~~Date: 2024-11-10~~

ISO/FDIS 20188~~:2024(en)~~

ISO/TC 20/SC 14

Secretariat: ANSI~~/AIAA~~

Date: 2024-12-20

Space systems — Product assurance requirements for commercial satellites

Systèmes spatiaux— — Exigences ~~de~~en matière d'assurance produit ~~pour les~~des satellites commerciaux

~~Космические системы.Требования по гарантированию качества продукции для коммерческих спутников~~

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/FDIS 20188
https://standards.iteh.ai/catalog/standards/iso/ae494b1d-4d49-43a4-bb49-7b23d0597bfc/iso-fdis-20188

Edited DIS - MUST BE USED FOR FINAL DRAFT

FDIS stage

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/FDIS 20188
https://standards.iteh.ai/catalog/standards/iso/ae494b1d-4d49-43a4-bb49-7b23d0597bfc/iso-fdis-20188

© ISO 2024, Published in Switzerland

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. Phone: + 41 22 749 01 11

Fax + 41 22 749 09 47

E-mail: copyright@iso.org
Website: www.iso.org

Published in Switzerland

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/FDIS 20188
https://standards.iteh.ai/catalog/standards/iso/ae494b1d-4d49-43a4-bb49-7b23d0597bfc/iso-fdis-20188

Edited DIS - MUST BE USED FOR FINAL DRAFT

Contents

Foreword ..... Error! Bookmark not defined.

Introduction ..... Error! Bookmark not defined.

1 Scope ..... Error! Bookmark not defined.

2 Normative references ..... Error! Bookmark not defined.

3 Terms and definitions ..... Error! Bookmark not defined.

4 Abbreviated terms ..... Error! Bookmark not defined.

5 Product assurance ..... Error! Bookmark not defined.
5.1 PA management ..... Error! Bookmark not defined.
5.2 PA plan ..... Error! Bookmark not defined.
5.3 Audit ..... Error! Bookmark not defined.
5.4 Customer right of access ..... Error! Bookmark not defined.
5.5 PA progress reports ..... Error! Bookmark not defined.
5.6 Risk management ..... Error! Bookmark not defined.
5.7 Critical item management ..... Error! Bookmark not defined.
5.8 Subcontractor product assurance ..... Error! Bookmark not defined.
5.9 End item data package ..... Error! Bookmark not defined.

6 Quality assurance ..... Error! Bookmark not defined.
6.1 Quality assurance programme ..... Error! Bookmark not defined.
6.2 Equipment qualification status review ..... Error! Bookmark not defined.
6.3 Review meeting and control boards ..... Error! Bookmark not defined.
6.4 Design review ..... Error! Bookmark not defined.
6.5 Pre-shipment review ..... Error! Bookmark not defined.
6.6 Flight readiness review ..... Error! Bookmark not defined.
6.7 Procurement control ..... Error! Bookmark not defined.
6.8 Manufacturing and storage control ..... Error! Bookmark not defined.
6.9 Manufacturing readiness review ..... Error! Bookmark not defined.
6.10 In-process inspection ..... Error! Bookmark not defined.
6.11 Process control ..... Error! Bookmark not defined.
6.12 Mandatory inspection points ..... Error! Bookmark not defined.
6.13 Workmanship standards ..... Error! Bookmark not defined.
6.14 Personnel training and competence ..... Error! Bookmark not defined.
6.15 Ground support equipment certification ..... Error! Bookmark not defined.
6.16 Electrostatic discharge control plan ..... Error! Bookmark not defined.
6.17 Contamination/cleanliness control plan ..... Error! Bookmark not defined.
6.18 Testing ..... Error! Bookmark not defined.
6.19 Test reviews ..... Error! Bookmark not defined.
6.20 Quality records and traceability ..... Error! Bookmark not defined.
6.21 Non-conformity control ..... Error! Bookmark not defined.
6.22 Alert system ..... Error! Bookmark not defined.
6.23 Handling, storage, preservation, packaging and shipping ..... Error! Bookmark not defined.
6.24 Preparation for delivery ..... Error! Bookmark not defined.
6.25 QA role in configuration management ..... Error! Bookmark not defined.

7 Dependability ..... Error! Bookmark not defined.

8 Safety ..... Error! Bookmark not defined.

iTeh Standards (https://standards.iteh.ai) Document Preview
ISO/FDIS 20188

© ISO 2024 — All rights reserved

© ISO 2024 – All rights reserved

9 EEE parts ..... Error! Bookmark not defined.
9.1 Programme plan ..... Error! Bookmark not defined.
9.2 Parts control board ..... Error! Bookmark not defined.
9.3 Parts selection ..... Error! Bookmark not defined.
9.4 Parts screening ..... Error! Bookmark not defined.
9.5 Lot acceptance test (LAT)/quality conformity inspection (QCI) Error! Bookmark not defined.
9.6 Parts qualification ..... Error! Bookmark not defined.
9.7 Incoming inspection and storage condition ..... Error! Bookmark not defined.
9.8 Parts traceability and lot control ..... Error! Bookmark not defined.
9.9 Lot transfer ..... Error! Bookmark not defined.
9.10 Non-conforming parts ..... Error! Bookmark not defined.

