



**SLOVENSKI STANDARD**  
**oSIST prEN 4709-005:2023**  
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**Aeronavtika - Letalski sistemi brez posadke - 005. del: Metoda preverjanja funkcije Geocaging**

Aerospace series - Unmanned Aircraft Systems - Part 005: Verification method for the Geocaging function

Luft- und Raumfahrt - Unbemannte Luftfahrzeugsysteme - Teil 005: Überprüfungsmethode für die Geocaging-Funktion

Série aérospatiale - Aéronefs télépilotés - Partie 005: Méthode de vérification de la fonction géocaging

**Ta slovenski standard je istoveten z: prEN 4709-005**

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**ICS:**

03.220.50	Zračni transport	Air transport
49.020	Letala in vesoljska vozila na splošno	Aircraft and space vehicles in general

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**DRAFT**  
**prEN 4709-005**

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ICS

English Version

## Aerospace series - Unmanned Aircraft Systems - Part 005: Verification method for the Geocaging function

Série Aérospatiale - Aéronefs télépilotes - Partie 5:  
Méthodes de vérification de la fonction Geocaging

Luft- und Raumfahrt - Unbemannte  
Luftfahrzeugsysteme - Teil 005: Überprüfungsmethode  
für die Geocaging-Funktion

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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.

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

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

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<b>Contents</b>	<b>Page</b>
<b>European foreword</b> .....	<b>3</b>
<b>Introduction</b> .....	<b>4</b>
<b>1 Scope</b> .....	<b>6</b>
<b>2 Normative references</b> .....	<b>6</b>
<b>3 Terms and definitions</b> .....	<b>6</b>
<b>4 List of abbreviated terms</b> .....	<b>8</b>
<b>5 Geocaging function requirements</b> .....	<b>8</b>
<b>5.1 Detailed requirements</b> .....	<b>8</b>
<b>5.2 Programming the flight geography and the operational volume</b> .....	<b>10</b>
<b>5.2.1 Performance requirements</b> .....	<b>10</b>
<b>5.2.2 Verification method</b> .....	<b>11</b>
<b>5.2.3 Pass criteria</b> .....	<b>11</b>
<b>5.2.4 Performance requirements</b> .....	<b>11</b>
<b>5.2.5 Verification method</b> .....	<b>12</b>
<b>5.2.6 Pass criteria</b> .....	<b>12</b>
<b>5.3 Flight plan limitations</b> .....	<b>12</b>
<b>5.3.1 Performance requirements</b> .....	<b>12</b>
<b>5.3.2 Verification method</b> .....	<b>13</b>
<b>5.3.3 Pass criteria</b> .....	<b>14</b>
<b>5.4 Containment of the UA inside the FG</b> .....	<b>14</b>
<b>5.4.1 Performance requirements</b> .....	<b>14</b>
<b>5.4.2 Verification method</b> .....	<b>14</b>
<b>5.4.3 Pass criteria</b> .....	<b>19</b>
<b>5.5 Triggering of the flight termination function by geocage</b> .....	<b>19</b>
<b>5.5.1 Performance requirements</b> .....	<b>19</b>
<b>5.5.2 Verification method</b> .....	<b>20</b>
<b>5.5.3 Pass criteria</b> .....	<b>20</b>
<b>6 Geocaging information requirements</b> .....	<b>20</b>
<b>6.1 General</b> .....	<b>20</b>
<b>6.2 Performance requirements</b> .....	<b>20</b>
<b>6.3 Pass criteria</b> .....	<b>22</b>
<b>Annex ZA (informative) Relationship between this European Standard and the Regulation (EU) 2019/945 of 12th March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems</b> .....	<b>23</b>
<b>Bibliography</b> .....	<b>24</b>

## European foreword

This document (prEN 4709-005:2023) has been prepared by Technical Committee CEN/TC 471 “Unmanned Aircraft Systems”, the secretariat of which is held by BNAE.

This document is currently submitted to the CEN Enquiry.

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

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

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[oSIST prEN 4709-005:2023](https://standards.iteh.ai/catalog/standards/sist/5462baf8-4613-4aed-8963-fcf21cd65a68/osist-pren-4709-005-2023)

