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Part 7: Application of systems engineering on defense programs

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

Partie 7: Application de l'ingénierie des systèmes aux programmes de défense

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IEEE Std 15288.1™-2014

IEEE Standard for Application of Systems Engineering on Defense Programs

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Approved 10 December 2014

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Abstract: The requirements for the application of ISO/IEC/IEEE 15288, System Life Cycle Processes for defense systems engineering needs are provided in this standard. This standard implements ISO/IEC/IEEE 15288 for use by United States Department of Defense (DoD) organizations and other defense agencies in acquiring systems or systems engineering support. While primarily supporting the acquirer-supplier agreement mode, this standard also can be used to support the other modes: use by organizations, projects, and process assessors. This standard provides the basis for selection, negotiation, agreement, and performance of necessary systems engineering activities and delivery of products, while allowing flexibility for both innovative implementation and tailoring of the specific systems engineering process(es) to be used by system suppliers, either contractors or government system developers, integrators, maintainers, or sustainers.

Keywords: 15288, acquisition, agreement processes, allocated baseline, attributes, defense program, Department of Defense, functional baseline, IEEE 15288.1™, information management, life cycle processes, organizational project-enabling processes, outputs, process activities, process outcomes, process tasks, product baseline, project assessment, system life cycle, systems engineering, technical management processes, technical processes

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Introduction

This introduction is not part of IEEE Std 15288.1-2014, IEEE Standard for Application of Systems Engineering on Defense Programs.

For effective and efficient application of ISO/IEC/IEEE 15288 on defense programs, additional application requirements are needed. ISO/IEC/IEEE 15288 is written in a general manner to address all types of systems and different modes of application. Thus, it does not have requirements specific to the use by defense projects that facilitate effective implementation of an acquirer-supplier agreement, such as use in defense contracts.

This standard implements ISO/IEC/IEEE 15288 for application on defense programs, providing the defense-specific language and terminology to help ensure the correct application of acquirer-supplier requirements for a defense program. This standard includes the expected/required outputs and associated attributes.

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IEEE Standard for Application of Systems Engineering on Defense Programs

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1. Overview

1.1 Scope

This standard establishes the requirements for systems engineering activities to be performed on projects of the United States (US) Department of Defense (DoD) and other defense agencies across the entire system life cycle, including the planning, acquisition, modification, and sustainment of defense systems. It provides the foundation for systems engineering within the context of ISO/IEC/IEEE 15288[1] and the acquisition environment of DoD and other defense agencies at all levels of system hierarchy. This standard provides detailed requirements for the application of the life cycle processes, activities, and tasks of ISO/IEC/IEEE 15288 for use on any defense system and includes the effective integration of agreement processes, technical processes, technical management processes, and essential specialty engineering requirements.

1.2 Purpose

This standard provides requirements for the application of ISO/IEC/IEEE 15288 for defense systems engineering needs. This standard implements ISO/IEC/IEEE 15288 for use by DoD organizations and other defense agencies in acquiring systems or systems engineering support. While primarily supporting the

[1]Information on normative references can be found in Clause 2.

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acquirer-supplier agreement mode, this standard also can be used to support the other modes: use by organizations, projects, and process assessors. This standard provides the basis for selection, negotiation, agreement, and performance of necessary systems engineering activities and delivery of products, while allowing flexibility for both innovative implementation and tailoring of the specific systems engineering process(es) to be used by system suppliers, either contractors or government system developers, integrators, maintainers, or sustainers.

1.3 Conformance

1.3.1 Intended usage

ISO/IEC/IEEE 15288:2015 2.1 “Intended usage” shall apply.

1.3.2 Full conformance

1.3.2.1 Full conformance to outcomes

ISO/IEC/IEEE 15288:2015 2.2.1 “Full conformance to outcomes” shall apply.

1.3.2.2 Full conformance to tasks

ISO/IEC/IEEE 15288:2015 2.2.2 “Full conformance to tasks” shall apply.

1.3.3 Tailored conformance

ISO/IEC/IEEE 15288:2015 2.3 “Tailored conformance” shall apply with the following additions:

The agreement between the acquirer and supplier shall include the systems engineering requirements based on the tailoring (or other adaptation) of the requirements of this standard to address the program situation.

The assessment of the supplier is based on the compliance to the agreement. The agreement shall include the means by which compliance will be determined (which may include accomplishment of outcomes, completion of tasks, or delivery of outputs).

NOTE—The acquirer request for proposal may include the intended tailoring (or other adaptation) of the systems engineering requirements from this standard. The supplier may propose changes or alternatives during the steps to finalize the agreement.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

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IEEE Std 15288.2™-2014, IEEE Standard for Technical Reviews and Audits on Defense Programs.[2]

ISO/IEC/IEEE 15288:2015(E), Systems and software engineering—System life cycle processes.[3]

SAE/EIA-649-1 (2014), Configuration Management Requirements for Defense Contracts.[4]

3. Definitions, acronyms, and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause. [5]

allocated baseline: The approved requirements for a product, subsystem or component, describing the functional, performance, interoperability, and interface requirements that are allocated from higher-level requirements and the verifications required to demonstrate achievement of those requirements, as established at a specific point in time and documented in the allocated configuration documentation. (SAE/EIA-649-1).

baseline: **(A)** *noun:* A formally controlled and maintained set of data that serves as the basis for defining change. **(B)** *verb:* To establish and approve a set of data. (Adapted from SAE/EIA-649-1.)

