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Département fédéral de l'environnement, des transports,
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Office fédéral de l'aviation civile OFAC
Affaires de la direction et services

Zones géographiques UAS

Documentation « modèle de géodonnées »

Référence du dossier : BAZL-155.44-10/3

Titre : Modèle de géodonnées « UAS Geographical Zone »
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RS 748.941 art. 27, 28, 29 et 34

Modèle de géodonnées
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Informations sur le document

Table des matières	Le présent document décrit le modèle de géodonnées relatif aux zones géographiques UAS délimitées pour garantir la sécurité, pour prévenir des dangers ou pour protéger la sphère privée ou l'environnement. Un modèle INTERLIS spécifique suisse a été défini à cet effet sur la base de la norme ED-269 « Minimum Operational Performance Standard for Geofencing » de l'EUROCAE.
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Statut	Adopté

Historique du document

Version	Date	Remarques
1.0	12.04.2022	Version approuvée
1.0	22.03.2023	Base légale définitive (chap. 2)

Table des matières

Abréviations

AESA	Agence européenne de la sécurité aérienne
AMC/GM	Acceptable Means of Compliance and Guidance Material (moyens acceptables de conformité et documents d'orientation)
CH1903+	système de référence géodésique, système de coordonnées suisse
CHBase	Modules de base pour les « modèles de géodonnées minimaux »
COSIG	Coordination, Services et Informations Géographiques
CTR	Controlled traffic region / control zone; zone de contrôle
EPSG	Système de coordonnées et projections basés sur des codes
UE	Union européenne
EUROCAE	European Organization for Civil Aviation Equipment
GCS	Organe de coordination de la géoinformation au niveau fédéral
GeoJSON	Format ouvert d'encodage des géodonnées utilisant la norme JSON (JavaScript Object Notation).
INTERLIS	Langage de description et mécanisme d'échange pour les géodonnées, norme eCH-0031
MN95	Cadre de référence des coordonnées nationales suisses (1995)
MTOM	Maximum take-off mass ; masse maximale au décollage
OFAC	Office fédéral de l'aviation civile
UAS	Unmanned aircraft system ; système d'aéronef sans équipage à bord
WGS84	World Geodetic System 1984 ; système de référence géodésique

Littérature

[1]   EUROCAE (2020) : ED-269 "Minimum Operational Performance Standard for Geofencing". Version juin 2020

[2]   GCS (2011) : Modules de base de la Confédération pour les « modèles de géodonnées minimaux » (CHBase), version 1.0 du 30 août 2011

1 Introduction

Le modèle de géodonnées relatif aux zones géographiques UAS (anglais : *UAS geographical zone*) est un fondement essentiel de la mise sur pied d'un système d'aéronef sans occupant à bord (UAS).

Une zone géographique UAS (zones dans lesquelles l'exploitation des drones est restreinte) est une partie de l'espace aérien définie par l'autorité compétente qui, aux fins de la géovigilance, accueille, limite ou exclut les exploitations d'UAS en fonction des risques découlant desdites exploitations pour ce qui est de la sécurité, du respect de la vie privée et de la protection des données à caractère personnel, de la sûreté ou de l'environnement.

La géovigilance (anglais : *geo-awareness*) est une fonction qui vise à détecter et à prévenir une violation potentielle des limites de l'espace aérien.

2 Conditions cadres

La Commission de l'Union européenne (UE) a édicté le 24 mai 2019 le règlement d'exécution (UE) 2019/947 concernant les règles et procédures applicables à l'exploitation d'aéronefs sans équipage à bord. L'article 15 fixe des conditions d'exploitation applicables aux zones géographiques UAS et oblige les États membres, lorsqu'ils définissent des zones géographiques UAS à des fins de géovigilance, à veiller à ce que les informations relatives auxdites zones, y compris leur durée de validité, soient rendues publiques dans un format numérique, unique et commun. Le règlement d'exécution (UE) 2019/947 est déjà appliqué dans l'UE depuis 2021. En Suisse, sa reprise a coïncidé avec l'entrée en vigueur de l'ordonnance révisée du DETEC sur les aéronefs de catégories spéciales (OACS) du 1er janvier 2023.

