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Standard**

**ISO/IEC/IEEE
24748-8**

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

**Part 8:
Technical reviews and audits on
defence programs**

Ingénierie des systèmes et du logiciel — Gestion du cycle de vie —

Partie 8: Revues techniques et audits des programmes de défense

**Second edition
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Sample Document

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialised 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/IEC documents 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 or www.iec.ch/members_experts/refdocs).

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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. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*, in cooperation with the Systems and Software 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 24748-8:2019), which has been technically revised.

The main changes are as follows:

- aligned document structure, terminology, etc. with related ISO standards (e.g. ISO/IEC/IEEE 15288:2023);
- reorganized and consolidated text for more consistent wording and to support different acquisition life cycles and organizations;
- added information to support software using highly iterative and incremental (agile) life cycles;
- defined common processes for technical reviews and audits on defence projects;
- defined review and audit topics associated with technical reviews and audits, replacing acceptability criteria;

- added context to support readers without significant defence industry experience;
- updated to reflect current best practices (e.g. digital engineering);
- removed selected guidance material (e.g. annexes describing optional reviews);
- updated definitions, acronyms and bibliography to be consistent with revised text.

A list of all parts in the ISO/IEC/IEEE 24748 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

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Introduction

This document responds to the needs of defence projects to have more specific and detailed requirements for technical reviews and audits as part of the assessment of projects during their life cycle. The requirements and guidance in this document have been written at the most general level possible so that they can meet the needs of defence agencies in different countries, either by direct application or by tailoring for an agency's specific needs.

Defence projects can be different from typical commercial projects in several ways:

- Defence systems can have hazards to human safety, the environment and national security that make their ownership and use prohibited outside of a defence organization. This can constrain the ability of projects to develop and deploy solutions for test and operational use;
- Acquisition teams can require comprehensive, cohesive technical data for systems and system elements, particularly plans, requirements and architectural descriptions (e.g. for certification activities or organic support);
- Acquisition teams using public funds often need extensive visibility into the definition and execution of supplier processes to support their fiduciary responsibilities.

These differences can result in the need to support more stakeholders in the review and audit process (6.6) and the need to review and audit more information items than found in typical commercial projects. However, non-defence projects are encouraged to apply it if useful.

This document can be used in one or more of the following modes:

- by an acquirer and a supplier, to help develop an agreement on the contribution of each party to the technical reviews and audit approach;
- by a project, to help establish and execute a technical review and audit approach for that project;
- by an organization, to help establish a desired approach to technical reviews and audits that can be applied across multiple projects;
- by process assessors, to serve as a reference for use in the performance of process assessments that support organizational process improvement.

NOTE Several tables in this document include a unique identifier (ID) for each table entry. This identifier can be used as desired to support compact references to the table entry in tailoring descriptions, checklists, etc.

Systems and software engineering — Life cycle management —

Part 8: Technical reviews and audits on defence programs

1 Scope

This document establishes the requirements for technical reviews and audits to be performed throughout the acquisition life cycle of defence projects. This document provides the purpose, timing, activities and tasks for each technical review and audit. It can be used to establish agreement between acquirers and suppliers on the technical reviews and audits that are needed for the project, as well as the focus and expectations of each technical review and audit.

This document is applicable to:

- those who implement or plan to implement technical reviews and audits in the acquisition of defence-related systems (and parts thereof) or services;
- those who are responsible for the technical management of projects concerned with the engineering of systems;
- those responsible for executing ISO/IEC/IEEE 15288 system life cycle processes for defence projects.

While primarily supporting the acquirer-supplier agreement mode, this document also can be used to support the other modes such as use by organizations, projects and process assessors.

NOTE In this document, the terms "project" and "program" are used interchangeably.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

ISO, IEC and IEEE 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/>
- IEEE Standards Dictionary Online: available at <https://ieeexplore.ieee.org/xpls/dictionary.jsp>

NOTE For additional terms and definitions in the field of systems and software engineering, see ISO/IEC/IEEE 24765, which is published periodically as a "snapshot" of the SEVOCAB (Systems and software Engineering Vocabulary) database and which is publicly accessible at <https://www.computer.org/sevocab>.

3.1.1

agile

development approach based on iterative development, frequent inspection and adaptation, and incremental deliveries in which requirements and solutions evolve through collaboration in cross-functional teams and through continual stakeholder feedback

[SOURCE: ISO/IEC/IEEE 24748-1:2024, 3.4]

3.1.2

evaluation

systematic determination of the extent to which an entity meets its specified criteria

[SOURCE: ISO/IEC 25001:2014, 4.1]

3.1.3

increment

tested, deliverable version of a product that provides new or modified capabilities

[SOURCE: ISO/IEC 33202:2024, 3.17, modified — “software” has been removed.]

