

Air Traffic Management - Information security for organisations supporting civil aviation operations

This document is a review generated by EVS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16495:2019 sisaldab Euroopa standardi EN 16495:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 16495:2019 consists of the English text of the European standard EN 16495:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 03.07.2019.	Date of Availability of the European standard is 03.07.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 03.100.70, 03.220.50, 35.240.60

Standardite reproduutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 16495

July 2019

ICS 03.100.70; 03.220.50; 35.240.60

Supersedes EN 16495:2014

English Version

Air Traffic Management - Information security for organisations supporting civil aviation operations

Gestion du trafic aérien - Sécurité de l'information pour les organismes assurant le soutien des opérations de l'aviation civile

Flugverkehrsmanagement - Informationssicherheit für Organisationen im Bereich der Zivilluftfahrt

This European Standard was approved by CEN on 12 May 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	7
Introduction	8
1 Scope.....	9
2 Normative references.....	9
3 Terms, definitions and abbreviations	9
3.1 Terms and definitions	9
3.2 Abbreviations	10
4 Aviation specific requirements related to EN ISO/IEC 27001:2017	11
4.1 Structure of this European Standard	11
4.2 Refinement of EN ISO/IEC 27001:2017 requirements	11
5 Information Security policies	11
5.1 Management direction for Information security.....	11
5.1.1 Policies for information security.....	11
5.1.2 Review of the policies for information security.....	11
6 Organization of information security	11
6.1 Internal organization.....	11
6.1.1 Information security roles and responsibilities.....	11
6.1.2 Segregation of duties	12
6.1.3 Contact with authorities	12
6.1.4 Contact with special interest groups.....	12
6.1.5 Information security in project management	12
6.2 Mobile devices and teleworking.....	12
7 Human resources security.....	12
7.1 Prior to employment.....	12
7.1.1 Screening.....	12
7.1.2 Terms and conditions of employment.....	13
7.2 During employment	13
7.2.1 Management responsibilities	13
7.2.2 Information security awareness, education and training.....	13
7.2.3 Disciplinary process.....	13
7.3 Termination and change of employment	13
8 Asset management.....	13
8.1 Responsibility for assets.....	13
8.1.1 Inventory of assets.....	13
8.1.2 Ownership of assets	13
8.1.3 Acceptable use of assets.....	13
8.1.4 Return of assets	14
8.2 Information classification.....	14
8.2.1 Classification of information.....	14
8.2.2 Labelling of information	14
8.2.3 Handling of assets	14
8.3 Media Handling	14
9 Access control.....	14
9.1 Business requirement for access control	14
9.2 User access management	14

9.2.1	User registration and de-registration	14
9.2.2	User access provisioning.....	15
9.2.3	Management of privileged access rights	15
9.2.4	Management of secret authentication information of users.....	15
9.2.5	Review of user access rights	15
9.2.6	Removal or adjustment of access rights.....	15
9.2.7	Digital Identity Management.....	15
9.2.8	Unique representation of entities across organisations	16
9.3	User responsibilities	16
9.4	System and application access control	16
9.4.1	Information access restriction.....	16
9.4.2	Secure log-on procedures.....	16
9.4.3	Password management system	16
9.4.4	Use of privileged utility programs.....	16
9.4.5	Access control to program source code	16
9.4.6	Web Application Firewalls	16
10	Cryptography	17
10.1	Cryptographic controls.....	17
10.1.1	Policy on the use of cryptographic controls.....	17
10.1.2	Key management	17
11	Physical and environmental security.....	17
11.1	Secure areas.....	17
11.1.1	Physical security perimeter.....	17
11.1.2	Physical entry controls	18
11.1.3	Securing offices, rooms, and facilities	18
11.1.4	Protecting against external and environmental threats	18
11.1.5	Working in secure areas	18
11.1.6	Delivery and loading areas.....	18
11.2	Equipment	18
11.2.1	Equipment siting and protection	18
11.2.2	Supporting utilities	18
11.2.3	Cabling security	18
11.2.4	Equipment maintenance	18
11.2.5	Removal of assets	18
11.2.6	Security of equipment and assets off-premises	18
11.2.7	Secure disposal or re-use of equipment.....	18
11.2.8	Unattended user equipment.....	18
11.2.9	Clear desk and clear screen policy	18
12	Operations security.....	19
12.1	Operational procedures and responsibilities	19
12.2	Protection from malware	19
12.3	Information Back-up	19
12.4	Logging and monitoring	19
12.4.1	Event logging	19
12.4.2	Protection of log information.....	19
12.4.3	Administrator and operator logs	19
12.4.4	Clock synchronisation.....	19
12.5	Control of operational software	19
12.6	Technical Vulnerability Management	19
12.7	Information systems audit considerations	19
13	Communications security	19
13.1	Network security management	19