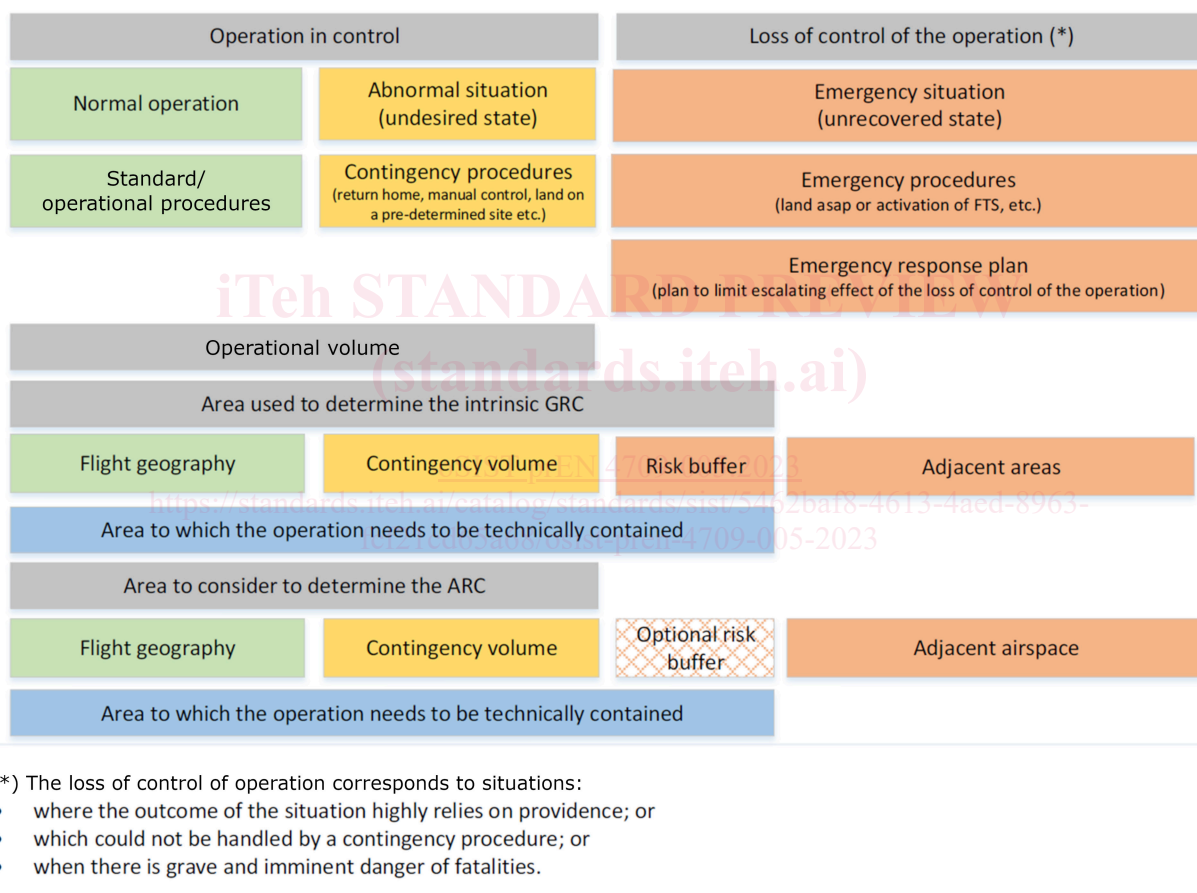
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## Introduction

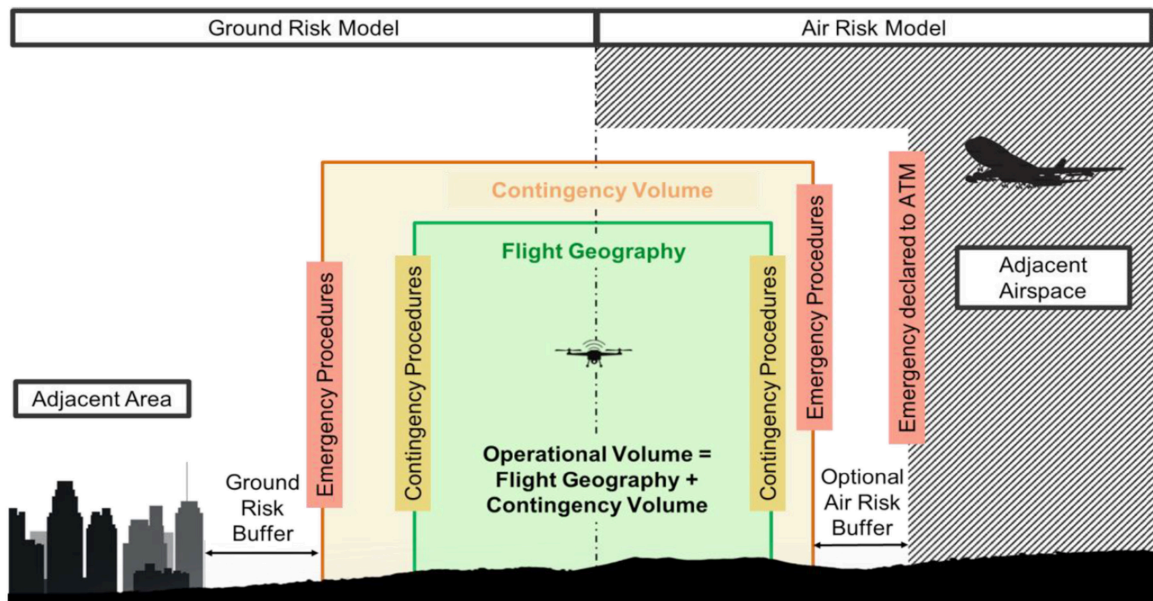
This document gives all economic operators (such as manufacturers, importers and distributors and their trade associations as well as bodies involved in the conformity assessment procedures) a viable way to prove compliance with the requirements linked to geocaging function and to find commonality in compliance methods.

