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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 5461

Space systems — Failure reporting, analysis, and corrective action (FRACA) process requirements

ICS: 49.140

ISO/TC 20/SC 14

Secretariat: **ANSI**

Voting begins on:
2024-07-09

Voting terminates on:
2024-10-01

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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.

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 documents 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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the 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*.

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.

Introduction

The failure reporting, analysis, and corrective action (FRACA) process is a closed-loop process that manages faults, failures, and anomalies of deliverable hardware, software, firmware, testing/monitoring devices, and maintenance/inspection equipment, which occur after qualification. ISO 5461 provides criteria for planning or rating a FRACA process in a manner that is commensurate with a product's unit-value/mission-criticality and space systems life cycle phase.

ISO 5461 is a tier-3 standard within the ISO TC 20/SC 14 space systems requirements hierarchical framework, for the following reasons:

- a) ISO 14300-2 (product assurance) requires that system safety, dependability, and quality assurance programme be implemented during the space system life cycle. Therefore, ISO 14620-1 (system safety), ISO 23460 (dependability), and ISO 27025 (quality assurance) are tier-two standards under ISO 14300-2, which is a tier-one standard.
- b) ISO 14620-1 requires that accidents and safety-critical nonconformances which occur during production, operations, and disposal phases in the space system life cycle be reported, investigated, and mitigated. ISO 23460 requires that reliability-critical failures which occur during the operations phase in the space system life cycle be reported, analyzed, and subjected to risk reduction. ISO 27025 requires that nonconformances which occur during the operations phase in the space system life cycle be reported, reviewed, and dispositioned via a corrective feedback loop. Therefore, ISO 5461 is a tier-three standard under ISO 14620-1, ISO 23460, and ISO 27025.

The FRACA and nonconformance management processes are sometimes assumed to provide identical functions during the space systems life cycle. However, the FRACA and nonconformance management processes provide separate and unique functions.

The FRACA process is first applied by the supplier to manage verified failures and anomalies of qualified hardware and software during production acceptance testing. After delivery and deployment of the space system, the space system operator can team-up with the supplier, via an SOW or MOA, to apply the FRACA process during the operations and disposal phases of the space system life cycle.

The nonconformance management process is applied by the supplier to manage verified nonconformances to requirements, from the time of the space system's conceptual development thru its delivery. It is important to note that not all verified failures or anomalies are a nonconformance, and not all verified nonconformances are a failure or anomaly. When the root cause of a failure or an anomaly during qualification testing is found to be an incorrect design, fabrication, or performance requirement, then corrective action should be determined and implemented by the FRACA process not the nonconformance management process. When the root cause of a failure or an anomaly during operation is found to be operator induced damage, then corrective action should be determined and implemented by the nonconformance management process not the FRACA process.

As in the case of the FRACA process, after delivery and deployment of the space system, the space system operator can team-up with the supplier, via an SOW or MOA, to apply the nonconformance management process during the operations and disposal phases of the space system life cycle.

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Space systems — Failure reporting, analysis, and corrective action (FRACA) process requirements

1 Scope

This document is applicable for managing failures that occur to space, launch, and ground control systems and equipment after qualification. The requirements in this document apply to all stake-holders that contribute to the design, analysis, test, production, and operation of space systems, as required in ISO 14300-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

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

ISO 17666, *Space systems — Risk management*

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

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

NOTE A number of documents that are available to aid suppliers achieve their safety, dependability, and quality assurance requirements are provided in the Bibliography.

3 Terms, definitions and abbreviations

For the purposes 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:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

The terms in this clause that are identical to terms found in ISO 10795 have identical definitions as the ones in ISO 10795, and the terms in this clause that are not identical to any terms in ISO 10795 have unique definitions as written.

3.1 Terms, and definitions

3.1.1

could not verify (CNV)

event described in the “Incident” record was non-repeatable and could not be verified after multiple attempts; also known as Could Not Duplicate (CND), or No Fault Found (NFF)