L'AESA a, avec notamment le concours de la Suisse, défini les bases et le cadre techniques préalables à la mise en œuvre. Dans le cadre des « Acceptable Means of Compliance » (AMC) et du « Guidance Material » (GM), l'« UAS Geographical Zone Data Model » d'EURO-CAE a été retenu comme norme pour le format de données numérique susmentionné (cf. [1], chapitre 8). Les éléments constitutifs et la structure des zones géographiques UAS y sont définis.

Le présent modèle de géodonnées est mis en œuvre au moyen d'INTERLIS 2 qui correspond à la norme suisse en matière de description des géodonnées. Les modules de base de la Confédération (CHBase) [2] s'appliquent également. Il s'agit d'un recueil de définitions IN-TERLIS harmonisées et de portée générale qui concourt ce faisant à l'harmonisation technique et matériel des données. La langue de modélisation est l'anglais.

Le modèle de géodonnées se base sur le cadre de référence MN95 du système de référence CH1903+. Puisque les données doivent être fournies en bout de course dans le système de référence WGS84 et au format GeoJSON, elles devront être *in fine* transformées et converties à l'aide des outils appropriés.

3 Modèle de données conceptuel : catalogue des objets

Dans le catalogue des objets suivant, l'écriture *italique* renvoie aux contenus de CHBase. Ces éléments ne sont pas décrits dans le présent document.

Les descriptions du contenu du catalogue des objets ont été reprises sans changement de l'« UAS Geographical Zone Data Model » et restent donc en anglais.

Certains éléments de l'« UAS Geographical Zone Data Model », qui ne sont pas pertinents dans le contexte suisse, ont été ignorés (cf. Annexe 7.4). Il en résulte un profil spécifiquement suisse, néanmoins pleinement compatible avec la norme européenne et les AMC/GM.

3.1 Domaines de valeurs : types de données

Domaine de valeur pour les types de données (*domains*)

CodeZoneIdentifierType	
A coded identifier of an UAS zone.	
Type	**Description**
TEXT*7	A string of maximum 7 characters.

TextShortType	
A free text.	
Type	**Description**
TEXT*200	A string of maximum 200 characters.

GeoShapeType	
A series of 4 or more coordinates and dimensions that define a geometrical shape by means of polygons.	
Type	**Description**
SURFACE	A polygonal shape using the CH1903+ coordinate reference system (EPSG:2056). There must be a single exterior and no circles. Interior holes are allowed. The last coordinate of the polygon needs to be equal to the first one.

DateTimeType	
A date and time instant.	
Type	**Description**
XML DATE/TIME	The date and time format shall follow the ISO 8601, in the form YYYY-MM-DDThh:mm:ss.ss.

TimeInterval	
A period of time.	
Type	**Description**
TEXT*11	Time period expressed according to the ISO 8601, in the format PnnDTnnHnnM (Example: P5DT or PT12H). - P indicates that the value is a time interval (mandatory). - nnD indicates the number of days comprised in the interval. - T indicates the start of the time block (mandatory). - nnH indicates the indicates the number of hours comprised in the interval. - nnM indicates the indicates the number of minutes comprised in the interval. The maximum number is 99.

TimeType	
A time instant type.	
Type	**Description**
XML TIME	Time format shall follow the ISO 8601 standard, in the form hh:mm:ss.ss.

3.2 Domaines de valeurs : listes de codes

Domaines de valeurs pour des énumérations/listes de codes

CodeAuthorityRole	
A coded list of values indicating the role that an authority has in relation with the UAS zone.	
Valeurs	**Description**
AUTHORIZATION	The designated authority shall be contacted to get an authorisation before accessing the UAS zone.
INFORMATION	The designated authority is a general purpose point of contact for the UAS in the zone. This applies when no special permission is required (see attribute restriction of class UASZoneVersion).