10 Materials, mechanical parts and processes (MMPP) ..... Error! Bookmark not defined.
10.1 Policy of materials selection and control ..... Error! Bookmark not defined.
10.2 Policy of mechanical parts selection and control ..... Error! Bookmark not defined.
10.3 Policy of processes selection and control ..... Error! Bookmark not defined.
10.4 Special processes ..... Error! Bookmark not defined.
10.5 Materials, mechanical parts and processes control board .. Error! Bookmark not defined.

11 Software product assurance ..... Error! Bookmark not defined.
11.1 General ..... Error! Bookmark not defined.
11.2 Software development ..... Error! Bookmark not defined.
11.3 Software configuration management ..... Error! Bookmark not defined.
11.4 Software non-conformity reporting and corrective action . Error! Bookmark not defined.

Bibliography ..... Error! Bookmark not defined.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/FDIS 20188
https://standards.iteh.ai/catalog/standards/iso/ae494b1d-4d49-43a4-bb49-7b23d0597bfc/iso-fdis-20188

© ISO 2024 – All rights reserved

Edited DIS - MUST BE USED FOR FINAL DRAFT

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

This second edition cancels and replaces the first edition (ISO 20188:2018), which has been technically revised.

The main changes are as follows:

— normative references with related references in the text have been updated;

— requirement related to the role of product assurance manager has been added;

— requirements have been updated in 6.216.21 (non-conformity control), in 6.256.25 (quality assurance role in configuration management, in Clause 7Clause 7 (dependability) and in Clause 8Clause 8 (safety);

— the Bibliography has been updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

© ISO 2024 — All rights reserved

© ISO 2024 – All rights reserved

Introduction

This document specifies the product assurance (PA) activities from the standpoint of commercial business during each phase of the project such as design, procurement, manufacturing, assembly, integration, test, and launch. These product assurance requirements are requested by customers for accomplishing the mission successfully and can lead to customer satisfaction.

The responsibility of the prime contractor is to allocate these requirements to subcontractors and suppliers, and to ensure their implementation.

The prime objective of PA is to ensure that commercial satellites accomplish their defined mission objectives and that they are safe and reliable.

A further objective is to achieve more cost-effective space projects and thereby to promote competitiveness by coordinating the development and implementation of appropriate PA methods and standards.

PA requirements defined in this document have been established to prevent potential problems. PA programmes also ensure that hardware and software of ground support equipment are also safe, reliable and do not degrade the flight hardware in any way.

This document intends to clarify the best practices and typical requirements dealing with product assurance activities in commercial business~~,~~ and realize quality improvement especially for customers having less experience.

The requirements described in this document are created by comparing and mixing experience and practical management methodologies used by main actors of aerospace industry in the world. The framework of PA policy and principles are based on ISO 14300-2,[24] ISO 27025, ISO 14620-1, ISO 23460, ISO 10794 and ISO 14621-2 and unified as one PA process. Detailed requirements of PA, quality assurance (QA), dependability, ~~EEE~~electrical, electronic, and electromechanical (EEE) parts, material, mechanical parts and processes, software product assurance and ground support equipment are referenced from relevant standards.

iTeh Standards
(https://standards.iteh.ai)
Document Preview
ISO/FDIS 20188
https://standards.iteh.ai/catalog/standards/iso/ae494b1d-4d49-43a4-bb49-7b23d0597bfc/iso-fdis-20188

© ISO 2024 – All rights reserved

Edited DIS - MUST BE USED FOR FINAL DRAFT

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/FDIS 20188
https://standards.iteh.ai/catalog/standards/iso/ae494b1d-4d49-43a4-bb49-7b23d0597bfc/iso-fdis-20188

Space systems — Product assurance requirements for commercial satellites

1 Scope

This document provides product assurance requirements and recommendations for commercial satellites throughout all phases. This document is applicable to the prime contractor, subcontractors and suppliers.

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.

