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**Systems and software engineering —
Life cycle processes — Project
management**

Ingénierie du logiciel — Processus de cycle de vie — Gestion de projet

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 rules given in the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC 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) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

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 Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Systems and software engineering*, in cooperation with the Software & Systems Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

This second edition cancels and replaces the first edition (ISO/IEC/IEEE 16326:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

- a) re-ordered the original [Clauses 2](#) and [4](#), and added a new [Clause 2](#) to comply with the new ISO document fixed structure requirements;
- b) moved the process guidelines up in front of the project management plan content requirements to put more emphasis on the process rather than the “product;”
- c) changed the citation tables in the new [Clause 6](#) to a single column so that the corresponding content is identical to both ISO/IEC/IEEE 15288:2015 and ISO/IEC/IEEE 12207:2017;
- d) added references in the applicable guidance portions of the new [Clause 6](#) that point to the more detailed process guidance information in ISO/IEC/IEEE 24748-4:2016 and ISO/IEC/IEEE 24748-5:2017;

- e) removed the PMP format requirements from the new [Clause 7](#);
- f) re-ordered the Bibliography to list the citations in numerical order.

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

This document provides normative content specifications for project management plans concerned with systems, and software systems.

This document also provides detailed discussion and advice on applying a set of technical management processes that are common to both the system and software life cycles as covered by ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 respectively. The discussion and advice are intended to aid in the preparation of the normative content of project management plans.

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Systems and software engineering — Life cycle processes — Project management

1 Scope

1.1 Purpose

This document is intended to aid project managers in managing to successful conclusion those projects concerned with systems, including software systems.

This document specifies the required content of the project management plan (PMP). This document also quotes the extracted purpose and outcome statements from the technical management processes of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207, and adds detailed guidance for managing projects that use these processes for systems, including software systems.

1.2 Field of application

This document is written for those who use or plan to use ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 on projects dealing with systems, including software systems, regardless of project scope, products, methodology, size or complexity. The field of application of this document spans the whole system or software life cycle and addresses all project management roles, specifically:

- those responsible for establishing and continuously improving their organization's policies for implementing ISO/IEC/IEEE 15288 system life cycle processes and ISO/IEC/IEEE 12207 software life cycle processes;
- those responsible for executing any ISO/IEC/IEEE 15288 system life cycle process or ISO/IEC/IEEE 12207 software life cycle process at a project level.
- organizations or individuals subcontracting a project management effort.

In many organizations, the various responsibilities of project management are assigned to more than one person. Where the term "project manager" is used in this document, the guidance, advice or normative requirement is taken as applying to the applicable role within the organization.

This document is intended to provide guidance for two-party situations and can be equally applied where the two parties are from the same organization. This document can also be used by a single party as self-imposed tasks.

This document can also serve as guidance in multi-party situations, where high risks are inherent in the supply and integration of complex software-based systems, and procurement can involve several vendors, organizations or contracting parties.

1.3 Limitations

The normative content specifications for PMPs and the guidance for application of the technical management processes have general application across the scope of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207, but are developed with a focus on projects dealing with systems with a significant software element, and software systems.

2 Normative References

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO, IEC and IEEE maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>
- IEEE Standards Dictionary Online: available at <http://ieeexplore.ieee.org/xpls/dictionary>

3.2 Abbreviated terms

CDRL	contract data requirements list
ICWG	interface control working group
PERT	program evaluation review technique
PM	project management (or project manager)
PMP	project management plan
PPL	product parts list
SDP	software development plan
SEE	software engineering environment
SEMP	systems engineering management plan
SWEBoK	software engineering body of knowledge
WBS	work breakdown structure

4 Conformance

4.1 General

This document provides normative definition of the content of the PMP and provides guidance for the execution of the technical management processes of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207. Users of this document can claim conformance to the normative documentation content, to the process provisions, or both.

4.2 Conformance to the normative documentation content

A claim of conformance to the documentation provisions of this document means that the user demonstrates that the content of a PMP conforms to the content requirements specified in [Clause 7](#).

4.3 Conformance to processes

A claim of conformance to the process provisions of this document is equivalent to claiming conformance to the technical management processes from ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 cited in [Clause 6](#).

4.4 Full conformance

A claim of full conformance to this document is equivalent to claiming conformance to the PMP content requirements cited in [Clause 7](#) and the technical management processes of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 cited in [Clause 6](#).

5 Application of this document

This document specifies the required content of the PMP such that the overall content of the plan, when executed successfully, fulfils the purposes and desired outcomes which are specified by the technical management processes of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207.

The technical management processes of ISO/IEC/IEEE 15288 and of ISO/IEC/IEEE 12207 contain the generic activities and tasks, which can be employed by any party that has to manage a project dealing with systems, including software systems. This document provides additional detailed guidance in [Clause 6](#) to assist managers of these projects as they prepare and execute the PMP for a specific project.