3.1.4

information

knowledge that is exchangeable amongst *users* (3.1.13), about things, facts, concepts, and so on, in a universe of discourse

[SOURCE: ISO/IEC 10746-2:2009, 3.2.6]

3.1.5

information item

information product

separately identifiable body of *information* (3.1.4) that is produced, stored, and delivered for human use

Note 1 to entry: A document produced to meet information requirements can be an information item, part of an information item, or a combination of several information items.

Note 2 to entry: An information item can be produced in several versions during a project or *system* (3.1.11) life cycle.

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.12]

3.1.6

information item content

information (3.1.4) included in an *information item* (3.1.5), associated with a *system* (3.1.11), product or service, to satisfy a requirement or need

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.13]

3.1.7

iteration

<process> repeating the application of the same process or set of processes on the same level of the *system* (3.1.11) structure

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.28]

3.1.8

recursion

<process> repeating the application of the same process or set of processes to successive levels of *system* (3.1.11) elements in the system structure

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.31]

Note 1 to entry: No specific order of application is implied by this definition. For software and hardware system elements, a process may be applied at recursively lower levels for system definition and recursively higher levels for system realization.

Note 2 to entry: This definition does not imply any specific hierarchical, vertical, or horizontal structure for the system of interest, enabling system, organization, or project.

3.1.9

software configuration item

computer software configuration item

aggregation of software that is designed for configuration management and treated as a single entity in the configuration management process

Note 1 to entry: The state of technology progression has resulted in the functionality of software code being realized by its execution while embedded in devices that are not properly described as computers (e.g. digital signal processors, field programmable gate assemblies). This document uses software configuration item to encompass the broader execution environment of software code.

[SOURCE: ISO/IEC/IEEE 24765:2017, modified — The admitted term "software configuration item" has been changed to the preferred term; the abbreviated terms have been removed; note 1 to entry has been added.]

3.1.10

specification

information item (3.1.5) that identifies, in a complete, precise, and verifiable manner, the requirements, design, behaviour, or other expected characteristics of a *system* (3.1.11), service, or process

Note 1 to entry: The more generic term is used for consistent terminology within this document and includes terms such as system performance specification, system requirements document, system or subsystem specification, or *agile* (3.1.1) backlog.

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.26, modified — Note 1 to entry has been added.]

3.1.11

system

arrangement of parts or elements that together exhibit a stated behaviour or meaning that the individual constituents do not

Note 1 to entry: A system is sometimes considered as a product or as the services it provides.

Note 2 to entry: In practice, the interpretation of its meaning is frequently clarified by the use of an associative noun, e.g. aircraft system. Alternatively, the word "system" is substituted simply by a context-dependent synonym (e.g. aircraft), though this potentially obscures a system principles perspective.

Note 3 to entry: A complete system includes all of the associated equipment, facilities, material, computer programs, firmware, technical documentation, services, and personnel required for operations and support to the degree necessary for self-sufficient use in its intended environment.

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.46]

3.1.12

technical review

systems engineering technical review

a systems engineering activity conducted at a logical transition point in a system life cycle, by which the progress of a project is assessed relative to its technical requirements using a mutually agreed-upon set of criteria

Note 1 to entry: Includes both incremental and system perspectives, as applicable, and considers technical maturity amidst programmatic constraints (cost/schedule), to ascertain readiness to proceed to subsequent activities with acceptable risk.

Note 2 to entry: Unless otherwise stated, the use of the term "review" in this document is intended to refer specifically to a technical review.

3.1.13

user

individual or group that interacts with a *system* (3.1.11) or benefits from a system during its utilization

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.53]

3.2 Abbreviated terms

ASR	alternative systems review
CDR	critical design review
ICA	incremental configuration audit
ICR	iterative capability review
ID	identifier
IPR	iterative planning review
IRR	incremental release review
IVR	incremental viability review
FCA	functional configuration audit
MVCR	minimum viable capability release
MVP	minimum viable product
PCA	physical configuration audit
PIR	project initiation review
PDR	preliminary design review
PRR	production readiness review
RASIC	responsible, accountable, supports, informed, consulted (model)
SBOM	software bill of materials
SFR	system functional review
SME	subject matter expert
SRR	system requirements review
SVR	system verification review
TRR	test readiness review

4 Conformance

Users of this document can make claims of conformance (conformance statements) to some or all requirements in this document. Users can structure the form of such claims to meet their needs, therefore this document does not prescribe the form of these claims.

