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Entwurf

**Luft- und Raumfahrt –
Unbemannte Luftfahrzeugsysteme –
Teil 003: Anforderungen an das Geo-Sensibilisierungssystem;
Englische Fassung prEN 4709-003:2020**

Aerospace series –
Unmanned Aircraft Systems –
Part 003: Geo-awareness requirements;
English version prEN 4709-003:2020

Série aérospatiale –
Aéronefs télépilotés –
Partie 003: Exigences de géovigilance;
Version anglaise prEN 4709-003:2020

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2021-01-15 wird der Öffentlichkeit zur Prüfung und Stellungnahme vorgelegt.

Weil die beabsichtigte Norm von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfs besonders zu vereinbaren.

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Gesamtumfang 31 Seiten

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Nationales Vorwort

Der Verband der Europäischen Luft-, Raumfahrt- und Verteidigungsindustrie – Normung (ASD-STAN) ist vom Europäischen Komitee für Normung (CEN) für zuständig erklärt worden, Europäische Normen (EN) für das Gebiet der Luft- und Raumfahrt auszuarbeiten. Durch die Vereinbarung vom 3. Oktober 1986 wurde ASD Assoziierte Organisation (ASB) des CEN.

Das vorliegende Dokument (prEN 4709-003:2020) wurde von ASD-STAN, Fachbereich Autonomes Fliegen, unter Mitwirkung deutscher Experten des DIN-Normenausschusses Luft- und Raumfahrt (NL) erarbeitet.

Das zuständige deutsche Normungsgremium ist der Arbeitsausschuss NA 131-01-04 AA „UAS Traffic Management (UTM)“ im DIN-Normenausschuss Luft- und Raumfahrt (NL).

Der vorliegende Norm-Entwurf enthält zur technischen Kommentierung einen Europäischen Norm-Entwurf (prEN) ausschließlich in Englischer Fassung aus der CEN-Umfrage.

Ein zweiter Norm-Entwurf wird nur die Deutsche Fassung der veröffentlichten ASD-STAN prEN enthalten. Es wird darauf hingewiesen, dass auf Grund der Verfahrensweise zur Normenerstellung bei ASD-STAN der zweite Norm-Entwurf ausschließlich der redaktionellen Prüfung der deutschen Sprachfassung dienen wird.

Entsprechend Beschluss 57/9 des Technischen Ausschusses des Beirats des DIN-Normenausschusses Luft- und Raumfahrt (NL) sind die europäischen Luft- und Raumfahrt-Normungsergebnisse zweisprachig, in Deutsch und Englisch, in das Deutsche Normenwerk zu überführen. Aus diesem Grund wird die Norm beide Sprachfassungen enthalten.

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Aerospace series - Unmanned Aircraft Systems - Part 003: Geo-awareness requirements

Série aérospatiale - Aéronefs télépilotes - Partie 003 :
Exigences de géovigilance

Luft- und Raumfahrt - Unbemannte
Luftfahrzeugsysteme - Teil 003: Anforderungen an das
Geo-Sensibilisierungssystem

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (prEN 4709-003:2020) has been prepared by the Aerospace and Defence Industries Association of Europe — Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document is currently submitted to the ASD-STAN National Domain Ballot in parallel to the CEN Enquiry.

This document was originally reviewed by the Domain Technical Coordinator of ASD-STAN's Autonomous flying Domain.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Introduction

The Commission Delegated Regulation (EU)2019/945 was published in March 2019. It applies on unmanned aircraft intended for use in the ‘open’ category, and on third-country operators of unmanned aircraft systems.

This document gives all Economic Operators (such as manufacturers, importers and distributors and their trade associations as well as bodies involved in the conformity assessment procedures) a viable way to prove compliance with the requirements laid out in the Delegated Act on unmanned aircraft.

Many organizations are involved in developing a range of general technical standards for electrical safety, EMC, environmental and a range of other standards to be applied to specific applications. For UAS the picture is complex but an acceptable means of compliance can be completed with existing technical standards and the use of electrical components that are intended to be incorporated into equipment and for which a risk assessment can be undertaken.

Based on its risk assessment, it is the manufacturer’s responsibility to determine if the risk is acceptable. The acceptable level of a product’s risk is determined in compliance with the safety objectives defined in the Delegated Act on unmanned aircraft.

The end user of this document assumes all responsibility for the safe application of the test methods. All relevant safety/quality procedures should be considered. Special consideration should be made when operating the UAS for evaluations. All local, state, federal, and country laws should be considered when operating UAS.

No patent applies to the requirement defined in this document.

1 Scope

1.1 Applicability

This document provides means of compliance of the function “Geo-awareness” specified in Parts 2 to 4 of the Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft intended for use in the “open” category, and on third-country operators of unmanned aircraft systems and its annex.

The Geo-awareness is specified in Part 2 – articles (13) and (14) for Class 1 UASs, in Part 3 – articles (15) and (16) for Class 2 UASs and in Part 4 – articles (10) and (11) for Class 3 UASs.

This document specifies the minimum performance expected from this Geo-awareness function, without prescribing its design and implementation as far as possible.

Compliance with this document is recommended as one means of assuring that the Function will perform its intended sub-functions satisfactorily under all conditions normally encountered in routine aeronautical operation.

NOTE In the rest of the document, we will use “Function” to mean the object of this specification, and equipment to identify the entity implementing this Function in whatever form.

1.2 General description of the Geo-awareness function

Geo-awareness means a function that, based on the UAS Geographical data provided by Member States (as specified in the Commission Implementing Regulation (EU) 2019-947-article 15), detects a potential breach of airspace limitations and alerts the remote pilots so that they can take effective immediate and action to prevent that breach.