NOTE 1 In the general case, any specific project exists within an organization's business program areas and project portfolios. The organization can have additional processes that are not directly related to project management, but that are essential to a project's successful execution. The organizational project-enabling processes in ISO/IEC/IEEE 15288 and the guidance in ISO 21500 provide useful information and guidance on how a project's technical management processes fit into the overall organization's process structure.

NOTE 2 Reference [\[2\]](#) also provides important information about managing projects.

The responsible people listed as actors for which guidance applies are those most often tasked with the listed preparation actions, but users of this document may agree to assign the actions to different people or organizations depending on a given program's organizational structure.

Project managers should also apply the guidance in this document in an iterative manner to consider any systemic impact when undertaking an action; e.g., an action or failure to act in one area can affect other areas.

6 Technical management processes

6.1 General

This clause examines the eight technical management processes of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 i.e.:

- Project planning process;
- Project assessment and control process;
- Decision management process;
- Risk management process;
- Configuration management process;
- Information management process;
- Measurement process;
- Quality assurance process.

NOTE ISO/IEC/IEEE 15288 uses the identical process model for process purposes and outcomes as ISO/IEC/IEEE 12207, but its tasks and activities differ.

This clause provides detailed discussion and application advice as it applies to the management of projects dealing with systems, including software systems. The discussion and advice are intended

to aid project managers in managing a specific project (e.g., direct management and control of the work, management of the scope, management of the schedule, management of the budget and costs, management of resources, management of stakeholders, risk management, and procurement management).

Normative project process portions from both ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 are contained in boxed text, with discussion and advice for that portion immediately following. The purposes and outcomes from ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 are essentially the same, but may have minor editorial differences in verb tense and punctuation.

The advice given for systems projects also applies to projects undertaken to produce software systems. Any advice given specifically for software systems is further segregated below the advice for systems. The guidance provided for each process section in this document is designed to treat the combined purpose and outcome statements for that section from both ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207.

The processes and activities for a given project can require iterative action to accomplish the requirements of a project. For instance, based upon the life cycle model being used, processes, activities and tasks can be employed at the same time; they can be interdependent; or they can be coordinated in an organized series of work breakdown structure (WBS) dependencies throughout a project life cycle. In addition, other more modern project development processes such as agile development can combine these processes and activities in different ways.

The project manager should communicate applicable project plans, deliverables and schedules to the organization's affected stakeholders. The project manager should enlist their commitment to support the technical management processes with the organization's project-enabling processes. ISO/IEC/IEEE 15288:2015, 6.2 and ISO/IEC/IEEE 12207:2017, 6.2 provide guidance for the following organizational project-enabling processes:

- Life Cycle Model Management process; [ISO/IEC/IEEE 16326:2019](https://standards.iteh.ai/catalog/standards/sist/c2c76521-b50d-49c8-ace3-22330d6cba56/iso-iec-ieee-16326-2019)
- Infrastructure Management process; <https://standards.iteh.ai/catalog/standards/sist/c2c76521-b50d-49c8-ace3-22330d6cba56/iso-iec-ieee-16326-2019>
- Portfolio Management process;
- Human Resource management process;
- Quality Management process;
- Knowledge Management process.

6.2 Project planning process

6.2.1 General

ISO/IEC/IEEE 15288:2015 and ISO/IEC/IEEE 12207:2017

6.3.1 Project planning process

6.3.1.1 Purpose

The purpose of the Project Planning process is to produce and coordinate effective and workable plans.

This process determines the scope of the project management and technical activities, identifies process outputs, tasks and deliverables, establishes schedules for task conduct, including achievement criteria, and required resources to accomplish tasks. This is an on-going process that continues throughout a project, with regular revisions to plans.

6.3.1.2 Outcomes

As a result of the successful implementation of the Project Planning process:

- a) Objectives and plans are defined.
- b) Roles, responsibilities, accountabilities, authorities are defined.
- c) Resources and services necessary to achieve the objectives are formally requested and committed.
- d) Plans for the execution of the project are activated.

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6.2.2 Guidance

NOTE 1 ISO/IEC/IEEE 24748-4 and ISO/IEC/IEEE 24748-5 provide detailed guidance on the processes required for successful planning, execution and management of a project's systems and software engineering efforts, respectively.

- a) The strategies defined in the guidance sections of each of the other Technical Management processes in this clause provide inputs and are integrated in the Project Planning process. The Project Assessment and Control process is used to assess whether the plans are integrated, aligned and feasible.
- b) The responsibility for preparing and approving plans should be assigned and documented.
- c) The project manager should plan the management of project requirements including their elicitation, documentation and analysis.
- d) Project planning should include the following activities:
 1. involving all stakeholders in the requirements definition of a project;
 2. establishing a baseline of project requirements;
 3. establishing a sequence of activities and events at a suitable level of detail that represents the full scope of work for the project;
 4. managing change to the scope and requirements throughout a project's life cycle; all changes in scope and requirements should be carefully evaluated and documented;
 5. reviewing the selection of processes made from a previously successful project when the scope and requirements are changed, to help ensure that the selected processes are still applicable