Also, per ISO/IEC 17007, this document does not address specific methods or procedures for individual conformity assessment activities, nor does it address general rules or methodology for conformity assessment.

For more information about conformance, see [Annex B](#).

5 Concepts

5.1 Project assessment and control

Reviews and audits support the “assess the project” activity of the ISO/IEC/IEEE 15288 project assessment and control process. The overall purpose of this process is to:

- assess if plans are aligned and feasible;
- determine the status of the project, technical and process performance;
- direct execution to confirm that the performance is according to plans and schedules, within projected budgets, to satisfy project objectives.

This process evaluates, periodically and at major events, the progress and achievements against requirements, plans, and overall strategic objectives. Information is provided for management action when significant variances are detected.

Although both reviews and audits support project assessment and control, technical reviews tend to include more focus on proactive areas such as risk identification, whereas configuration audits focus more on confirming the proper operation and outcomes of the configuration management system (5.2). Together, they provide key points throughout the project to evaluate significant achievements and to assess technical maturity and risk. Project assessment is performed at major project decision points by means of these reviews and audits, and the results inform a project’s management to enable any required project control actions. These actions can include redirecting project activities and tasks as appropriate to correct identified deficiencies.

5.2 Configuration management

Reviews and audits also support the “perform configuration identification” and “configuration verification and audit” activities of the ISO/IEC/IEEE 15288 configuration management process. The overall purpose of the configuration management process is to manage system and system element configurations over their life cycle. Managing includes establishing and maintaining consistency, integrity, traceability, and control. Configurations include information items and their product configuration information (e.g. version number).

Reviews and audits typically assess sets of related information items (e.g. requirements, architecture, design) for desired attributes such as consistency, integrity, and traceability. Thus, reviews and audits can be used where appropriate to support the incorporation of quality information items into a project configuration baseline (e.g. functional baseline, allocated baseline, or product baseline) and to provide confidence that the baseline is sufficiently mature to be used in future activities. See ISO/IEC/IEEE 24748-7, IEEE 828 and SAE EIA-649-1A for more information on configuration management for defence projects, including configuration baselines and configuration audits.

5.3 Validation

Reviews and audits also support the ISO/IEC/IEEE 15288 validation process. The overall purpose of this process is to provide objective evidence that the system, when in use, fulfils its business or mission objectives and stakeholder needs and requirements, achieving its intended use in its intended operational environment. Although validation can be done for the system of interest (or a system element) after it has been implemented or integrated and verified, validation can also be performed for individual information items produced in the definition and realization of the system and its elements. The validation process can help confirm:

- the “right” information items have been produced according to the needs and requirements of the stakeholders;
- whether or not these information items will result in the “right” system once realized.

Reviews and audits provide opportunities for stakeholders to provide early and frequent feedback on the evolution of the system and its associated information items with respect to the stakeholders’ needs and

requirements. These stakeholder discussions (in-process validation) can help determine that the proposed baselines are acceptable to the organization, customer, user, and other stakeholders.

Proposed changes to enhance system performance or to reduce risk or cost are welcome for consideration, but after baselining these will go through formal change control, since others can be building on previously defined and released information items.

5.4 Information and digital engineering

Much of the value of a review or audit comes from the effective evaluation of project information and consideration of the results. Project information can be provided in a static format (a document or database), as an interactive model or simulation, as a demonstration, or any other means best suited to the expected outcomes of the review or audit. In some cases, the evaluation can be used to determine formal acceptance of an information item. However, an excessive focus on information item acceptance can get in the way of supporting the project assessment and control (5.1), configuration management (5.2) and validation (5.3) needs of the project. This document uses the term “review or audit topic” to establish the necessary information and associated attributes needed to support the review or audit outcomes. As much as possible, this document specifies the necessary information item content and its attributes, not how the information is made available, to support its use across different organizations and life cycles. However, some suggestions for information items to use with the review and audit topics are included in [Annex A](#).

An incomplete information item (“draft,” “preliminary,” etc.) can be used for some reviews or audits, so long as the completeness and other technical qualities support the expected outcomes of the review or audit. Generally, review and audit topics do not distinguish between incomplete and complete information items.

