INTERNATIONAL STANDARD

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Space systems — Programme management —

Part 1: Structuring of a project

Systèmes spatiaux — Management de programme —

Partie 1: Structuration d'un projet

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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 14300-1 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 14300-1:2001), which has been technically revised.

ISO 14300 consists of the following parts, under the general title *Space systems — Programme management*:

— *Part 1: Structuring of a project*

— *Part 2: Product assurance*

Introduction

This part of ISO 14300 provides an overview and requirements of space programme management with the overall objective of optimizing performance, costs and schedules and of minimizing the risks.

Programme management is an integral element of any programme, but, in space, it is particularly important due to the following:

— specific environmental conditions in space;

— need for a high level of performance;

— limited number of models;

— limited access to the product during operations;

— quasi-impossibility of making repairs in the case of failure during flight;

— often high complexity of the organization;

— associated high costs involved.

The deployment of this standardized common set of programme management requirements should encourage and facilitate international space co-operation.

Space systems — Programme management —

Part 1:
Structuring of a project

1 Scope

This part of ISO 14300 addresses the space programme/project management requirements, applicable through a top-down approach in a contractual relationship between customers and suppliers.

NOTE The term programme is understood to be a group of several projects. Both “programme” and “project” may be used in the same context throughout this part of ISO 14300.

The applicable requirements for product assurance are given in ISO 14300-2. Annex A of this part of ISO 14300 gives the general ISO standards framework for space systems programme management.

This part of ISO 14300 is intended to be used as a basis when establishing and negotiating customer project management requirements, and guiding the supplier's responses.

It allows:

— a clear definition of the roles, responsibilities and authorities of the different customers and suppliers;

— coherence between their activities;

— communication capability between them;

— stable and rigorous project organization; and

— as far as possible, standardization of the rules applicable to various programmes/projects.

It still allows for supplier flexibility in its implementation and tailoring.

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 9000:2005, *Quality management systems — Fundamentals and vocabulary*

ISO 10007, *Quality management systems — Guidelines for configuration management*

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

ISO 11893, *Space systems — Programme management — Project organization*

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

ISO 16192, *Space systems — Experience gained in space projects (Lessons learned) — Principles and guidelines*

ISO 17666, *Space systems — Risk management*

ISO 21349, *Space systems — Project reviews*

ISO 21351, *Space systems — Functional and technical specifications*

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000:2005, ISO 10795 and the following apply.

3.1
project
set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time, cost and resources

NOTE Adapted from ISO 9000:2005.

3.2
programme
group of projects managed in a coordinated way to obtain benefits not available from managing them individually

4 Abbreviated terms

The following abbreviated terms are used in this document.

CCB configuration control board

CDR critical design review

CI configuration item

CM configuration management

DF design data file

EIDP end item data package

FS functional specification

ILS integrated logistic support

IPR intellectual property rights

LB log book

LSA logistic support analysis

PDR preliminary design review

PSR pre-shipment review

QR qualification review

TS technical specification

WBS work breakdown structure

WPD work package description

RAMS reliability, availability, maintainability and safety

5 Project management specification and plan

5.1 General

The attainment of quality, including requirements to meet cost, schedule and technical performance throughout project execution is the overall goal of management.

Any company involved in a space project shall take into account the requirements stated in a quality management system standard, e.g. ISO 9001:2008.

When a level 0 customer (the first level in the contractual line issuing a contract) intends to make this part of ISO 14300 a condition of a contract, this customer shall include in the solicitation (request for proposal, invitation to tender, request for quotation, etc.) a dedicated project management specification for its application by lower level customers and suppliers.

The application of the management requirements from the level 0 customer to the lowest level of suppliers in the contract chain shall be consistent with the criticality, complexity and cost of the product to be supplied. Thus, suppliers of less critical products may seek to have fewer requirements. Nonetheless, the continuity and the coherence of the project requirements shall be maintained. Selection and tailoring of this part of ISO 14300 is needed at the customer level. Any adaptation of this part of ISO 14300 shall be based on specific objectives and constraints.

At a given level, the supplier shall adapt the management requirements contracted with his own customer to his own suppliers. The customer can consequently fulfill his own obligations towards the next higher level (see Figure 1).

The suppliers shall prepare a management plan in order to comply with the dedicated project management specification, received from their customer.

5.2 Project management specification

Depending on the nature of the project or the project phase, the project management specification shall be issued by the level 0 customer and may include additional requirements or, on the contrary, certain elements which may be deleted with regard to this part of ISO 14300.

The level 0 customer shall require this part of ISO 14300, as tailored, and the appropriate selected clauses of ISO 14300-2, to be used by suppliers as the basis for developing their management plans.