ISO 10007, *Quality management — Guidelines for configuration management*

ISO 10794:2018, *Space systems — Programme management~~—~~ — Material, mechanical parts and processes*

ISO 10795, *Space systems — Programme management and quality — Vocabulary*

ISO 14620-1, *Space systems — Safety requirements — Part 1: System safety*

ISO 14621-1, *Space systems — Electrical, electronic and electromechanical (EEE) parts — Part 1: Parts management*

ISO 14621-2, *Space systems — Electrical, electronic and electromechanical (EEE) parts — Part 2: Control programme requirements*

iTeh Standards (https://standards.iteh.ai) Document Preview ISO/FDIS 20188 https://standards.iteh.ai/catalog/standards/iso/fe494bdd-4149-42c4-bb49-7b23d0597bfc/iso-fdis-20188

ISO 16192, *Space systems — Lessons learned — Principles and guidelines*

ISO 17666, *Space systems — Risk management*

ISO 21886, *Space systems — Configuration management*

ISO 23460, *Space projects — Programme management — Dependability assurance requirements*

ISO 23461:2010, *Space systems — Programme management — Non-conformance control system*

ISO 27025, *Space systems — Programme management —~~Quality~~ Product quality assurance requirements*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 10795 and the following apply.

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

— ~~—~~IEC Electropedia: available at https://www.electropedia.org/

— ~~—~~ISO Online browsing platform: available at https://www.iso.org/obp

~~© ISO 2024 – All rights reserved~~

Edited DIS - MUST BE USED FOR FINAL DRAFT

3.1 3.1
commercial satellite
satellite used for private business

Note 1 to entry: Non-commercial satellites are military satellites or civil satellites developed on behalf of government organizations, space agencies and/or research organizations.

4 Abbreviated terms

CDR	critical design review
CIL	critical item list
DMPL	declared mechanical parts list
DPA	destructive physical analysis
EEE	electrical, electronic, and electromechanical
EIDP	end item data package
EQSR	equipment qualification status review
ESD	electrostatic discharge
FRR	flight readiness review
GSE	ground support equipment
LAT	lot acceptance test
MIP	mandatory inspection point
MMPP	materials, mechanical parts and processes
MMPPCB	materials, mechanical parts and processes control board
MRB	material review board
MRR	manufacturing readiness review
PAD	parts approval document
PCB	parts control board
PDA	percent defective allowable
PDR	preliminary design review
PIND	particle impact noise detection
PSR	pre-shipment review
QCI	quality conformity inspection
RVT	radiation verification test
SCCB	software configuration control board
SCM	software configuration management
SCMS	software configuration management system
SEE	single event effect

iTeh Standards (https://standards.iteh.ai) Document Preview
ISO/FDIS 20188
https://standards.iteh.ai/catalog/standards/sist/494b1d-4d49-43a4-bb49-7b23d0597bfc/iso-fdis-20188

© ISO 2024 — All rights reserved

© ISO 2024 – All rights reserved

SEU	single event upset
SET	single event transient
SDR	special design review
TRB	test review board
TRR	test readiness review

5 Product assurance

5.1 PA management

The PA programme shall be implemented throughout all phases with coordination of all parties involved. It shall be managed in such a way as to:

a) ~~a)~~ ensure that the project and PA organization, requirements, methods, tools and resources are well-defined before development and implemented at each level from system down to piece part;

b) ~~b)~~ ensure that aspects are identified, which can affect project requirements having major impacts on safety, mission success and the related cost and schedule consequences;

c) ~~c)~~ ensure that adverse consequences of these aspects are prevented by the early detection, characterization, elimination, minimization and containment of problem contributors and initiators;

d) ~~d)~~ ensure that risks are assessed and controlled, and that acceptability of the residual ones is evaluated;

e) ~~e)~~ provide at any time the necessary visibility of the quality status of the product;

f) ~~f)~~ ensure that the end product conforms to its specifications and that observed non-~~conformitiess~~conformities are properly disposed.

iTeh Standards (https://standards.iteh.ai) Document Preview ISO/FDIS 20188

The contractor shall designate a PA manager who shall have the prime responsibility for the management and direction of the PA programme. In addition, the PA manager shall ensure that waivers or deviations are acceptable to the customer for the non-conformity, if the non-conformity needs to be accepted by the customer.

The PA manager shall act as the focal point of contact within the project for the customer.

The PA manager, irrespective of other responsibilities, shall have sufficient organizational authority and independence:

— ~~a)~~ to propose, establish and implement the product assurance ~~program~~programme in accordance with project product assurance requirements;

— ~~b)~~ to have unimpeded access to the top management through the company PA executive to fulfil the duties.

The contractor shall report on a regular basis on the status of the product assurance programme implementation. The contractor shall plan and perform quality audits using established and maintained procedures. The contractor shall prepare and implement a project product assurance plan that shall be maintained throughout the project life cycle.

The role of the PA manager is to provide to the top management and to the customer the guaranties (i.e. confidence) of the conformity of the product at each stage of product life cycle (i.e. specified, designed, manufactured, in use). In addition, the PA manager should not only inform the top management and the

© ISO 2024 – All rights reserved

Edited DIS - MUST BE USED FOR FINAL DRAFT