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Road vehicles — Cybersecurity engineering

Véhicules routiers — Ingénierie de la cybersécurité

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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.

SAE International is a global association of more than 128,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries. Standards from SAE International are used to advance mobility engineering throughout the world. The SAE Technical Standards Development Program is among the organization's primary provisions to those mobility industries it serves aerospace, automotive, and commercial vehicle. These works are authorized, revised, and maintained by the volunteer efforts of more than 9,000 engineers, and other qualified professionals from around the world. SAE subject matter experts act as individuals in the standards process, not as representatives of their organizations. Thus, SAE standards represent optimal technical content developed in a transparent, open, and collaborative process.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1 and the SAE Technical Standards Board Policy. 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 editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and SAE International 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).

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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 jointly prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*, and SAE TEVEES18A *Vehicle Cybersecurity Systems Engineering Committee*.

This first edition of ISO/SAE 21434 cancels and supersedes SAE J3061:2016^[37].

The main changes are as follows:

- complete rework of contents and structure.

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. Alternatively, to provide feedback on this document, please visit <https://www.sae.org/standards/content/ISO/SAE 21434/>.

Introduction

Purpose of this document

This document addresses the cybersecurity perspective in engineering of electrical and electronic (E/E) systems within road vehicles. By ensuring appropriate consideration of cybersecurity, this document aims to enable the engineering of E/E systems to keep up with state-of-the-art technology and evolving attack methods.

This document provides vocabulary, objectives, requirements and guidelines related to cybersecurity engineering as a foundation for common understanding throughout the supply chain. This enables organizations to:

- define cybersecurity policies and processes;
- manage cybersecurity risk; and
- foster a cybersecurity culture.

This document can be used to implement a cybersecurity management system including cybersecurity risk management.

Organization of this document

An overview of the document structure is given in Figure 1. The elements of [Figure 1](#) do not prescribe an execution sequence of the individual topics.

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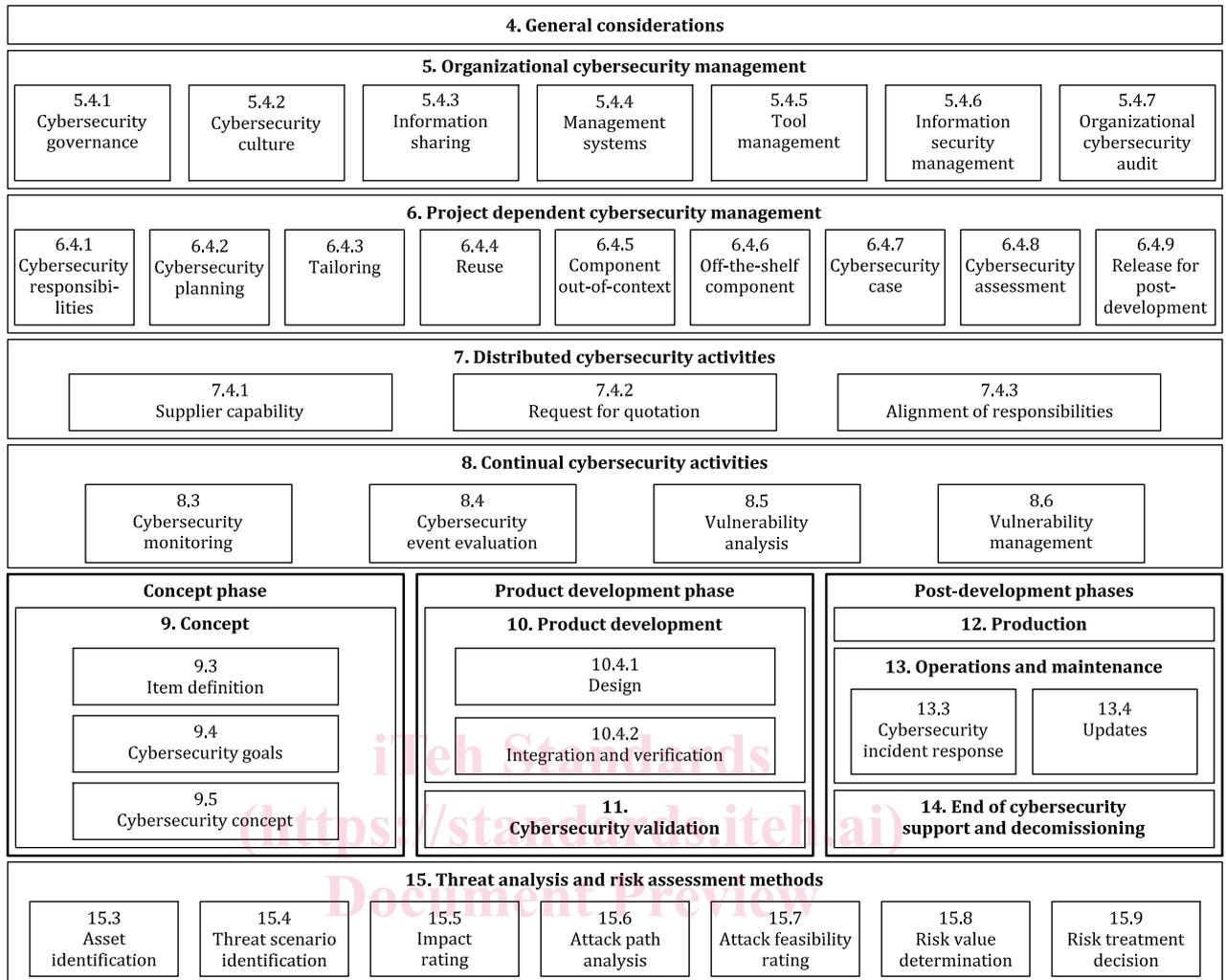