Each supplier of a given level acts as a customer towards his own suppliers and shall specify the management requirements in the relevant contracts through a specific document or through the statement of work itself.

5.3 Project management plan

In response to this project management specification, each supplier concerned prepares a project management plan which contains descriptions of main activities, implementation methods and general procedures with respect to its organization.

Existing supplier policies, procedures and other management controls should be used, where appropriate, and in this case should be made available to their direct customer.

The supplier is encouraged to tailor any specified requirement that may provide more effective scheduling or reduce costs without loss in compliance to the intent of the requirement. Such tailored requirements should be individually identified within the supplier's project management plan to facilitate review by the customer.

The project management plan shall be submitted to the customer for acceptance. The plan, as accepted by the customer, becomes the basis for determining compliance with the customer project management requirements.

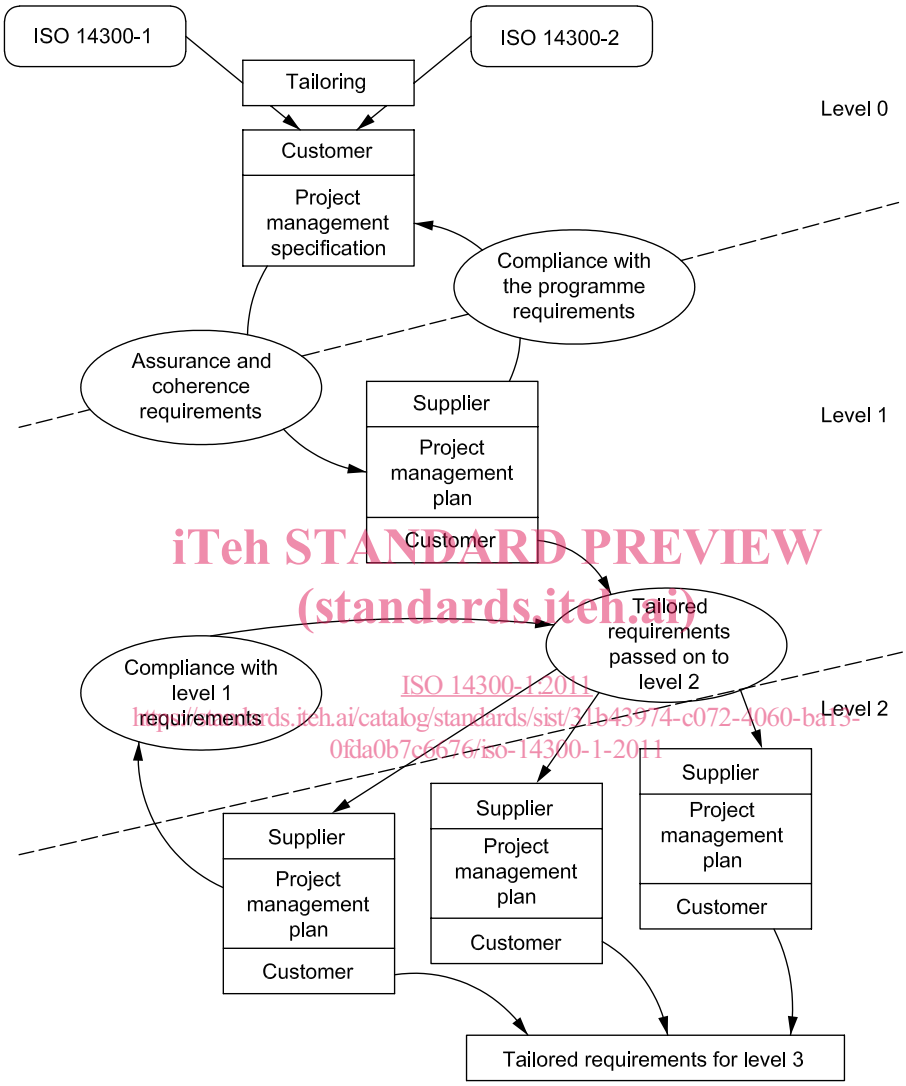

Figure 1 — Establishing project management rules

6 Work breakdown structure

6.1 General

The project work breakdown structure (WBS) is the reference system for project management data which:

— ensures the coherence between technical, documentary, administrative and financial activities of the whole project; and

— identifies the responsibilities and authorities of each supplier.

The rules to be observed when producing, modifying and using the project WBS are specified hereafter and detailed in ISO 27026.

6.2 Objectives

The project WBS is the structured and comprehensive breakdown of the whole project. On the basis of the product tree (see 6.4.3) or the function tree (see 6.4.2), it identifies the tasks and principal resources[1)] required to complete products intended to satisfy the expressed requirements.