13.1.1	Network controls.....	19
13.1.2	Security of network services.....	20
13.1.3	Segregation in networks.....	20
13.2	Information transfer.....	20
14	System acquisition, development and maintenance.....	20
14.1	Security requirements of information systems	20
14.1.1	Information Security requirements analysis and specification.....	20
14.1.2	Securing application services on public networks	20
14.1.3	Protecting application services transactions.....	20
14.2	Security in development and support processes.....	20
14.2.1	Secure development policy.....	20
14.2.2	System change control procedures.....	20
14.2.3	Technical review of applications after operating platform changes.....	20
14.2.4	Restrictions on changes to software packages.....	21
14.2.5	Secure system engineering principles.....	21
14.2.6	Secure development environment.....	21
14.2.7	Outsourced development.....	21
14.2.8	System security testing	21
14.2.9	System acceptance testing	21
14.3	Test data.....	21
15	Supplier relationships.....	21
15.1	Information security in supplier relationships.....	21
15.1.1	Information security policy for supplier relationships	21
15.1.2	Addressing security within supplier agreements	21
15.1.3	Information and communication technology supply chain.....	21
15.2	Supplier service delivery management	21
16	Information security incident management	22
16.1	Management of information security incidents and improvements.....	22
16.1.1	Responsibilities and procedures.....	22
16.1.2	Reporting information security events	22
16.1.3	Reporting information security weaknesses	22
16.1.4	Assessment of and decision on information security events	22
16.1.5	Response to information security incidents	22
16.1.6	Learning from information security incidents	22
16.1.7	Collection of evidence.....	22
17	Information security aspects of business continuity management.....	23
17.1	Information security continuity	23
17.1.1	Planning information security continuity.....	23
17.1.2	Implementing information security continuity	23
17.1.3	Verify, review and evaluate information security continuity.....	23
17.1.4	Business continuity planning framework.....	24
17.2	Redundancies	24
18	Compliance	24
18.1	Compliance with legal and contractual requirements	24
18.1.1	Identification of applicable legislation and contractual requirements	24
18.1.2	Intellectual property rights.....	24
18.1.3	Protection of records	24
18.1.4	Privacy and protection of personally identifiable information	24
18.1.5	Regulation of cryptographic controls	25
18.2	Information security reviews	25
18.2.1	Independent review of information security.....	25

18.2.2 Compliance with security policies and standards	25
18.2.3 Technical compliance review.....	25
Annex A (informative) Additional guidance related to air traffic management.....	26
A.1 Assessment of information security risks	26
A.1.1 Internal information security risk management	26
Figure A.1 —Assessment of information security risks.....	27
A.2 Interoperability issues of risk assessments.....	29
A.2.1 General	29
A.2.2 Information security risk management for multiple organisations.....	29
A.2.3 Alignment of safety and security risk management.....	30
A.3 Determining controls	30
A.4 Levels of trust.....	30
A.4.1 Introduction.....	30
A.4.2 Scale of trust levels.....	31
A.4.3 Classification criteria	32
A.5 Statement of applicability.....	32
A.6 Measurement and auditing of security	32
Annex B (informative) Implementation examples	33
B.1 General	33
Table B.1 —Overview of an example for LoT-O	33
Figure B.1 —LoT-A versus LoT-O	34
B.2 Security of information in web applications and web services (LoT-A-WEB).....	34
B.2.1 General	34
B.2.2 Parameters for the Level of Trust of a web application/web service.....	34
B.2.3 Determination of the web application / the web service (LoT-A-WEB)	34
Table B.2 —Level of Trust of the web application/the web service	35
B.2.4 Consequences.....	35
Table B.3 —Evaluation Criteria for LoT-A-WEB	35
B.3 Connections between multiple organisations/external connections (LoT-A-NET)	35
B.3.1 Determination of the necessary protection controls.....	35
B.3.1.1 General	35
Figure B.2 —Process for implementation of external connection protection	36
B.3.1.2 Identity of the User.....	36
B.3.1.3 Owner of the terminal device.....	37
B.3.1.4 Connection point/Protection of the terminal device.....	37
B.3.1.5 Authentication of the connection.....	37
B.3.1.6 Transfer net.....	38