UomDistance	
A list of units of measurement used for distances. In Switzerland only meters are used.	
Valeurs	**Description**
M	Meters

CodeZoneType	
A code that indicates that a zone is provided with its common definition.	
Valeurs	**Description**
COMMON	The zone is provided with its common definition, valid for any UAS and operator.

CodeRestrictionType	
A coded indicator of the restriction level for the zone.	
Valeurs	**Description**
REQ_AUTHORISA-TION.MTOM_ALL	Indicates that the flight of UAS (independent of their weight) is subject to explicit authorisation requirements during the time of applicability.
REQ_AUTHORISA-TION.MTOM_FROM	Indicates that the flight of UAS (from a specific weight) is subject to explicit authorisation requirements during the time of applicability.
REQ_AUTHORISA-TION.CTR	Indicates that the flight of UAS within CTR (above 120m AGL) is subject to explicit authorisation requirements during the time of applicability.
NO_RESTRICTION	Indicates that the zone may be used during the applicability time without any special permissions or restrictions.

CodeZoneReasonType	
A coded indication of a reason that justifies the existence of an UAS zone.	
Valeurs	**Description**
AIR_TRAFFIC	Due to the presence of air traffic.
NATURE	Due to the presence of a wildlife/nature sanctuary or another area with sensitive nature/fauna.
SENSITIVE	Due to the presence of a sensitive site, in the vicinity of which the presence of drones could be considered a potential risk.

CodeVerticalReferenceType	
A coded value that indicates a vertical reference system.	
Valeurs	**Description**
AGL	Height above ground/surface level.
AMSL	Altitude above Mean Sea Level.

CodeWeekDayType	
A coded value indicating a day/days of the week.	
Valeurs	**Description**
MON	Monday
TUE	Tuesday
WED	Wednesday
THU	Thursday
FRI	Friday
SAT	Saturday
SUN	Sunday
Any	Any day of the week

CodeYesNoType	
A coded value that indicates a choice between a positive (yes) or a negative (no) applicability.	
Valeurs	**Description**
Yes	The situation is true, according to the property default definition.
No	The situation is not true.

Message	
The value of a code which is a generic placeholder and refers to the corresponding entry in the multilingual code list for predefined and generic message text elements, which may be used as display texts. Only values that exist in the code list should be used.	
Type	**Description**
MSG01	Code as placeholder for predefined message text 1
MSG02	Code as placeholder for predefined message text 2
MSG03	Code as placeholder for predefined message text 3
MSG04	Code as placeholder for predefined message text 4
MSG05	Code as placeholder for predefined message text 5
MSG06	Code as placeholder for predefined message text 6
MSG07	Code as placeholder for predefined message text 7
MSG08	Code as placeholder for predefined message text 8
MSG09	Code as placeholder for predefined message text 9
MSG10	Code as placeholder for predefined message text 10

Restriction	
The value of a code which is a generic placeholder and refers to the corresponding entry in the multilingual code list for predefined and generic restriction text elements, which may be used as display texts. Only values that exist in the code list should be used.	

Type	Description
RST01	Code as placeholder for predefined restriction text 1
RST02	Code as placeholder for predefined restriction text 2
RST03	Code as placeholder for predefined restriction text 3
RST04	Code as placeholder for predefined restriction text 4
RST05	Code as placeholder for predefined restriction text 5
RST06	Code as placeholder for predefined restriction text 6
RST07	Code as placeholder for predefined restriction text 7
RST08	Code as placeholder for predefined restriction text 8
RST09	Code as placeholder for predefined restriction text 9
RST10	Code as placeholder for predefined restriction text 10

3.3 Structures

3.3.1 Structure « LocalisedUri »

Structure containing localised Uniform Resource Identifier (URI)

Attribut	Multi-plicité	Type de donnée (domaine de valeur)	Description
Language	1	International-Codes_V1.Lan-guageCode_ISO639_1	Standard language code (ISO639_1) based on the CHBase [2] model convention
Text	1	URI	Uniform Resource identifier (URI)

3.3.2 Structure « MultilingualUri »

Structure containing multilingual elements of localised Uniform Resource Identifier (URI)

Attribut	Multi-plicité	Type de donnée (domaine de valeur)	Description
LocalisedText	1..*	UASGeographical-Zone_V1.LocalisedUri	Text as localised Uniform Resource Identifier (URI)

3.4 Thème « CodelistTexts »

Topic for code lists with unique object identification (UUID)

3.4.1 Classe « MessageText »

Class containing a multilingual code list for predefined and generic message text elements.

Attribut	Multi-plicité	Type de don-née (domaine de valeur)	Description
Code	1	Message	A message code which refers to an enumeration of codes.
Description	1	Localisa-tionCH_V1.Mul-tilingualText	Multilingual text based on the CHBase model convention [2].

3.4.2 Classe « RestrictionText »

Class containing a multilingual code list for predefined and generic restriction text elements.

Attribut	Multi-plicité	Type de don-née (domaine de valeur)	Description
Code	1	Restriction	A restriction code which refers to an enumeration of codes.
Description	1	Localisa-tionCH_V1.Mul-tilingualText	Multilingual text based on the CHBase model convention [2].

3.5 Thème « UASZones »

Topic for geographical UAS zones with unique object identification (UUID)

3.5.1 Classe « UASZoneVersion »

Class representing an airspace of defined dimensions, above the land areas or territorial waters of a State, within which a particular restriction (or condition; not applicable herein) for UAS flights applies.

Attribut	Multi-plicité	Type de don-née (domaine de valeur)	Description
identifier	1	CodeZoneIdenti-fierType	A string of characters that uniquely identifies the UAS zone within the State/Territory identified by the country attribute. Recommendation: use of an abbreviation specific for organization or canton as a prefix.
country	1	International-Codes_V1. CountryCode_ ISO3166_1	A 3 letter identifier of a country or territory using the ISO 3166-1 alpha-3 standard (CHE for Switzerland)

			based on the CHBase model convention [2]. The State that has the authority to declare the zone.
name	1	Localisa-tionCH_V1.MultilingualText	A text name by which the zone may be known by the public or by the UAS community.
type	1	CodeZoneType	An indication that the zone is provided with its common definition (whereas a customised definition for a particular user is not applicable herein).
Restriction	1	CodeRestriction-Type	An indication if flying in the zone is restricted or unrestricted (whereas prohibited or conditional are not applicable herein).
restrictionConditions	1	Restriction	An indication to be displayed to the user of the zone. Contains a code concerning to the restriction conditions.
reason	1	CodeZone-ReasonType	A coded indication for the reason that led to the establishment of the zone.
Message	1	Message	A message to be displayed to the user of the zone. Contains a code concerning the granting authority.
regulationExemption	0..1	CodeYes-NoType	This is an (possible) extension point. It allows adding additional attributes of national interest through this element.
additionalProperties	0..1	Chaîne de caractères (TEXT*40)	Indicates (possible) exemptions from the national or European regulations.

3.5.2 Classe « AirspaceVolume »

The definition of the airspace volume comprised by the zone, in the form of a cylinder with a horizontal projection and vertical limits.

Attribut	Multi-plicité	Type de don-née (domaine de valeur)	Description
uomDimensions	1	UomDistance	The unit of measurement used for the vertical dimensions and also for the horizontal Projection.
lowerLimit	0..1	Number (0..99999)	The lowest level included in the zone. If not specified, it means that the zone starts from surface (ground).

lowerVerticalReference	1	CodeVerticalRefernceType	The vertical reference system used for expressing the lower limit. Note: If lowerLimit is not specified, the required value will be "AGL".
upperLimit	0..1	Number (0..99999)	The highest level included in the zone. If not specified, it means that the zone extends to any possible level (unlimited).
upperVerticalReference	1	CodeVerticalRefernceType	The vertical reference system used for expressing the upper limit
horizontalProjection	1	GeoShapeType	The shape of the zone in the Swiss projection. The coordinate resolution should be at least 1 meter, whereas not more than 3 decimal places (means milimeter) should be provided.

