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Systèmes spatiaux — Management des risques

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Foreword

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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 17666 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European Standard..." to mean "...this International Standard...".

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Foreword

This document (EN ISO 17666:2003) has been prepared by the European Cooperation for Space Standardization (ECSS) for CEN in close collaboration with Technical Committee ISO/TC 20 " Aircraft and space vehicles".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2003, and conflicting national standards shall be withdrawn at the latest by September 2003.

Annex A is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

Risks are a threat to the project success because they have negative effects on the project cost, schedule and technical performance, but appropriate practices of controlling risks can also present new opportunities with positive impact.

The objective of project risk management is to identify, assess, reduce, accept, and control space project risks in a systematic, proactive, comprehensive, and cost-effective manner, taking into account the project's technical and programmatic constraints. Risk is considered tradable against the conventional known project resources within the management, programmatic (e.g. cost, schedule), and technical (e.g. mass, power, dependability, safety) domains. The overall risk management in a project is an iterative process throughout the project life cycle, with iterations being determined by the project progress through the different project phases, and by changes to a given project baseline influencing project resources.

Risk management is implemented at each level of the customer-supplier network.

Known project practices for dealing with project risks, such as system and engineering analyses, analyses of safety, critical items, dependability, critical path, and cost, are an integral part of project risk management. Ranking of risks according to their criticality for the project success, allowing management attention to be directed to the essential issues, is a major objective of risk management.

The project actors agree on the extent of the risk management to be implemented into a given project depending on the project definition and characterisation.

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1 Scope

This European Standard defines, extending the requirements of ISO 14300-1, the principles and requirements for integrated risk management on a space project; it explains what is needed to implement a project-integrated risk management policy by any project actor, at any level (i.e. customer, first-level supplier, or lower-level suppliers).

This European Standard contains a summary of the general risk management process, which is subdivided into four (4) basic steps and nine (9) tasks. The implementation can be tailored to project-specific conditions.

The risk management process requires information exchange among all project domains and provides visibility over risks, with a ranking according to their criticality for the project; these risks are monitored and controlled according to the rules defined for the domains to which they belong.

The fields of application of this standard are all the space project phases. A definition of project phasing is given in ISO 14300-1.

When viewed from the perspective of a specific programme or project context, the requirements defined in this European Standard should be tailored to match the genuine requirements of a particular profile and circumstances of a programme or project.

NOTE Tailoring is a process by which individual requirements or specifications, standards, and related documents are evaluated and made applicable to a specific programme or project by selection, and in some exceptional cases, modification and addition of requirements in the standards.

2 Terms, definitions and abbreviated terms

2.1 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

2.1.1

acceptance of (risk)

decision to cope with consequences, should a risk scenario materialise

NOTE 1 A risk can be accepted when its magnitude is less than a given threshold, defined in the risk management policy.

NOTE 2 In the context of risk management, acceptance can mean that even though a risk is not eliminated, its existence and magnitude are acknowledged and tolerated.

2.1.2

(risk) communication

all information and data necessary for risk management addressed to a decision maker and to relevant actors within the project hierarchy

2.1.3

(risk) index

score used to measure the magnitude of the risk; it is a combination of the likelihood of occurrence and the severity of consequence, where scores are used to measure likelihood and severity

2.1.4

individual (risk)

risk identified, assessed, and mitigated as a distinct risk items in a project

2.1.5

(risk) management

systematic and iterative optimisation of the project resources, performed according to the established project risk management policy

2.1.6

(risk) management policy

describes the organisation's attitude towards risks, how it conducts risk management, the risks it is prepared to accept and defines the main requirements for the risk management plan

2.1.7

(risk) management process

consists of all the project activities related to the identification, assessment, reduction, acceptance, and feedback of risks

2.1.8

overall (risk)

risk resulting from the assessment of the combination of individual risks and their impact on each other, in the context of the whole project

NOTE Overall risk can be expressed as a combination of qualitative and quantitative assessment.

