be used to comply with the requirements of IEC 62239-1 where applicable (see Annex C), to enable the plan owner to harmonise its plan for both documents.

This document provides an aid in the aerospace certification process.

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 (all parts), *Process management for avionics – Atmospheric radiation effects*

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*

IEC TS 62647-1, *Process management for avionics – Aerospace and defence electronic systems containing lead-free solder – Part 1: Preparation for a lead-free control plan*

GEIA-STD-0005-1, *Performance Standard for Aerospace and High Performance Electronic Systems Containing Lead-Free Solder*

IPC/JEDEC J-STD-20, *Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices*