

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Dependability reviews during the life cycle

Revue de la sûreté de fonctionnement au cours du cycle de vie





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 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
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 corrigendum or an amendment might have been published.

IEC publications search - 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 It also gives information on projects, replaced and withdrawn publications.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

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

IEC Customer Service Centre - 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.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries 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

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.

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.

Recherche de publications IEC - 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

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

Service Clients - 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.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques 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

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.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Dependability reviews during the life cycle

Revue de la sûreté de fonctionnement au cours du cycle de vie

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 03.120.01

ISBN 978-2-8322-7977-9

**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.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	8
3.1 Terms and definitions.....	8
3.2 Abbreviated terms.....	11
4 Introducing dependability reviews	11
4.1 General.....	11
4.2 Technical reviews	13
4.3 Status reviews	13
4.4 Overview of the dependability review method.....	14
4.4.1 Overview	14
4.4.2 Identifying stakeholders.....	14
4.4.3 Identifying what the requirements are	15
4.4.4 Capturing information on actual performance.....	15
4.4.5 Assessing the gap between requirements and actual performance	15
4.4.6 Identifying risks and areas of concern.....	15
4.4.7 Recommending actions.....	16
4.5 Planning for and timing of dependability reviews	16
4.6 Levels of dependability reviews.....	17
4.6.1 Overview	17
4.6.2 Team reviews	18
4.6.3 Project reviews	18
4.6.4 Status reviews.....	19
5 Dependability review activities during the life cycle.....	19
5.1 General.....	19
5.2 Concept stage.....	20
5.3 Development stage	20
5.3.1 Overview.....	20
5.3.2 Design reviews	21
5.4 Realization stage	22
5.5 Utilization stage	23
5.6 Enhancement stage	23
5.7 Retirement stage	24
6 Implementing the dependability review process	24
6.1 General.....	24
6.2 Planning of the review.....	24
6.3 Selection of the review team	25
6.4 Preparation of the input package	25
6.5 Meeting notification and agenda	25
6.6 Conducting a review meeting	26
6.6.1 General	26
6.6.2 Meeting protocol.....	26
6.6.3 Action points.....	27
6.6.4 Recommendations	27

6.6.5	Rejected action points and recommendations	27
6.6.6	Meeting conclusion	27
6.7	Preparing and distributing review minutes	27
6.7.1	General	27
6.7.2	Minutes	28
6.8	Actions and recommendations from a review	28
6.9	Follow-up and completion of action points and recommendations	29
Annex A (informative)	Examples of an input package for a review	30
A.1	Concept stage	30
A.2	Development stage	30
A.3	Realization stage	31
A.4	Utilization stage	31
A.5	Enhancement stage	31
A.6	Retirement stage	32
Annex B (informative)	Examples of objectives for dependability reviews during the life cycle	33
B.1	General	33
B.2	Concept stage	33
B.3	Development stage	33
B.3.1	Conceptual design review	33
B.3.2	Detail design review	33
B.3.3	Final design review	34
B.4	Realization stage	34
B.5	Utilization stage	35
B.5.1	Operation	35
B.5.2	Maintenance	35
B.6	Enhancement stage	35
B.7	Retirement stage	36
Annex C (informative)	Considerations during dependability reviews through the life cycle	37
C.1	General	37
C.2	Examples of dependability review considerations in the concept stage	37
C.3	Examples of dependability review considerations in the development stage	38
C.4	Examples of dependability review considerations in the realization stage	39
C.5	Examples of dependability review considerations in the utilization stage	40
C.6	Examples of dependability review considerations in the enhancement stage	41
C.7	Examples of dependability review considerations in the retirement stage	42
Annex D (informative)	Functions and responsibilities of some key persons for a technical review	43
D.1	General	43
D.2	Chair	43
D.3	Secretary	44
D.4	Relevant specialists	44
D.5	Project or team manager and members	45
D.6	Customers and users	45
Annex E (informative)	Dependability topics for a review	46
E.1	General	46
E.2	Reliability	46
E.3	Maintainability	46

