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**Systems and software engineering —
Guidelines for the utilization of ISO/
IEC/IEEE 15288 in the context of
system of systems (SoS)**

*Ingénierie des systèmes et du logiciel — Lignes directrices pour
l'utilisation de l'ISO/IEC/IECC 15288 dans le contexte d'un système de
systèmes (SdS)*

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Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative References	1
3 Terms, definitions, and abbreviated terms	1
3.1 Terms and definitions	1
3.2 Abbreviated terms	3
4 Relationship to other standards	3
5 Key concepts and application	4
5.1 Differences between systems and SoS	4
5.2 Managerial and operational independence	7
6 Application of system life cycle processes to SoS	10
6.1 Agreement processes	10
6.1.1 General	10
6.1.2 Acquisition process	12
6.1.3 Supply process	13
6.2 Organizational project-enabling processes	15
6.2.1 General	15
6.2.2 Life cycle model management process	16
6.2.3 Infrastructure management process	17
6.2.4 Portfolio management process	18
6.2.5 Human resource management process	20
6.2.6 Quality management process	21
6.2.7 Knowledge management process	22
6.3 Technical management processes	23
6.3.1 General	23
6.3.2 Project planning process	24
6.3.3 Project assessment and control process	25
6.3.4 Decision management process	27
6.3.5 Risk management process	28
6.3.6 Configuration management process	29
6.3.7 Information management process	30
6.3.8 Measurement process	31
6.3.9 Quality assurance process	32
6.4 Technical processes	33
6.4.1 General	33
6.4.2 Business or mission analysis process	36
6.4.3 Stakeholder needs and requirements definition process	37
6.4.4 System requirements definition process	39
6.4.5 Architecture definition process	41
6.4.6 Design definition process	44
6.4.7 System analysis process	46
6.4.8 Implementation process	47
6.4.9 Integration process	48
6.4.10 Verification process	49
6.4.11 Transition process	51
6.4.12 Validation process	52
6.4.13 Operation process	54
6.4.14 Maintenance process	55
6.4.15 Disposal process	56
Bibliography	58

IEEE notices and abstract.....	59
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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).

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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 Systems and Software Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

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.

Introduction

Application of systems engineering to systems of systems has become increasingly important for the realization and sustainability of large and persistent sociotechnical systems in domains as varied as healthcare, transportation, energy, and defense, and contexts such as corporations, cities, and government. This has been intensified in the last fifteen years by the pervasiveness of information technology (IT), illustrated by new technologies and paradigms such as Sensor Networks, Cloud Computing, the Internet of Things, Big Data, Smart Devices and Ambient Intelligence. It is, for instance, the application of these technologies to cities that transform them into smarter cities.

This document provides guidance for the utilization of ISO/IEC/IEEE 15288 in the context of SoS. While ISO/IEC/IEEE 15288 applies to systems in general (including constituent systems), this document provides guidance on the application of these processes to the special case of SoS. However, ISO/IEC/IEEE 21840 is not a self-contained SoS replacement for ISO/IEC/IEEE 15288. This document is intended to be used in conjunction with ISO/IEC/IEEE 15288, ISO/IEC/IEEE 21839 and ISO/IEC/IEEE 21841 and is not intended to be used without them.

For example, ISO/IEC/IEEE 21841 provides a taxonomy for SoS, providing specific viewpoints that align with stakeholder concerns. Using a taxonomy in conjunction with this document facilitates better communications among the various stakeholders that are involved in activities like governance, engineering, operation, and management of these SoS. However, this document does not require the use of any specific taxa in ISO/IEC/IEEE 21841.

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Systems and software engineering — Guidelines for the utilization of ISO/IEC/IEEE 15288 in the context of system of systems (SoS)

1 Scope

This document provides guidance on the application of processes in ISO/IEC/IEEE 15288 to systems of systems (SoS). The scope of this document is the same as ISO/IEC/IEEE 15288, which addresses more than systems engineering activities.

NOTE 1 Throughout the document, there is mixed use of "system of systems" and "systems of systems". "SoS" could refer to a system of systems or systems of systems. Similarly, "CS" could refer to a constituent system or constituent systems.

This document provides general guidance for each ISO/IEC/IEEE 15288 process and process outcome in the context of SoS, but it does not address specific activities, tasks, methods, or procedures. Additional processes and process outcomes unique to SoS can still be needed and are not covered by this document.

This document explores the similarities and differences between systems and SoS and, by extension, the similarities and differences between engineering of systems and SoS. The guidance contained in this document is expected to evolve as the discipline matures.

NOTE 2 In many cases, this document notes that ISO/IEC/IEEE 15288 processes or process outcomes "... applies as stated to SoS." Some interpretation within the context of SoS can still be needed.

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.

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 www.computer.org/sevocab.

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

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

3.1.1

capability

measure of capacity and the ability of an entity (*system* (3.1.8), person or organization) to achieve its objectives

[SOURCE: ISO/IEC 19770-1:2017, 3.10, modified — Note 1 to entry has been removed.]