3.5.3 Classe « TimePeriod »

Defines the applicability dates and times of the zone, including its eventual usage permissions/restrictions. If the restriction varies in time, separate time periods must be defined.

Attribut	Multiplicité	Type de donnée (domaine de valeur)	Description
permanent	1	CodeYesNoType	An indication that the area is permanent if Yes. Permanent 'Yes' means: always active, no start nor end date / time. Permanent 'No' means: a start and end date / time must be defined.
startDateTime	0..1	DateTimeType	The date and time when the area starts to exist.
endDateTime	0..1	DateTimeType	The date and time when the area ceases to exist.

3.5.4 Classe « DailyPeriod »

Specifies a daily applicability schedule of the zone and its eventual permissions/restrictions, within the time when the area exists according to the TimePeriod information.

Attribut	Multiplicité	Type de donnée (domaine de valeur)	Description
day	1..6	CodeWeekDayType	The day of the week.
startTime	1	TimeType	The daily start time.
endTime	1	TimeType	The daily end time.

3.5.5 Classe « Authority »

A relevant authority that is in charge for authorising or providing information for UAS operations in the UAS zone.

Attribut	Multi-plicité	Type de donnée (domaine de valeur)	Description
name	1	Localisa-tionCH_V1.Multilin-gualText	The official multilingual name of a public or private authority. Important: Languages DE, FR, IT and EN have to be provided. Use the main language value as default for the other languages if no specific URL exists. The permissible length of the URL values is limited to 200 characters.
service	0..1	Localisa-tionCH_V1.Multilin-gualTex	The multilingual name of a specific department / service within the organisation. Important: Languages DE, FR, IT and EN have to be provided. Use the main language value as default for the other languages if no specific URL exists. The permissible length of the URL values is limited to 200 characters.
contactName	0..1	TextShortType	The name or role of a specific person that needs to be contacted within the organisation.
siteURL	1	MultilingualUri	The multilingual URL of the public internet site through which the organisation may be contacted. Important: Languages DE, FR, IT and EN have to be provided. Use the main language value as default for the other languages if no specific URL exists. The permissible length of the URL values is limited to 200 characters
email	0..1	TextShortType	The e-mail address by which the organisation may be contacted.
phone	0..1	TextShortType	A phone number at which the organisation may be contacted. The country code (0041) has to be included

3.5.6 Classe « AuthorityRequirements » (classe d'association)

Indicates role of an authority in relation with an UAS zone and related requirements, such as the lead time before the actual use of the zone.

Attribut	Multi-plicité	Type de don-née (domaine de valeur)	Description
purpose	1	CodeAuthority-Role	The role of the authority in relation with the zone.
intervalBefore	0..1	TimeInterval	The minimal time interval required between authorisation request and starting to operate in the zone.

3.5.7 Classe « Metadata »

Information that qualifies and provides traceability for the zone operational data. It is mandatory, although it is only used in ground databases and not transmitted to the UAS or user,

| Attribut	Multi-plicité	Type de don-née (domaine de valeur)	Description
creationDateTime	1	DateTimeType	Indicates when the zone was initially created.
updateDateTime	1	DateTimeType	Indicates when the characteristics of the zone have been last time updated.
author	1	TextShortType	Indicates who has last updated the information about the zone.

