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Space systems — Project reviews

Systèmes spatiaux — Revue des projets

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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 21349 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Introduction

Space systems are very complex, incorporating many different technologies. Space programmes can last for many years, progressing through several different stages from conception to disposal or other disposition. When a space programme advances from one stage to another, substantial changes in the type and amount of resources required can occur. In addition, there may be attendant risks to either the success of the project or to the well being of project equipment or to personnel. Well-regulated project reviews can be an important factor in ensuring that all factors are ready for these changes, and that the risks are well understood and accepted. Use of this International Standard as a basis for the activities comprising a review, their necessary resources, controls, inputs and results is intended to enhance communication between different organizations that participate in a review process, and to reduce the costs of planning and performing reviews.

Space systems — Project reviews

1 Scope

This International Standard provides process requirements for project reviews as a set of required functions. The requirements and recommendations cover the function inputs, outputs, mechanisms and controlling conditions. It is intended for use in implementing the review requirements of ISO 14300-1, ISO 14300-2, ISO 15865 and such other space systems and operations standards that require formal reviews.

This International Standard specifies the responsibilities of a review board and gives guidance concerning review board composition.

This International Standard is applicable to reviews for a project at any level within a larger project, as well as for major milestone reviews at the top level of a major project. It is intended to be used either by an independent developer as a basis for enterprise processes, or as a basis for an agreement between a supplier and a customer.

This International Standard also provides normative descriptions of the kinds of reviews that are commonly useful in assuring the success of a space project.

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 14300-1:2001, *Space systems — Programme management — Part 1: Structuring of a programme*

ISO 17666, *Space systems – Risk management*

3 Terms and definitions

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

3.1
independent expert
person highly qualified in some aspect of the technical content of the project review who does not have a personal conflict of interest concerning the outcome of the review

3.2
milestone
designated project status that indicates the amount of progress made toward project completion, or that should be achieved before the project proceeds to a new phase

3.3
milestone criteria
observable facts that indicate a milestone has been reached

3.4
project data files
collection of requirements, specifications, plans, technical result documentation and all other project data that serves to represent the project status

3.5
project decision authority
entity with authority to certify that the preconditions for a review are met, to initiate the review process, to reach decisions on the review board recommendations and to cause the agreed project actions to be carried out

3.6
project expert
person well acquainted with the project status and documentation and highly qualified in some area of the technical content of the project review

3.7
project review team
body consisting of project experts, charged with preparing all evidence for the review and formulating responses to action items

NOTE The best practice for conducting a review involves two separate teams of experts: the project review team and the review board (3.8). The project review team is composed of persons well acquainted with the project, and is responsible for assembling information concerning the actual status of the project.

3.8
review board

body, organized into sub-entities, as necessary, consisting of a review board chairperson or delegated person and review board members, charged with evaluating the evidence of project status, along with identifying issues and necessary corrective actions, to determine that the objectives and success criteria of a review milestone have been met

NOTE The purpose of the review board is to prepare an objective evaluation of the project status. Achievement of an objective evaluation is aided by use of independent experts who have no prior association with the project and no personal conflict of interest with respect to the outcome of the review.

3.9
review board chairperson
leader of the review board, who approves the review policy, objectives, success criteria, organization of the review board and nomination of review board members

3.10
review board member
independent expert, sometimes termed a subject matter expert, who is a participant in the review board

3.11
review policy
policy that provides either requirements or guidance (or both) for the overall conduct of the review

4 General

4.1 Purpose of a review

The purpose of a project review is to establish whether or not the project has reached a defined project milestone and to identify specific actions necessary for the project to proceed to the next phase.

NOTE The flow of activities to achieve this purpose is one of identifying the participants and the plan, preparing the evidence of the project status, evaluating the evidence relative to milestone criteria, followed by preparation of specific recommendations based on the evaluation and performing actions identified by the review.

Typical milestones and their relation to space project phases are defined in ISO 14300-1, and in Clause 6 of this International Standard.

4.2 Process model

4.2.1 Function hierarchy

The project review process is presented in the framework of a model using the syntax and semantics in IEEE Std. 1320.1-1998. This model identifies the necessary functions to be performed in terms of the function name and purpose, its inputs, outputs, mechanisms and controls. For reference, the essential features of the modelling syntax and semantics used in this International Standard are summarized in Annex A. This International Standard uses the diagrammatic portion of IEEE Std. 1320.1-1998 as a framework and does not claim full compliance with IEEE Std. 1320.1-1998.