E.4	Maintenance	47
E.5	Maintenance support.....	47
E.6	Availability	47
E.7	Quality assurance	48
E.8	Environmental effects	49
E.9	Product safety.....	50
E.10	Human factors	50
E.11	Legal matters.....	51
E.12	Durability	52
E.13	Security	52
E.14	Property damage	52
E.15	Accountability	53
	Bibliography.....	54
	Figure 1 – Flow of reviews during a life cycle stage	18
	Figure 2 – Implementing the review process	24

Currently in preview, click buy full vers.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DEPENDABILITY REVIEWS DURING THE LIFE CYCLE

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)"). The 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 cooperating 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 62960 has been prepared by IEC technical committee 56: Dependability.

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

FDIS	Report on voting
56/1874/FDIS	56/1878/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.

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

Dependability is the ability to perform as and when required. Dependability has many attributes but is usually characterized in terms of reliability, maintainability, supportability (including maintenance and support) and availability. These attributes are subject to change over the life cycle and can benefit from regular review.

Benefits of dependability review throughout the life cycle include:

- discovering and mitigating or eliminating weaknesses in the early life cycle stages before they manifest as dependability problems in later stages;
- identifying and treating problems which might occur later in the life cycle, and providing feedback to prevent their recurrence and to adapt systems to changes in environment and other factors;
- providing assurance of dependability and of the systems and processes that aim to achieve dependability;
- continually improving the dependability of the system in order to maintain or improve a commercial advantage.

Systems are becoming increasingly complex and constantly changing. This raises specific problems that need attention. Systems are changing in the following ways. A system is often developed, and/or utilized, in organizations across national borders and industry sectors. Changes such as legislation affecting one country or industry sector may necessitate a change to the system. System requirements can also change over time as technology, environmental conditions and societal demands change.

Dependability reviews are mainly used for large systems, but even small products such as mobile phones are complicated systems that may require dependability reviews.

Organizations involved in different parts of the life cycle might not be able to share a common purpose. For example, an engineering design company during the development and realization stages may not be able to fully anticipate the needs of stakeholders at the utilization stage. More generally, it is becoming increasingly difficult to predict at some earlier stage potential dependability problems that can occur at a later life cycle stage. Dependability reviews carried out at appropriate points during the life cycle can assist in addressing all of the above issues.

This document provides guidance on dependability reviews as part of an organization's technical review processes. It provides a coherent set of principles for dependability reviews which could be useful in addition to, and in support of, general monitoring and dependability assurance carried out by various organizations at different life cycle stages.

In many cases dependability aspects of a system are covered in other reviews such as design reviews or manufacturability reviews. In these cases, the procedures given in this document can be applied. The informative annexes can be used as checklists to cover all technical relevant aspects.

Dependability reviews described in this document are a key part of a dependability management system as described in IEC 60300-1.

DEPENDABILITY REVIEWS DURING THE LIFE CYCLE

1 Scope

This document provides guidance on a review methodology for dependability from a technical perspective that is applicable at all stages of a system life cycle. Its application can improve the dependability of a system throughout its life cycle by triggering appropriate actions at appropriate times to address potential dependability problems.

It provides guidance for developers, manufacturers, users and third-party independent reviewers such as consulting organizations.

This document describes a dependability review methodology focusing on:

- coherence of review activities across life cycle stages and their impact on dependability;
- stakeholder identification and how this affects dependability review activities;
- the relationships between different types of reviews;
- procedures for effective dependability reviews;
- examples of dependability review activities.

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 60050-192, *International electro-technical vocabulary – Part 192: Dependability* (available at <http://www.electropedia.org>)

3 Terms and definitions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-192 and the following 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>

3.1.1

dependability management

coordinated activities to direct and control an organization with regard to dependability

Note 1 to entry: Dependability management is part of an organization's overall management.

[SOURCE: IEC 60300-1:2014, 3.1.4]