Modern engineering practices incorporate digital engineering concepts, enabling the use of integrated models and simulations throughout the project lifecycle to digitally represent the system and associated information item content. The extent to which a project adopts a digital engineering approach will not impact “what” reviews and audits need to be conducted, but it can have a profound and revolutionary impact upon “how” they are conducted. A well-defined digital ecosystem, with an associated authoritative source of truth and static and interactive models of systems and their environment, will enable timely and iterative analyses. In addition, by leveraging constructive, virtual, and live simulation tools, the ecosystem can enable exploration of options not easily analysed elsewhere.

5.5 Agile development

To create frequent opportunities for effective project assessment and control, validation, and value delivery, some projects adopt the principles and practices described in ISO/IEC 33202 and ISO/IEC/IEEE 24748-10, particularly for software systems or system elements. Typical agile implementation aspects relevant to this standard include:

- Stakeholder needs, system requirements, design, etc. can evolve rapidly over the course of the project, with different functional capabilities at different levels of maturity at any point. A “definition of ready” may be defined to support decision gates (6.1), such as determining that sufficient information exists to start implementation. However, these decisions can happen so frequently as to overwhelm the ability of key stakeholders to participate in them (6.6);
- To support this highly iterative and incremental approach, stakeholder needs and associated requirements may be defined in units of work called agile backlog items, sometimes supplemented by global requirements captured in a “definition of done”. These backlog items may be decomposed into smaller related units of work and ultimately allocated to specific schedule periods, responsible teams, system element implementation versions, and associated test or other verification data as needed. Where a complete set of requirements, etc., is needed for a system or system element (introduction), extracting such information directly from agile backlog information can be difficult, in part because the sequence in which backlog items are implemented will usually affect the result. This can lead to the creation of alternate representations (including traditional requirements specifications, interface control documents, and other such documents) for systems and system elements;
- Rather than relying on large-scale reviews of comprehensive configuration baselines of increasing fidelity over the course of the project, agile projects may use lightweight reviews of backlog item definition

and completion, coupled with validation of deliverable products in an operationally representative environment, creating a single technical baseline that evolves incrementally as the backlog evolves. This approach is particularly effective for software, where modern languages and tools can narrow the distinction between requirements, design, implementation and test, and where the cost to correct defects is lower than many physical systems.

[Clause 9](#) addresses technical reviews and audits for agile projects.

6 Timing and frequency

6.1 Alignment to system life cycle model

Per ISO/IEC/IEEE 15288, every system has a life cycle model that comprises one or more stages, as needed. The stages can be iterative, concurrent, or overlapping, as appropriate for the system's scope, magnitude, complexity, changing needs, and opportunities. Typical system life cycle stages include concept, development, production, utilization, support, and retirement. These stages describe the major progress and achievement milestones of the system through its life cycle.

Stages give rise to decision gates. These decision gates apply specific decision criteria and are used by organizations to understand and manage the inherent uncertainties and risks associated with business case, costs, schedule, performance, or functionality of a system. The stages thus provide a framework within which a project has high-level visibility and control of technical management and technical processes.

Reviews and audits are assessment tools that provide decision-makers with sufficient information on the project's technical readiness to proceed to the next stage or to the next decision point within a stage. As a result, reviews and audits are often aligned to the beginning or end of each stage, as well as to key decision points within a stage, as appropriate.

See ISO/IEC/IEEE 24748-1 for details on different system life cycle models and how to select a life cycle model for a specific project. ISO/IEC/IEEE 24748-2 provides additional information on decision gates.

6.2 Risk-based decision points

In addition to life cycle stage boundaries, a review or audit can be held prior to a project task that poses significant technical or programmatic risks. For example, a test readiness review can be held prior to a particular test that has significant safety or security risks.

6.3 Entry criteria

A review or audit should not be conducted ([7.2](#)) unless and until the system under development meets the associated entry criteria. Entry criteria should support the purpose of the review or audit, including the required level of development maturity. The entry criteria are applied across all requirements and technical disciplines. Example entry criteria include:

- completion of required activities and tasks to prepare for the review or audit ([7.1](#));
- availability of specific information items necessary to support the review or audit topics ([5.4](#)).

Entry criteria should be documented in appropriate project plans prior to the start of the review or audit.

6.4 Exit criteria

The conduct of a review or audit ([7.2](#)) should be considered complete only after the associated exit criteria have been met. Example exit criteria include:

- confirmation that the expected review or audit outcomes have been achieved;
- action items have been properly dispositioned.

Exit criteria should be documented in appropriate project plans prior to the start of the review or audit.