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 given to the operation of the UAS for evaluations. All local, state, federal, and national laws should be considered when operating any UAS.

Operational volume and contingency volume are defined in SORA semantic model. Figure 1 provides a consistent use of the terms. Figure 2 provides a graphical representation of the model.



**Figure 1 — SORA semantic model [Source: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022]**



**Figure 2 — Graphical representation of the SORA semantic model [Source: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022]**

NOTE 1 SORA Step #9 – Adjacent area/airspace considerations and PDRA-G01, G02 and G03.

This document provides a contribution to SORA Step #9 compliance, requirement (b), also known as Standard containment. Nonetheless, this document cannot be used as a complete means of compliance to SORA Step #9, as it does not include design requirements.

NOTE 2 PDRA-G01, G02 and G03 also include this requirement in section technical provisions, Containment.

<https://standards.iteh.ai/catalog/standards/sist/5462baf8-4613-4aed-8963-fcf21cd65a68/osist-pren-4709-005-2023>

**prEN 4709-005:2023 (E)****1 Scope**

This document provides requirements, test methods and pass criteria for the:

- implemented geocage function used to prevent the UA from breaching the horizontal and vertical limits of the planned operational volume;
- information to be provided in the manufacturer's instructions describing this function, its limits and the required size of the contingency volume after accounting the errors, reaction time and corrections.

**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.

EN 4709-001:—,<sup>1</sup> *Aerospace series — Unmanned Aircraft Systems — Part 001: Product requirements and verification*

EN 4709-006:—,<sup>2</sup> *Aerospace series — Unmanned Aircraft Systems — Part 006: Means to terminate flight, requirements, and verification*

EN 4709-007:—,<sup>3</sup> *Aerospace series — Unmanned Aircraft Systems — Part 007: General product requirements for UAS classes C5 and C6*

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 4709-001<sup>1</sup> and the following apply.

ISO and IEC maintain terminology 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****caution alert**

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

Note 1 to entry: in this document, the caution alert condition is related to the breach of the flight geography volume.

<sup>1</sup> Under preparation. Stage at the time of publication: prEN 4709-001:2021.

<sup>2</sup> Under preparation. Stage at the time of publication: prEN 4709-006:2023.

<sup>3</sup> Under development.



### 3.2

#### **command unit**

equipment or system of equipment to control unmanned aircraft remotely as defined in point 32 of Article 3 of Regulation (EU) 2018/1139 which supports the control or the monitoring of the unmanned aircraft during any phase of flight, with the exception of any infrastructure supporting the command and control (C2) link service

[SOURCE: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022]

### 3.3

#### **contingency measures**

preventive or corrective action to be taken in response to an event and a need to depart from the agreed plan of action

### 3.4

#### **contingency volume**

volume of airspace outside the flight geography where contingency procedures are applied

[SOURCE: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022]

### 3.5

#### **flight geography**

volume(s) of airspace defined spatially and temporally in which the UAS operator plans to conduct the operation under normal procedures

[SOURCE: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022]

### 3.6

#### **global navigation satellite system**

##### **GNSS**

positioning system based on one or several satellite constellations

### 3.7

#### **haptic signal**

any type of signal that is transferred to the hand of the user through the handheld controller in the form of vibrations

### 3.8

#### **operational volume**

combination of the flight geography and the contingency volume

[SOURCE: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022]

### 3.9

#### **UAS geographical zone**

##### **UGZ**

portion of airspace established by the competent authority that facilitates, restricts, or excludes UAS operations in order to address risks pertaining to safety, privacy, protection of personal data, security, or the environment, arising from UAS operations

[SOURCE: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022]

**prEN 4709-005:2023 (E)****3.10****warning alert**

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

Note 1 to entry: In this document, the warning alert condition is related to the breach of the operational volume.