Table B.4 —Maximum Level of Trust depending on the respective technical parameters.....	38
B.3.2 Effects of the coupling of networks.....	40
B.4 Certificates/Public Key Infrastructure (LoT-A-PKI)	41
B.4.1 Parameters for the Level of Trust of the certificate management	41
B.4.2 Determination of the Level of Trust of the certificate management (LoT-A-PKI)	41
Table B.5 —Trust of identity management.....	41
B.4.3 Effects: Recognition of Certificates/PKI.....	41
B.5 Identity Management (LoT-A-IDM)	42
B.5.1 Parameters for the Level of Trust of Identity Management	42
B.5.2 Determination of the Level of Trust of the Identity Management (LoT-A-IDM).....	42
Table B.6 —Level of Trust of the Identity Management.....	43
B.5.3 Effects: Recognition of identities	43
Annex C (informative) Level of trust — Implementation Example	44
Table C.1 —Further security controls appropriate to different levels of trust.....	44
Annex D (informative) Application of Controls in Regulatory Oversight — Implementation Example	58
Figure D.1 —Oversight scheme	59
Table D.1 — Mapping of Controls	59
Annex E (informativ) Guidance on aviation specific transorganisational aspects.....	63
Bibliography.....	64

European foreword

This document (EN 16495:2019) has been prepared by Technical Committee CEN/TC 377 "Air Traffic Management", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2020, and conflicting national standards shall be withdrawn at the latest by January 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 16495:2014.

In comparison with the previous edition, the following technical modifications have been made:

- adaptation to the structures of EN ISO/IEC 27002:2017 and ISO/IEC 27009:2016;
- guidance on alignment of safety and security management;
- guidance on Information Security specific to development and production and maintenance;
- guidance on information security assurance;
- informative Annex D "Application of Controls in Regulatory Oversight — Implementation Example";
- informative Annex E "Guidance on aviation specific transorganisational aspects".

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document provides guiding principles based on EN ISO/IEC 27002:2017 “Code of practice for information security controls” applied to security management systems in aviation organisations. The aim of this document is to extend the contents of EN ISO/IEC 27002:2017 to the domain of air traffic management, thus allowing aviation organisations to implement a standardized and specific information security management system (ISMS), that is in accordance with EN ISO/IEC 27001:2017 transorganisational aspects of air traffic management.

In addition to the security objectives and measures that are set forth in EN ISO/IEC 27001:2017, aviation organisations are subject to further special requirements: Service delivery in aviation is greatly defined by the cooperation of the individual participants. An organization's information security management is therefore dependent on the information security management of the organisations with which it cooperates to deliver service. This document therefore focuses on aspects of cooperation.

This cooperation requires

- sharing the results of risk assessments along the business process chain;
- agreement on the required level of trust;
- agreement on the required security controls and their implementation.

1 Scope

This document provides guidance based on EN ISO/IEC 27002:2017 applied to organisations supporting civil aviation, with a focus on air traffic management operations.

This includes, but is not limited to, airspace users, airports and air navigation service providers.

Not included are activities of the organisations that do not have any impact on the security of civil aviation operations like for example airport retail and service business and corporate real estate management.

The basis of all guidance in this document is trust and cooperation between the parties involved in Air Traffic Management.

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/IEC 27000:2018, *Information technology — Security techniques — Information security management systems — Overview and vocabulary*

EN ISO/IEC 27001:2017, *Information technology — Security techniques — Information security management systems — Requirements*

EN ISO/IEC 27002:2017, *Information technology — Security techniques — Code of practice for information security controls*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 27000:2018 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

air traffic management

functional system comprised of an aggregation of the airborne and ground-based functions (air traffic services, airspace management and air traffic flow management) required to ensure the safe and efficient movement of aircraft during all phases of operations and covering responsibilities of all partners of the air traffic transport value chain

3.1.2

trust

situation where one party is willing to rely on the actions of another party

Note 1 to entry: Trust is more than what can be achieved by assurance. However, assurance represents a supporting instrument to trust building.