For clarity in communicating the relationships between the review functions, the model is construed as a three-level hierarchy of functions, as shown in Figure 1. This hierarchy can be used for guidance in planning reviews; but for a conforming application of this International Standard, use of this hierarchy to represent the process is not required.

In a conforming application, the twelve functions at the third level of the hierarchy of Figure 1 shall be implemented. Detailed requirements and guidance for these functions are given in Clause 5.

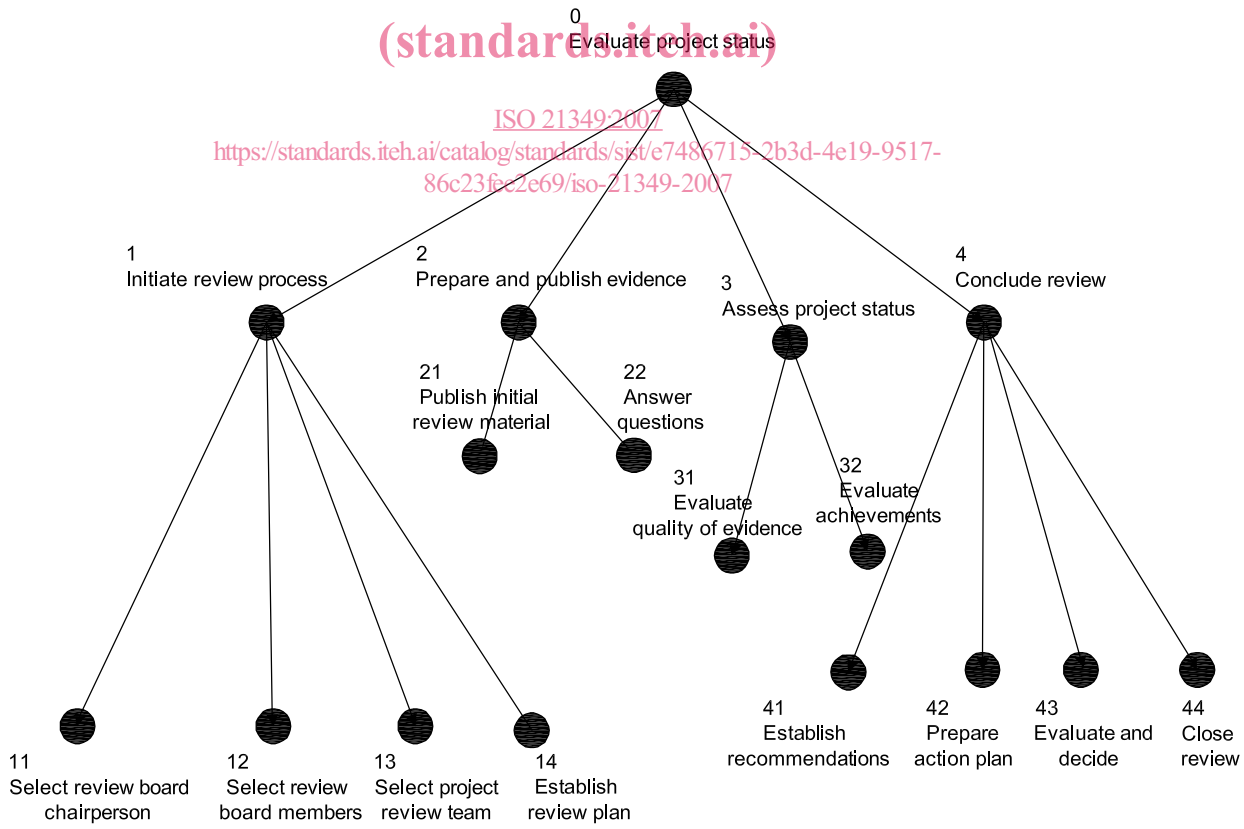

Figure 1 — Function hierarchy

4.2.2 Co-ordination of functions

A function may be performed concurrently with any other function and in any order that is appropriate, so long as the necessary inputs, controls and mechanisms are in place for the performance of the function. The performance of a function may be interrupted if this is appropriate, for example, because of resource conflicts.