4 Modèle de géodonnées conceptuel : diagramme de classes UML

Le modèle de géodonnées « UASGeographicalZone_V1 » permet de procéder le cas échéant à l'extension des types d'objet indépendamment du modèle de données.
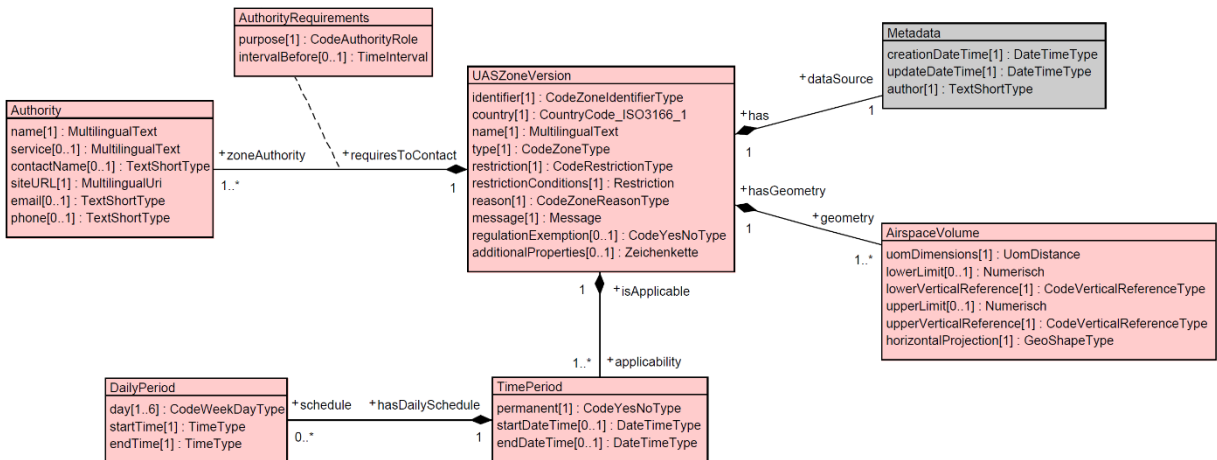
Aperçu des thèmes

CodelistTexts

UASZones

Thème « CodelistTexts »

RestrictionText
Code
Description

MessageText
Code
Description
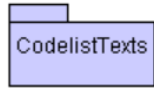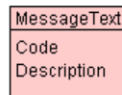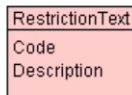
Thème « UASZones »

5 Modèle de représentation

La représentation des zones géographiques UAS découle des attributs « reason » et « restriction » de la classe « UASZoneVersion » (cf. chap. 3.5.1).

Valeur d'attribut « UASZone-Version. reason » [1]	Valeur d'attribut « UASZoneVersion. restriction » [2]	Couleur (R/G/B)	Signature	Symbole / signification
AIR_TRAFFIC	REQ_AUTHORISATION.MTOM_ALL	177 / 19 / 19	Uni ; transparence : 40 %	Périmètre d'aérodrome
AIR_TRAFFIC	REQ_AUTHORISATION.MTOM_FROM	144 / 0 / 80	Uni ; transparence : 40 %	Zone dans un rayon de 5 km d'un aérodrome ou zone adaptée
AIR_TRAFFIC	REQ_AUTHORISATION.CTR	144 / 0 / 80	Hachures diagonales (angle de 45° à droite, espacement des lignes : 10 points, épaisseur des lignes : 0.5 points), épaisseur du contour : 1.5 points	
NATURE	-	255 / 170 / 0	Uni ; transparence : 40 %	Zone protégée
SENSITIVE	-	0 / 65 / 190	Uni ; transparence : 40 %	Centrales nucléaires, établissements d'exécution des peines, infrastructures militaires, interdictions de vol diverses

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[1] Conformément au domaine de valeur de la liste de codes « *CodeZoneReasonType* » (cf. chap. 3.2)

[2] Conformément au domaine de valeur de la liste de codes « *CodeRestrictionType* » (cf. chap. 3.2). La valeur « NO_RESTRICTION » n'est actuellement pas prise en compte dans la représentation, bien qu'elle puisse être présente dans les données.