Figure 1 — Overview of this document

[Clause 4](#) (General considerations) is informational and includes the context and perspective of the approach to road vehicle cybersecurity engineering taken in this document.

[Clause 5](#) (Organizational cybersecurity management) includes the cybersecurity management and specification of the organizational cybersecurity policies, rules and processes.

[Clause 6](#) (Project dependent cybersecurity management) includes the cybersecurity management and cybersecurity activities at the project level.

[Clause 7](#) (Distributed cybersecurity activities) includes requirements for assigning responsibilities for cybersecurity activities between customer and supplier.

[Clause 8](#) (Continual cybersecurity activities) includes activities that provide information for ongoing risk assessments and defines vulnerability management of E/E systems until end of cybersecurity support.

[Clause 9](#) (Concept) includes activities that determine cybersecurity risks, cybersecurity goals and cybersecurity requirements for an item.

[Clause 10](#) (Product development) includes activities that define the cybersecurity specifications, and implement and verify cybersecurity requirements.

[Clause 11](#) (Cybersecurity validation) includes the cybersecurity validation of an item at the vehicle level.

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[Clause 12](#) (Production) includes the cybersecurity-related aspects of manufacturing and assembly of an item or component.

[Clause 13](#) (Operations and maintenance) includes activities related to cybersecurity incident response and updates to an item or component.

[Clause 14](#) (End of cybersecurity support and decommissioning) includes cybersecurity considerations for end of support and decommissioning of an item or component.

[Clause 15](#) (Threat analysis and risk assessment methods) includes modular methods for analysis and assessment to determine the extent of cybersecurity risk so that treatment can be pursued.

[Clauses 5](#) through [15](#) have their own objectives, provisions (i.e. requirements, recommendations, permissions) and work products. Work products are the results of cybersecurity activities that fulfil one or more associated requirements.

“Prerequisites” are mandatory inputs consisting of work products from a previous phase. “Further supporting information” is information that can be considered, which can be made available by sources that are different from the persons responsible for the cybersecurity activities.

A summary of cybersecurity activities and work products can be found in [Annex A](#).

Provisions and work products are assigned unique identifiers consisting of a two-letter abbreviation (“RQ” for a requirement, “RC” for a recommendation, “PM” for a permission and “WP” for a work product), followed by two numbers, separated by hyphens. The first number refers to the clause, and the second gives the order in the consecutive sequence of provisions or work products, respectively, of that clause. For example, [RQ-05-14] refers to the 14th provision in [Clause 5](#), which is a requirement.

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Road vehicles — Cybersecurity engineering

1 Scope

This document specifies engineering requirements for cybersecurity risk management regarding concept, product development, production, operation, maintenance and decommissioning of electrical and electronic (E/E) systems in road vehicles, including their components and interfaces.

A framework is defined that includes requirements for cybersecurity processes and a common language for communicating and managing cybersecurity risk.

This document is applicable to series production road vehicle E/E systems, including their components and interfaces, whose development or modification began after the publication of this document.

This document does not prescribe specific technology or solutions related to cybersecurity.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 26262-3:2018, *Road vehicles — Functional safety — Part 3: Concept phase*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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<https://www.iso.org/obp/ui/#iso:code:31000:21434> For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological 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/>

3.1.1

architectural design

representation that allows for identification of *components* (3.1.7), their boundaries, interfaces and interactions

3.1.2

asset

object that has value, or contributes to value

Note 1 to entry: An asset has one or more *cybersecurity properties* (3.1.20) whose compromise can lead to one or more *damage scenarios* (3.1.22).

3.1.3

attack feasibility

attribute of an *attack path* (3.1.4) describing the ease of successfully carrying out the corresponding set of actions