2.1.9

(risk) reduction

implementation of measures that leads to reduction of the likelihood or severity of risk

NOTE Preventive measures aim at eliminating the cause of a problem situation, and mitigation measures aim at preventing the propagation of the cause to the consequence or reducing the severity of the consequence or the likelihood of the occurrence.

2.1.10

residual (risk)

risk remaining after implementation of risk reduction measures

2.1.11

resolved (risk)

risk that has been rendered acceptable

2.1.12

risk

undesirable situation or circumstance that has both a likelihood of occurring and a potentially negative consequence on a project

NOTE Risks arise from uncertainty due to a lack of predictability or control of events. Risks are inherent to any project and can arise at any time during the project life cycle; reducing these uncertainties reduces the risk.

2.1.13

(risk) scenario

sequence or combination of events leading from the initial cause to the unwanted consequence

NOTE The cause can be a single event or something activating a dormant problem.

2.1.14

(risk) trend

evolution of risks throughout the life cycle of a project

2.1.15**unresolved (risk)**

risk for which risk reduction attempts are not feasible, cannot be verified, or have proven unsuccessful: a risk remaining unacceptable

2.2 Abbreviated terms

The following abbreviated terms are defined and used within this European Standard.

Abbreviation	Meaning
ECSS	European Cooperation for Space Standardization
IEC	International Electrotechnical Commission

3 Principles of risk management**3.1 Risk management concept**

Risk management is a systematic and iterative process for optimising resources in accordance with the project's risk management policy. It is integrated through defined roles and responsibilities into the day to day activities in all project domains. Risk management assists managers and engineers when including risk aspects in management and engineering practices and judgement throughout the project life cycle. It is performed in an integrated, holistic way, maximising the overall benefits in areas such as:

- design, construction, testing, operation, maintenance, and disposal, together with their interfaces;
- control over risk consequences; [ISO 17666:2003](https://standards.iteh.ai/catalog/standards/sist/fdf89859-2fd-4714-a073-43ac8851b546/iso-17666-2003)
- management, cost, and schedule. <https://standards.iteh.ai/catalog/standards/sist/fdf89859-2fd-4714-a073-43ac8851b546/iso-17666-2003>

This process adds value to the data that is routinely developed, maintained, and reported.

3.2 Risk management process

The entire spectrum of risks is assessed. Tradeoffs are made among different, and often competing, goals. Undesired events are assessed for their severity and likelihood of occurrence. The assessments of the alternatives for mitigating the risks are iterated, and the resulting measurements of performance and risk trend are used to optimise the tradable resources.

Within the risk management process, available risk information is produced and structured, facilitating risk communication and management decision making. The results of risk assessment and reduction and the residual risks are communicated to the project team for information and followup.

3.3 Risk management implementation into a project

Risk management requires corporate commitment in each actor's organisation and the establishment of clear lines of responsibility and accountability from corporate level downwards. Project management has the overall responsibility for the implementation of risk management, ensuring an integrated, coherent approach for all project domains.

Risk management is a continuous, iterative process. It constitutes an integral part of normal project activity and is embedded within the existing management processes. It utilises the existing elements of the project management processes to the maximum extent possible.

3.4 Risk management documentation

The risk management process is documented to ensure that the risk management policies are established, understood, implemented, and maintained, and that they are traceable to the origin and rationale of all risk-related decisions made during the life of the project.

4 The risk management process

4.1 Overview of the risk management process

The iterative four-step risk management process of a project is illustrated in Figure 1. The tasks to be performed within each of these steps are shown in Figure 2.

Step 1 comprises the establishment of the risk management policy (Task 1) and risk management plan (Task 2), and is performed at the beginning of a project. The implementation of the risk management process consists of a number of “risk management cycles” over the project duration comprising the Steps 2 to 4, subdivided into the seven Tasks 3 to 9.

The period designated in the illustration with “Risk management process” comprises all the project phases of the project concerned. The frequency and project events at which cycles are required in a project (only three are shown in Figure 1 for illustration purposes) depend on the needs and complexity of the project and need to be defined during Step 1. Unforeseen cycles are required when changes to, for example, the schedule, technologies, techniques, and performance of the project baseline occur.

