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Space systems — Programme management — Non-conformance control system

Systèmes spatiaux — Management de programme — Système de maîtrise des non-conformités

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 23461 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Introduction

This International Standard applies to non-conformance control in space programmes.

This International Standard applies to all deliverable products and supplies, at all levels, which fail to conform to specification requirements and design baselines.

The objectives of the non-conformance control system are to:

a) identify and segregate the non-conforming items;

b) record, report and review effective communication between suppliers and customers;

c) take corrective action against root causes of failure to ensure conformance of the products.

Space systems — Programme management — Non-conformance control system

1 Scope

This International Standard specifies a control system for non-conformances related to any product for space systems, such as electrical, electronic, and electromechanical components and software, as well as operational non-conformances and anomalies.

This International Standard applies to all deliverable products and supplies, at all levels, which fail to conform to specification requirements and design baselines.

This International Standard is applicable throughout phases of:

a) procurement, production, qualification, integration, and test;

b) acceptance, delivery, and transportation;

c) launch preparation and flight or launch readiness;

d) operational validation or qualification;

e) operation;

f) refurbishment.

This International Standard also specifies requirements for the interfaces with company internal non-conformance reporting and processing.

Engineering changes lie outside the scope of this International Standard.

2 Normative references

The following referenced documents are indispensable for the application 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 14300-1, *Space systems — Programme management — Part 1: Structuring of a programme*

ISO 14300-2, *Space systems — Programme management — Part 2: Product assurance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14300-1 and ISO 14300-2 apply.

4 Abbreviated terms

CCN contract change notice

CIL critical item list

OTS off–the–shelf

DJF design justification file

EEE electrical, electronic, electromechanical

FMECA failure mode effect and criticality analysis

NCR non-conformance report

NRB non-conformance review board (formerly known as material review board or MRB)

QA quality assurance

PA product assurance

RFD request for deviation

RFW request for waiver

5 Non-conformance control system — basic requirements

5.1 General principles

The following general principles apply.

a) The system shall provide for a disciplined approach to the identification and segregation of non-conforming items; the recording, reporting, review, disposition and analysis of non-conformances; and the definition and implementation of corrective and preventive actions.

b) Special attention shall be paid to:

   1) corrective actions against root causes, to avoid recurrence for other products;

   2) prompt and effective communication between suppliers and customers;

   3) the prevention of non-conformance occurrence, from the analysis of non-conformance records and derived lessons learned.

c) The supplier shall document his implementation of the non-conformance control system.

5.2 Non-conformance classes

5.2.1 General

Non-conformances shall be classified as major or minor, based on the severity of their consequences, as defined in 5.2.2 and 5.2.3. In case of doubt, non-conformances shall be classified as major.

Classification of non-conformances is not based on their consequences on cost and schedule.

5.2.2 Major

Major non-conformances shall be those which can have an impact on the customer's requirements in the following areas:

a) safety of people or equipment;

b) operational, functional or any technical requirements imposed by the business agreement;

c) reliability, maintainability, availability;

d) lifetime;

e) functional or dimensional interchangeability;

f) interfaces with hardware or software regulated by different business agreements, and in the following cases:

   1) changes to or deviations from approved qualification or acceptance test procedures,

   2) project specific items which are proposed to be scrapped,

   3) for EEE components, in case of:

      i) lot or batch rejection during manufacturing, screening or testing at the manufacturer's facilities, if the purchaser proposes:

         I) to use as–is the rejected lot or batch,

         II) to continue processing, rework or testing, although the lot or batch does not conform to the specified requirements;

      ii) non-conformances detected after delivery from the manufacturer.

5.2.3 Minor

Minor non-conformances are those which by definition cannot be classified as major.

The following discrepancies relating to EEE components after delivery from the manufacturer may be classified as minor:

a) random failures, where no risk for a lot–related reliability or quality problem exists;

b) if the form, fit or function are not affected;

c) minor inconsistencies in the accompanying documentation.

The consequences of several different minor non-conformances on the same item shall be evaluated for proper classification.

5.3 Non-conformance review board

5.3.1 General

The non-conformance review board (NRB) shall:

a) be the sole technical authority for the treatment of non-conformances occurring in the frame of a business agreement;

b) have all dispositions and decisions made by consensus by all core members;

c) involve higher management levels, in case of conflict;

d) maintain the independence of PA from the project management organization.

5.3.2 Internal NRB

The internal NRB shall:

a) have core members for the business agreement nominated and authorized by the supplier;

b) document the responsibilities and authorities of each member;

c) include core members from at least the following areas:

   1) project PA (chair),

   2) engineering;

d) have a chair who nominates additional members, or experts, depending on the subject of the non-conformance report (NCR);

e) be responsible for the correct application of this International Standard and its proper interfacing with internal non-conformance reporting and processing.

5.3.3 Customer NRB

For major non-conformances (see 5.2.2) the participation of the customer in the NRB is mandatory.

The customer NRB shall include representatives from at least the following areas:

a) project PA (chair);

b) engineering;

c) at least one customer's representative.

The customer's representative shall also nominate additional members or experts, depending on the NCR subject. The customer's representative may, with the supplier's agreement, invite observers or consultants from higher customer level, depending on the impacts of the non-conformance.

5.4 Non-conformance dispositions

5.4.1 General

A basic disposition for a non-conforming item can be one of 5.4.2 to 5.4.6.

5.4.2 Return to supplier

This disposition only applies to non-conforming procured items.

5.4.3 Use “as–is”

The item is found to be usable without eliminating the non-conformance.

5.4.4 Rework

The item is recoverable to conform completely to all specified requirements. By definition, rework is the re–application of the process as originally planned.

Additional work shall be performed to prepare the item for the rework (e.g. removal of faulty work and cleaning). In no case shall the result of earlier applied processes or the precondition for other processes to be applied later on, be affected.

5.4.5 Repair

The item is recoverable such that it fulfils the intended usage requirements although it does not conform to the originally specified requirements.

The repair procedure shall be one of the following:

a) qualified or standard — approved by the customer in advance for defined applications;

b) specific — drawn up for the specific non-conformance and approved by the NRB.

Any repair procedure shall include the verifications needed to check the repair result.

5.4.6 Scrap

The item is not recoverable by rework or repair, for technical or economic reasons.

5.5 Interfaces with internal non-conformance reporting and processing

The supplier's internal reporting and processing of non-conformances shall:

a) not conflict with this International Standard;

b) be open and visible to customer reviews;

c) not delay the processing of the non-conformance in accordance with this International Standard.

6 Non-conformance processing requirements

6.1 General

A non-conformance processing flow chart appears in Figure A.1.

6.2 Immediate actions

The immediate actions in response to detection of non-conformance shall be:

a) performance of an immediate preliminary assessment by the project PA member to establish its extent and cause;

b) follow-up, without delay, of the assessment, consisting of:

   1) provision for the safety of personnel and equipment,

   2) prevention of unauthorized use of the non-conforming items, by marking and, unless otherwise determined by the PA representative, segregation until their disposition,

   3) prevention of the recurrence of the non-conformance on similar or identical items under processing or testing at that time, which can require suspension of manufacturing or testing;