This breakdown is achieved in a consistent way at different levels of responsibility and authority.

The project WBS is used as a common reference for the level 0 customer and the suppliers so as to identify all tasks required to entirely complete the project, regardless of whether these tasks are:

— on the project budget or not;

— under the responsibility and authority of the suppliers or other organizations.

The project WBS ensures management, planning, performance and control of all tasks implied by the project.

6.3 Responsibility and authority for development

Each supplier shall:

— develop the product tree for his own supplies and limit it to interfaces with his own customer and suppliers; and

— express his requirements concerning the establishment of the WBS to his suppliers.

These requirements are in particular associated with the project organization (see Clause 7) and the configuration items (CIs) (see Clause 10).

6.4 Rules for defining the WBS

6.4.1 Main aspects

The coding of tasks, resources and products (and possibly, functions) shall be unique and constant in time.

The tasks to be performed shall be linked to each level of the product tree (see 6.4.3).

As long as the system's product tree has not been defined, it is possible to associate tasks with functions of the function tree (see 6.4.2).

The principal resources to be used to accomplish each task shall be clearly identified.

When the resources involved in the project have to be developed (specific resources), they shall be considered in the same way as the products to be provided.

6.4.2 Function tree

The function tree gives the framework of system performance by breaking it down into functions. Each function can be decomposed into sub-functions, independent of the products involved.

It is possible to link tasks to functions at the early stages of the project, i.e. at least up to the system definition phase (phases 0, A and B; see 8.2).

At the system level, the function tree assures coherence of the whole system and the configuration control.

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1) Principal resources include the development of all hardware and software (e.g. test benches, tools) necessary for the project and also the resources required for the adaptation or the reuse of existing means, i.e. all those whose unavailability may be a constraint for the project.

6.4.3 Product tree

The product tree gives the top-down framework of the product by breaking down the system into elements, i.e. from the system, to subsystem, to equipment, to component level, where appropriate.

All product tree elements are under configuration control. The identifiers shall be consistent with all related work packages and documentation.

The product approach is based on a priori knowledge or knowledge gained since the project started concerning the products to be provided.

The product tree has to be established at the end of phase B (see 8.2.4) at the latest.

Products indicated in the product tree shall include, as a minimum, each product having a technical specification (TS).

6.4.4 Tasks

The tasks can be described in work package description (WPD)[2].

Each task is mainly characterized by:

a) the customer/supplier relationship;

b) a unique and identified person or organization in charge;

c) its content, including:

   — a title

   — an objective (e.g. qualification test)

   — a description with excluded tasks, if necessary

   — a task type (design, production, product assurance, management, tests, etc.);

d) its link to an element (product or function);

e) its planning constraints, including:

   — a planned duration

   — one (or several) input event(s) and data

   — one (or several) output event(s) and data

   — possibly, intermediate events (key events for the task);

f) its conditions of performance; and

g) the resources required for its performance.

The resources used shall be associated with the task which implement them.

2) A WPD is the information associated with tasks and work packages.

6.5 Management rules for changes

Changes in the WBS shall not modify its organization, so as not to disrupt project management.

Each added product, function, resource or task shall be given a new identification (reuse of identifiers having already been used at any other stage shall not be allowed).

The changes take into account the modifications of mandatory services and/or requirements which shall be accomplished in compliance with the contractual specifications (modification of clauses, riders, etc.).

7 Project organization

7.1 General

The implementation of a project organization is required to ensure consistent project performance and to control project execution.

This clause defines the organizational principles (organization at customer and industrial levels for project management) and specifies the organizational requirements concerning information circuits, internal and external to the project and its environment. More requirements are defined in ISO 11893.

On the basis of contractual data, this clause is used by the different project suppliers as a definition model and for implementation of the respective organization at each level.

7.2 Principles

The organization to be implemented shall take into account the project phases concerned, the nature of the tasks to be performed and the associated responsibility and authority levels.

The preparation, definition and implementation of the project organization shall be planned in compliance with project phasing (see 8.2).

The choice of the simplest and most effective management project as well as contractual relationships shall be made taking into account the specific project aspects, whether it be a national or an international one.

The person in charge of the definition and implementation of the project organization shall be identified.

The responsibilities and authorities for project management and contracting shall be identified so as to anticipate contractual and legal incidences.

Each project organization shall be coherent in contractual and technical terms.

If the project is associated with other programmes/projects, responsibilities and authorities regarding interface definition and management shall be specified and taken into account when implementing the project organization.

7.3 Organizational requirements

7.3.1 General

The project phases requiring an effective implementation of project organization (feasibility, definition, development, production, and utilization) shall be specified. The project change may lead to modifications of the implemented organization during project execution.