Risks at any stage of the project are controlled as part of the project management activities.

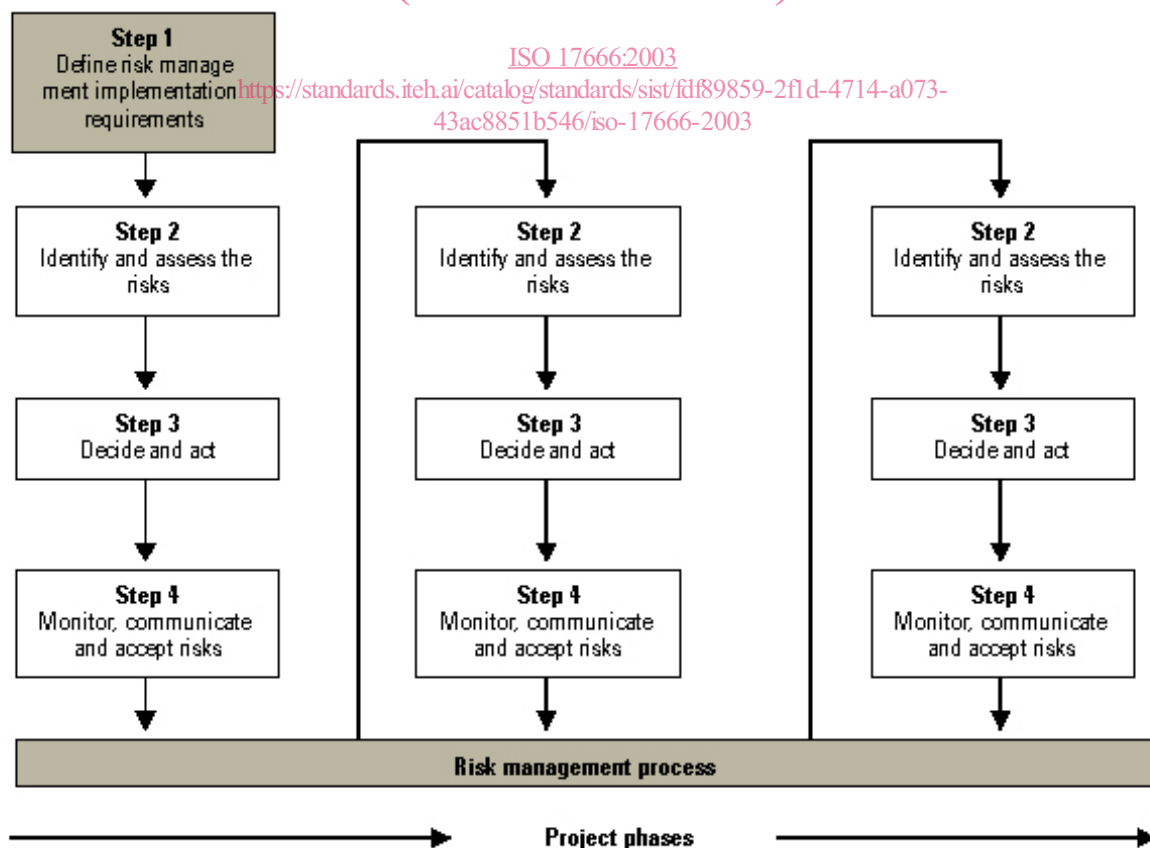


Figure 1 — The steps and cycles in the risk management process

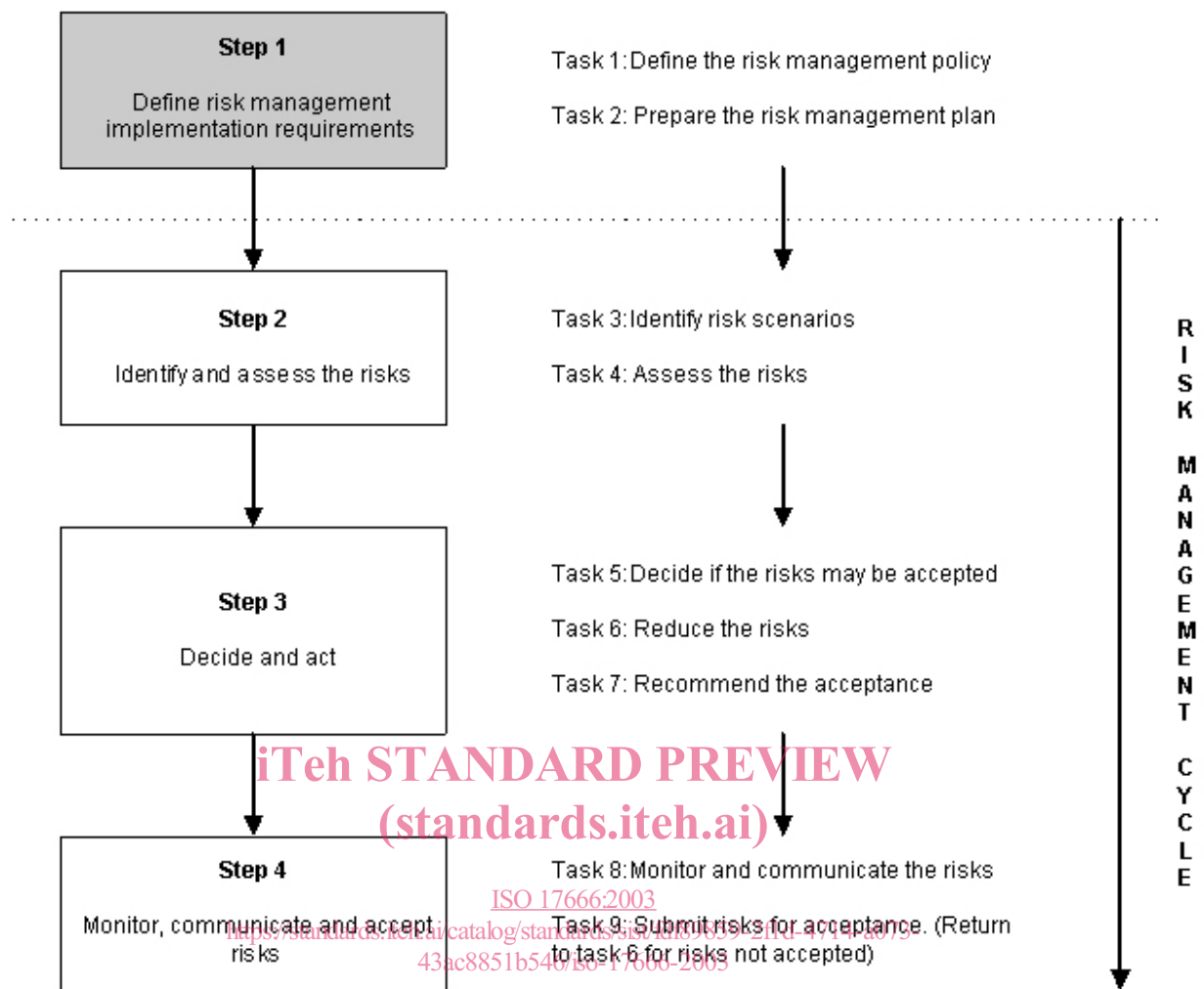


Figure 2 — The tasks associated with the steps of the risk management process within the risk management cycle

4.2 Risk management steps and tasks

4.2.1 Step 1: Define risk management implementation requirements

4.2.1.1 Purpose

To initiate the risk management process by defining the project risk management policy and preparing the project risk management plan.

4.2.1.2 Task 1: Define the risk management policy

The following activities are included in this task:

- Identification of the set of resources with impact on risks.
- Identification of the project goals and resource constraints.
- Description of the project strategy for dealing with risks, such as the definition of margins and the apportionment of risk between customer and supplier.
- Definition of scheme for ranking the risk goals according to the requirements of the project.