NOTE—This standard uses the noun form of baseline to refer only to configuration baselines managed by the configuration management process, including the functional baseline, allocated baseline, and product baseline. It does not refer to other baselines used in DoD such as the acquisition program baseline.[6]

configuration item: Any system element or aggregation of system elements that satisfies an end use function and is designated by the acquirer for separate configuration control. (Adapted from SAE/EIA-649-1.)

functional baseline: Describes the system's performance (functional, interoperability, and interface characteristics) and the verification required to demonstrate the achievement of those specified characteristics. (SAE/EIA-649-1)

NOTE—The functional baseline is directly traceable to the operational requirements contained in the initial capabilities document or equivalent document.

product baseline: Describes the detailed design at a specific point in time, for production, fielding/deployment, and operations and support. (SAE/EIA-649-1)

[2]IEEE publications are available from The Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, NJ 08854, USA (http://standards.ieee.org/).
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NOTE 1—The product baseline prescribes all necessary physical (form, fit, or function) characteristics and selected functional characteristics designated for production acceptance testing and production test requirements.

NOTE 2—The product baseline is also known as the product configuration baseline. It is intended as the production configuration.

system effectiveness analysis: An analytical approach used to determine how well a system performs in its intended utilization environment.

3.2 Acronyms and abbreviations

The following acronyms and abbreviations appear in this standard:

CAPE	cost assessment and program evaluation
CDR	critical design review
CDRL	contract data requirements list
CI	configuration item
CM	configuration management
CWBS	contract work breakdown structure
DEMIL	demilitarization
DIA	Defense Intelligence Agency
DISR	DoD Information Technology Standards Registry
DoD	Department of Defense
DoDAF	DoD architecture framework
DT&E	developmental test and evaluation
ECP	engineering change proposal
ECR	engineering change request
ESOH	environment, safety, and occupational health
EVM	earned value management
FMECA	failure mode, effects, and criticality analysis
GFE	government-furnished equipment
GFI	government-furnished information
IMP	integrated master plan
IMS	integrated master schedule
IOT&E	initial operational test and evaluation
JCIDS	Joint Capabilities Integration and Development System
LCSP	life cycle sustainment plan
NDI	non-development item
OpsCon	operational concept
PDR	preliminary design review
PSA	product support analysis
SEMP	systems engineering management plan
SEP	systems engineering plan
SIP	system integration plan

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SOO	statement of objectives
SoS	system of systems
SOW	statement of work
TPM	technical performance measures
US	United States
WBS	work breakdown structure

4. This clause is a placeholder to align clauses with ISO/IEC/IEEE 15288

5. Key concepts and application of this international standard

5.1 Introduction

ISO/IEC/IEEE 15288:2015 5.1 “Introduction” applies as stated.

5.2 System concepts

5.2.1 Systems

ISO/IEC/IEEE 15288:2015 5.2.1 “Systems” applies as stated.

5.2.2 System structure

ISO/IEC/IEEE 15288:2015 5.2.2 “System structure” applies as stated.

5.2.3 Enabling systems

ISO/IEC/IEEE 15288:2015 5.2.3 “Enabling systems” applies as stated.

5.3 Organization and project concepts

5.3.1 Organizations

ISO/IEC/IEEE 15288:2015 5.3.1 “Organizations” applies as stated.

5.3.2 Organization and project-level adoption

ISO/IEC/IEEE 15288:2015 5.3.2 “Organization and project-level adoption” applies as stated.

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5.4 Life cycle concepts

5.4.1 System Life Cycle Model

ISO/IEC/IEEE 15288:2015 5.4.1 "System Life Cycle Model" applies as stated.

NOTE—For use in US DoD programs, see *Operation of the Defense Acquisition System* (DoDI 5000.02) [B4][7] for a discussion of the DoD System Life Cycle Model. For use on other defense programs, refer to the applicable life cycle model of the acquisition organization.

5.4.2 System life cycle stages

ISO/IEC/IEEE 15288:2015 5.4.2 "System life cycle stages" applies as stated.

NOTE—For use in US DoD programs, see *Operation of the Defense Acquisition System* (DoDI 5000.02) [B4] for a discussion of the DoD system life cycle stages. For use on other defense programs, refer to the applicable life cycle model of the acquisition organization.

5.5 Process concepts

5.5.1 Criteria for processes

ISO/IEC/IEEE 15288:2015 5.5.1 "Criteria for processes" applies as stated.

5.5.2 Description of processes

ISO/IEC/IEEE 15288:2015 5.5.2 "Description of processes" applies as stated with the following addition:

For the DoD application, each process includes systems engineering outputs with attributes.

5.5.3 General characteristics of processes

ISO/IEC/IEEE 15288:2015 5.5.3 "General characteristics of processes" applies as stated.

5.5.4 Tailoring

ISO/IEC/IEEE 15288:2015 5.5.4 "Tailoring" applies as stated.

5.6 Processes in this standard

5.6.1 Introduction

ISO/IEC/IEEE 15288:2015 5.6.1 "Introduction" applies as stated.

[7] The numbers in brackets correspond to those of the bibliography in Annex H.

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