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Space systems — Requirements and guidelines for the management of systems engineering

Systèmes spatiaux — Exigences et lignes directrices pour le management de l'ingénierie système

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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 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).

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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 18676:2017), which has been technically revised.

The main changes are as follows:

— updated the normative references in Clause 2;

— updated the terms and definitions references in Clause 3.

— changed some recommendations to requirements in Clauses 5 to 13.

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.

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Introduction

There is general consensus that to accomplish space programme/project requirements, it is mandatory to manage the systems engineering activities. The main role of systems engineering management is to ensure system performance conforms with expressed need and to control the technical risks involved in development. Also, cost and schedule parameters are taken into account in space systems engineering in the search of optimal performance.

Thus, this document provides requirements and recommendations for managing the systems engineering activities related to planning, assessment and control of space programmes/projects.

These requirements and recommendations are intended to help customers and space system organizations to establish management requirements for systems engineering activities and help the organization to construct the elements of the systems engineering management plan (SEMP).

Given the need for systems engineering management, the overall systems engineering activities can be divided into two types:

— systems engineering management activities related to programme management which comprise planning, assessing, controlling, trade-off studies and decision-making;

— technical activities linked to the technical processes (stakeholder requirements analysis, system requirements analysis, system architectural design, system detailed design and assembly, integration, and verification and validation) applied to the system.

Therefore, systems engineering management reinforces the technical viewpoint within programme management.

In this document, a set of leading indicators are suggested as measures for evaluating the effectiveness of each space systems engineering activity. Leading indicators are important tools for project management to make interventions and actions to avoid rework and wasted effort during the whole system engineering life cycle.

This document emphasizes the following aspects of managing space systems engineering:

— the positioning of space systems engineering activities related to the management of space activities;

— the framework for the management of systems engineering;

— the systems engineering management plan (SEMP);

— the system, product and work breakdown structures;

— the phasing, scheduling and recursivity of the systems engineering management;

— reviews, audits and control gates;

— the main activities of systems engineering and the respective management approach.

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Space systems — Requirements and guidelines for the management of systems engineering

1 Scope

This document presents the requirements and recommendations for the management of systems engineering for space systems.

This document addresses the systems engineering activities and provides guidelines for interfacing with specific major management subjects (e.g. configuration management, data management, interface management, risk management, requirements management, and integrated logistics support).

This document establishes a common reference for all customers and suppliers in the space sector to work with management of systems engineering for all space products and projects.

This document does not describe in detail the standard systems engineering process or project management process for all types of space systems.

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

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

ISO 27026, *Space systems — Programme management — Breakdown of project management structures*

ISO 21886, *Space systems — Configuration management*

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
management
coordinated activities to direct and control an *organization* (3.2)

Note 1 to entry: Management can include establishing policies and objectives, and *processes* (3.3) to achieve these objectives.

Note 2 to entry: The word “management” sometimes refers to people, i.e. a person or group of people with authority and responsibility for the conduct and control of an organization. When “management” is used in this sense, it should always be used with some form of qualifier to avoid confusion with the concept of “management” as a set of activities defined above. For example, “management shall…” is deprecated whereas “top management shall…” is acceptable. Otherwise, different words should be adopted to convey the concept when related to people, e.g. managerial or managers.

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