**4 List of abbreviated terms**

AGL	Above Ground Level
AMSL	Above Mean Sea Level
ARC	Air Risk Class
ATO	Above Take-Off Point
FG	Flight Geography
FTS	Flight Termination system
GNSS	Global Navigation Satellite System
GRC	Ground Risk Class
OV	Operational Volume
Req.	Requirement
RP	Remote Pilot
RPS	Remote Pilot Station
RTH	Return To Home
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System
UI	User Interface
UGZ	UAS Geographical Zone

**5 Geocaging function requirements****5.1 Detailed requirements**

The geocaging function shall provide a way to program the flight geography and the operational volume.

The geocaging function has to be implemented on the UA and achieve the following objectives:

- (1) ensure that, in normal operation, the UA is maintained inside the flight geography;
- (2) once breaching the FG, the geocage function shall bring back the UA inside;
- (3) once breaching the operational volume, the geocage function shall activate the flight termination.

Those objectives require:

- a) the upload before take-off of the flight geography; and
- b) the upload before take-off of the contingency volume or the operational volume, taking into account the information provided in the manufacturer instructions.

Achieving the first objective (1) requires:

- c) the flight plan limitation (prohibition of take-off, landing, waypoints, home points or any automatic command outside the FG).

Achieving the second objective (2) requires:

- d) triggering of a caution alert when the UA breaches the limits of the FG. The caution alert could be visual with one or more of the following: aural (sound) and/or haptic;
- e) an automatic contingency manoeuvre aimed to bring back the UA inside the Flight Geography (FG). It shall be triggered when the UA reaches the flight geography limits taking into account positioning/accuracy errors.

Achieving the third objective (3) requires:

- f) triggering of a warning alert when the UA reaches the limits of the operational volume;
- g) the automatic triggering of the Flight Termination System (FTS) when the UA reaches the limits of the operational volume as per Clause 5 “Product requirements and compliance of means to terminate the flight for Class 6 UAS” of EN 4709-006<sup>2</sup>.

NOTE The validation of manufacturer instructions to define the ground risk buffer are considered out of the scope of this document and are treated in EN 4709-006<sup>2</sup> FTS document.

The compliance of the geocaging function towards these requirements shall be demonstrated.

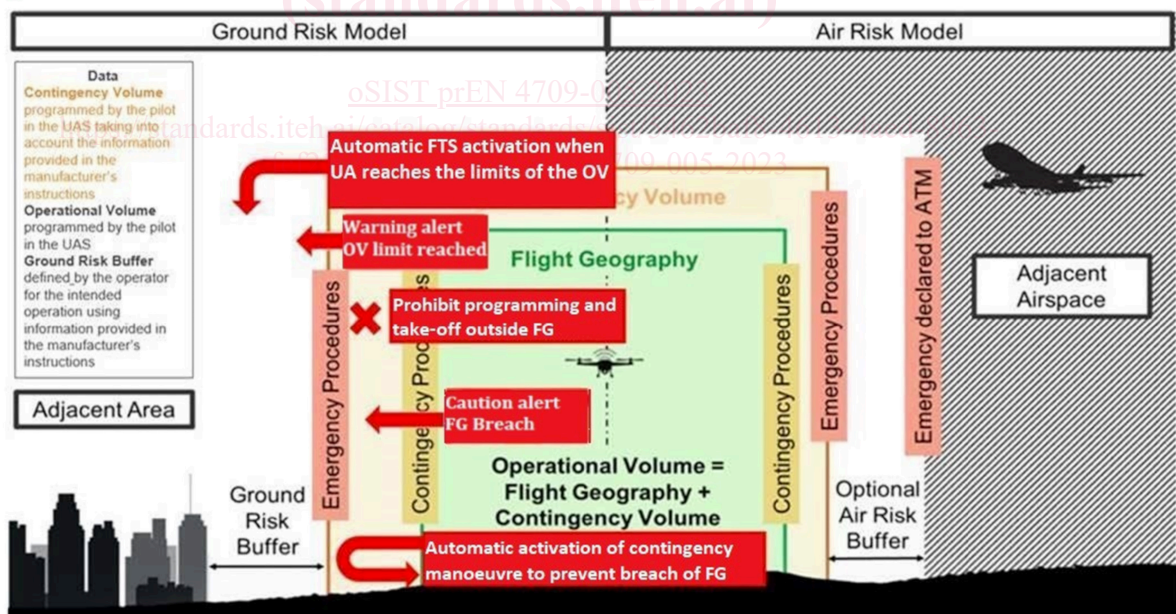


Figure 3 — Graphical representation of SORA semantic model and the geocaging function  
[Source: *Easy Access Rules for Unmanned Aircraft Systems*, September 2022, with modifications]