In many cases the inputs, outputs and controls can consist of many increments of data or other material that are available at distributed times. Similarly, not all personnel participating in implementing a function are needed for the production of some specific increment of output. In these cases, outputs may be produced incrementally, rather than held until the total output has been completed.

4.3 Review context

The review context, corresponding to level 0 of Figure 1, is shown in Figure 2. The central box represents the function performed by the complete review process. The function of the review process, as stated in 4.1, is to evaluate project status relative to a specified project milestone. For the purposes of the diagram, this is abbreviated to “Evaluate project status”. The incoming arrows at the top and bottom, and on the left of the function box represent necessary preconditions for the review to be performed. Specifically,

a) the review process is controlled by the project review policy and the milestone criteria;

b) the input to the review process is the total set of project data files; and

c) the mechanism for performing the review process includes

   1) available independent experts,

   2) available project experts, and

   3) the project decision authority.

Requirements for these preconditions are given in 4.4.

The concrete result of the review is an agreed report of conclusions, recommendations and action items, and an approved plan for resolving any remaining problems. These outputs are shown on the right of the function box in Figure 2. Requirements for these outputs are given in 5.5.

Every model is an abstraction and includes only factors that are important from a certain viewpoint. The review process model used in this International Standard uses the viewpoint of project management.

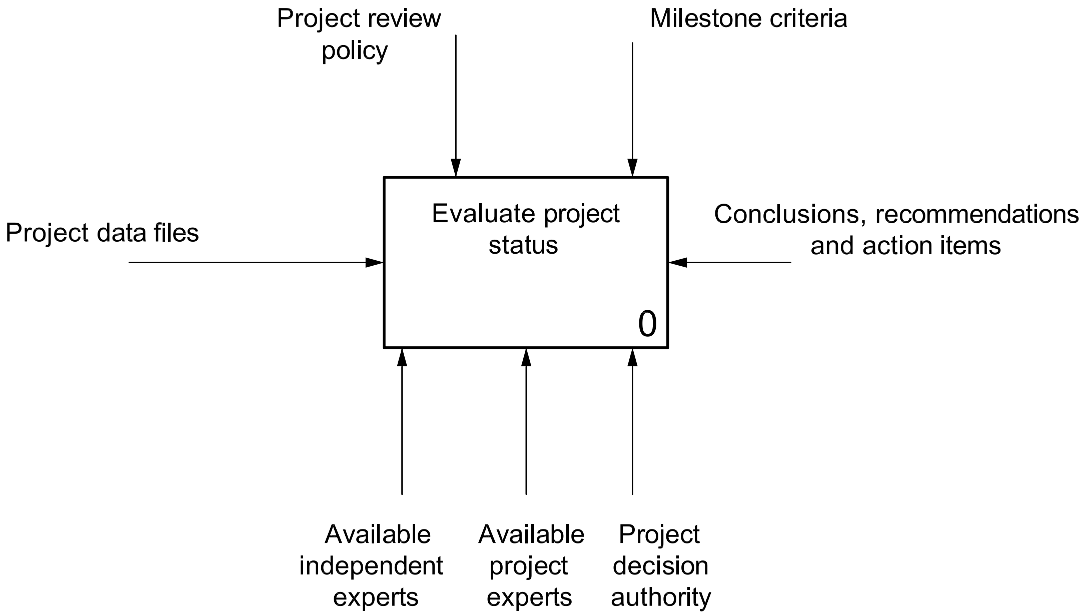

Figure 2 — Context diagram for the top-level function "Evaluate project status"

4.4 Preconditions for a review

4.4.1 General preconditions

4.4.1.1 Project review policy

The project shall have a review policy. Factors that should be considered for inclusion in the review policy include the following:

a) selection of review board chairperson and review board members;

b) qualifications of review board members;

c) number of review board members and distribution of technical expertise;

d) style, format and medium of review publications, presentations and responses;

e) rules of order for conduct of meetings;

f) rules and procedures for the review board to reach recommendations;

g) rules and procedures for reaching decisions which involve both the project decision authority and the review board;

h) selection of members of the project review team; and

i) establishment of a review plan.

4.4.1.2 Project decision authority

The project decision authority for the review shall be identified.

The project decision authority may be a single individual or a group of individuals that can reach a decision by vote, consensus or some other established method.