The Geo-awareness function manages only the following conditions:

- Horizontal and vertical boundaries of UGZ;
- Time applicability of the UGZ;
- Optional: notification or authorization required by UGZ.

Other conditions defined in the Commission Implementing Regulation (EU) 2019-947-article 15-1 are not expressed yet by Member States and will not be treated in this version of the document.

Optionally a function of automatic alteration of the trajectory can complete the function Geo-awareness by preventing the UA to penetrate a restricted zone (UAS geographical zone) by engaging an adequate manoeuvre without any pilot action. The overall function is called “Geofencing”.

The function can be realized as a set of hardware and/or software components inside the UAS, in the remote pilot station and/or on board the UA itself, which are fed by data about the applicable UAS geographical zones for the requested zone of operation, provided by a ground service called in our document “UAS geographical zone data service”.

The document is structured as follows:

- Clauses 1 to 3 of this document provide information required to understand the need for the Function characteristics and tests defined in the remaining clauses. It describes typical Function applications and operational objectives and is the basis for the performance criteria stated in Clause 4 to Clause 5. Definitions essential to proper understanding of this document are provided in Clause 3.
- Clause 4 contains general design requirements.

- Clause 5 contains the requirements for the Geo-awareness function, defining performance under standard operating conditions.
- Clause 6 contains the requirements for the Automatic Geofencing function, defining performance under standard operating conditions.
- Clause 7 describes recommended test procedures for demonstrating compliance with Clause 5 and Clause 6.

Operational performance standards for functions or components that refer to equipment capabilities that exceed the stated minimum requirements are identified as optional features. Performance requirements and associated test procedures should be developed for these optional features.

1.3 Assumptions

It is assumed that the UAS is operated in compliance with the requirements defined in the Commission Implementing Regulation (EU) 2019-947– Annex Part A, especially UAS.OPEN.050 (5) and UAS.OPEN.060 (1)(b) concerning the use of up-to-date UGZ data before flight.

It is assumed that the UA is operated in compliance with the conditions defined in the Commission Implementing Regulation (EU) 2019-947– article 4 (condition for Open category of UAS operations).

It is assumed that the update of UAS geographical zones is not required during the flight.

It is assumed that the quality of the UGZ data provided and received by the UAS are verified for validity against the required data model.

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.

prEN 4709-001:2019, Aerospace series — Unmanned Aircraft systems — Part 1: Product requirements and verification ¹⁾

3 Terms, definitions, symbols, and abbreviated terms

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

3.1

Acceptable Means of Compliance

AMC

non-binding standards adopted by EASA to illustrate means to establish compliance with the Basic Regulation and its Implementing Rules

¹⁾ Published as ASD-STAN Standard at the date of publication of this document by AeroSpace and Defence industries Association of Europe — Standardization (ASD-STAN), <http://www.asd-stan.org/>.

3.2

advisory alert

alert for conditions that require awareness and may require subsequent response by the UAS remote pilot

3.3

automatic flight

flight following pre-programmed instructions, loaded in the unmanned aircraft (UA) flight control system that the UA executes

3.4

caution alert

alert for conditions that require immediate awareness and subsequent response by the UAS remote pilot

3.5

command unit

see Remote Pilot Station

3.6

Direct Remote Identification

DRI

system that ensures the local broadcast of information about an unmanned aircraft in operation, including the marking of the unmanned aircraft, so that this information can be obtained without physical access to the unmanned aircraft

3.7

equipment to control unmanned aircraft remotely

instrument, equipment, mechanism, apparatus, appurtenance, software or accessory that is necessary for the safe operation of a UA, other than a part, and which is not carried on board that UA

3.8

geographical information distributor

entity responsible for providing data to the end-user (may not be the originator of the data) (consistent with U-Space Service Provider USSP)

3.9

Global Navigation Satellite System

GNSS

positioning system based on one or several satellite constellations

3.10

Remote Pilot

RP

natural person responsible for safely conducting the flight of a UA by operating its flight controls, either manually or semi-manually or, when the UA flies automatically, by monitoring its course and remaining able to intervene and change its course at any time

3.11

Remote Pilot Station

RPS

component of the UAS containing the equipment used to control the UA

3.12

return home

fail safe system that upon loss of data link will direct the UA back to predefined home position

3.13

Unmanned aircraft

UA

aircraft operating or designed to operate autonomously or to be piloted remotely without a pilot on board

3.14

Unmanned Aircraft System

UAS

UA and its associated elements which are operated with no pilot on board

3.15

UAS Geographical Zone

UGZ

Geographical zone defined in 3D, including attributes defining the applicability and conditions of restriction of flight

3.16

UAS Operator

legal or natural person who operates or intends to operate one or more UAS

3.17

UGZ Data Service

Data distribution Service to which an UAS operator can connect to access to geographical zones applying to the geo-awareness function

3.18

UGZ Data Service

Data distribution Service to which an UAS operator can connect to access to geographical zones applying to the geo-awareness function

3.19

Visual Line Of Sight

VLOS

type of UAS operation in which, the remote pilot is able to maintain continuous unaided visual contact with the unmanned aircraft, allowing the remote pilot to control the flight path of the unmanned aircraft in relation to other aircraft, people and obstacles for the purpose of avoiding collisions

3.20

Warning Alert

alert for conditions that require immediate awareness and immediate response by the UAS remote pilot

4 General Design Requirements

4.1 Intended function

The equipment implementing the Geo-awareness Function shall perform its intended sub-function(s), as defined by the manufacturer.