INTERNATIONAL STANDARD

ISO 14619

Second edition
2023-01

Space systems — Space experiments — General requirements

Systèmes spatiaux — Expériences spatiales — Exigences générales

Reference number
ISO 14619:2023(E)

© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

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
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2023 – All rights reserved

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Space experiment organizational requirements **2**
4.1 General 2
4.2 Participants 2
4.3 Phases 2
5 Planning phase **2**
5.1 General 2
5.2 Proposal 3
5.2.1 General 3
5.2.2 Terms and definitions 3
5.2.3 Introduction 3
5.2.4 SE's objectives and tasks 3
5.2.5 SE participants' responsibilities 3
5.2.6 Requirements for SE equipment 3
5.2.7 Requirements for the ground-support for an SE 4
5.2.8 Technical specification for a space system 4
5.2.9 Project financing and the source of funding 4
5.2.10 Scientific and technical justification for the SE (as an annex to the proposal) 5
5.3 Project 5
5.4 Scientific evaluation of the project 5
5.5 Technical feasibility of the project 5
5.6 Economic appraisal of the project 5
5.7 Statement of work 5
5.7.1 General 5
5.7.2 Terms and definitions 6
5.7.3 Introduction 6
5.7.4 SE's objectives and tasks 6
5.7.5 SE participants' responsibilities 6
5.7.6 Scientific equipment 6
5.7.7 Requirements for ground support for an SE 7
5.7.8 Technical specification for the space system 7
5.7.9 SE implementation procedure 7
5.7.10 SE output data — Analysis and processing of the experiment results 8
5.7.11 List of documents 8
6 Development phase **8**
6.1 General 8
6.2 SE programme plan 8
6.2.1 General 8
6.2.2 Introduction 9
6.2.3 SE's objectives and tasks 9
6.2.4 SE participants' responsibilities 9
6.2.5 Scientific equipment 9
6.2.6 Preparation on the ground 9
6.2.7 SM implementation procedure 9
6.2.8 SE sessions management and performance 10
6.2.9 Scientific observations management and support 10
6.2.10 Analysis and processing of the experiment results 10
6.3 Design and engineering of the equipment 10

© ISO 2023 – All rights reserved

6.4 Preparation of the hardware for the ground support of the scientific observations and for the results processing 10
6.5 Integration of the SE into the flight programme 10

7 Execution phase 11
7.1 General 11
7.2 Progress report 11
7.3 Summary report 11

8 Analysis and processing of the results and preparation of the final report 11
8.1 General 11
8.2 Final report 11

© ISO 2023 – All rights reserved

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 14619:2003), which has been technically revised.

The main changes are as follows:

— description of new terms and definitions;

— adjustment of organizational roles and responsibilities;

— definition and clarification of the content of documents;

— addition of information on ensuring the long-term sustainability of the space environment.

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 2023 – All rights reserved

Introduction

This document establishes the requirements for conducting space experiments (SEs).

Space systems are used for solving various practical problems of humanity. The possibilities for expanding the use of these systems are far from being exhausted. The space environment provides ideal conditions for certain scientific studies, which are difficult or impossible to carry out in a terrestrial environment.

It often happens that an experiment is conducted on board a space system that is available and operational (i.e. the experiment becomes part of the operations of the space system itself). The SE is carried out using both hardware and software subsystems. This poses a problem of accomplishing two interrelated objectives:

— to ensure successful execution and performance of the experiment;

— to avoid interfering with an operational space system so as not to impair its functioning.

One method of solving this problem is to standardize the procedure for integrating (introducing) SEs into the operational processes of the space system. This document specifies the procedures for an experiment preparation on the ground and processing of the data, obtained when conducting SEs with the use of a space system that is already operational.

© ISO 2023 – All rights reserved

Space systems — Space experiments — General requirements

1 Scope

This document addresses experimental add-on components to a space system under development and specifies the procedures for preparing and carrying out space experiments (SEs), and analysis and processing of the findings.

It is applicable to both manned and unmanned space systems. It can be tailored to the specific needs of different kinds of SEs.

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 14300-1, *Space systems — Programme management — Part 1: Structuring of a project*

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

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

ISO 14620-2, *Space systems — Safety requirements — Part 2: Launch site operations*

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

3 Terms and definitions

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/

3.1
space system
system that contains at least a space, a ground or a launch segment

3.2
space experiment
SE
system of operations, actions, and/or observations performed in space with the objective of obtaining information on the subject under investigation

3.3
space experiment project
SE project
developed plan for conducting a *space experiment* (3.2): from a proposal preparation up to analysis and processing of the results, and preparation of the final report

© ISO 2023 – All rights reserved

3.4
scientific equipment
set of equipment designed to perform a *space experiment* (3.2) and purposefully integrated into a *space system* (3.1)

3.5
project manager
authorized person accountable for planning, execution and accomplishing the stated objectives of the project

3.6
principal investigator
authorized person accountable for a specific scientific project

3.7
collaborator
authorized person who participates in a *space experiment* (3.2)

4 Space experiment organizational requirements

4.1 General

Execution of an SE using a space system shall be in accordance with the relevant programme management and safety International Standards, specifically ISO 14300-1, ISO 14300-2, ISO 14620-1 and ISO 14620-2.

4.2 Participants

The following participants shall be responsible for the management and execution of an SE:

a) project manager;

b) principal investigator;

c) collaborator(s).

4.3 Phases

The phases include:

a) SE planning (see Clause 5);

b) development (see Clause 6);

c) execution (see Clause 7);

d) analysis and processing of the results and preparation of the final report (see Clause 8).

5 Planning phase

5.1 General

The objective of operations at the planning phase of an SE is to assess the feasibility of conducting a particular SE in a particular space system. In addition, the effects of the experiment on the orbital environment shall be accessed for the long-term sustainability of the space activities. The organization of an SE shall be achieved through the following steps:

a) preparation of a proposal (see 5.2);

© ISO 2023 – All rights reserved