6 Fonction de filtre

Les filtres suivants doivent être appliqués pour la conversion des données INTERLIS au format GeoJSON avant publication :

- Les coordonnées de l'attribut « horizontalProjection » de la classe « AirspaceVolume » doivent être indiquées en WGS84.

- Au lieu des listes de codes multilingues (cf. annexes 7.1 et 7.2), seule les listes de codes en anglais seront intégrées.

- La description anglaise de l'attribut « message » de « UASZoneVersion » (cf. chap. 3.5.1) ainsi que les valeurs en anglais des attributs « name », « service » et « siteURL » de la classe « Authority » (cf. chap. 3.5.5) doivent être limitée à 200 caractères pour des raisons de compatibilité.

- La classe « metadata » est à omettre.

- Les données doivent être codées en UTF-8.

7 Annexe

7.1 Liste de codes « RestrictionText »

Code	Description (de)	Description (fr)	Description (it)	Description (en)
RST01	Der Betrieb von unbemannten Luftfahrzeugen ist verboten.	L'exploitation d'aéronefs sans occupants est interdite.	L'esercizio di aeromobili senza occupanti è vietato.	The operation of unmanned aircraft is prohibited.
RST02	Der Betrieb von unbemannten Luftfahrzeugen mit einem Gewicht von mehr als 250 g ist verboten.	L'exploitation d'aéronefs sans occupants d'un poids supérieur à 250 g est interdite.	L'esercizio di aeromobili senza occupanti di peso superiore a 250 g è vietato.	The operation of unmanned aircraft weighing more than 250 g is prohibited.
RST03	Der Betrieb von unbemannten Luftfahrzeugen mit einem Gewicht von mehr als 250 g ist ab einer Höhe von 120 m über Grund verboten.	L'exploitation d'aéronefs sans occupants d'un poids supérieur à 250 g est interdite à partir d'une hauteur de 120 m au-dessus du sol.	L'esercizio di aeromobili senza occupanti di peso superiore a 250 g è vietato a partire da un'altezza di 120 m sopra il suolo.	The operation of unmanned aircraft weighing more than 250 g is prohibited from an altitude of 120 m above ground.

7.2 Liste de codes « MessageText »

Code	Description (de)	Description (fr)	Description (it)	Description (en)
MSG01	Ausnahmebewilligungen können bei der zuständigen Stelle beantragt werden.	Des autorisations exceptionnelles peuvent être demandées à l'autorité compétente.	I permessi d'esenzione possono essere richieste all'autorità competente.	Exemption permits may be applied for at the competent authority.
MSG02	Ausnahmebewilligungen können bei der zuständigen kantonalen Fachstelle beantragt werden.	Des autorisations exceptionnelles peuvent être demandées auprès du service cantonal spécialisé compétent.	I permessi d'esenzione possono essere richieste al servizio cantonale specializzato competente.	Exemption permits may be applied for at the competent cantonal specialist office.

7.3 Fichier du modèle INTERLIS

En cas des divergences entre la documentation du modèle et le Model Repository, c'est la version ILI au Model Repository qui s'applique.

« UASGeographicalZoneDataModel_V1.ili »

```
INTERLIS 2.3;
/** EN: UAS Geographical Zone Data Model
 */
!!@ technicalContact=mailto:gis@bazl.admin.ch
!!@ furtherInformation=https://www.bazl.admin.ch/geoinformation
MODEL UASGeographicalZone_V1 (en)
AT "https://models.geo.admin.ch/BAZL/"
VERSION "2022-04-08"  =
  IMPORTS GeometryCHLV95_V1,InternationalCodes_V1,CatalogueObjects_V1,Localisa-
tionCH_V1;

  DOMAIN

    /** EN: Enumeration of predefined and generic message text elements
     */
    Message = (
      /** EN: Code as placeholder for predefined message text 1
       */
      MSG01,
      /** EN: Code as placeholder for predefined message text 2
       */
      MSG02,
      /** EN: Code as placeholder for predefined message text 3
       */
      MSG03,
      /** EN: Code as placeholder for predefined message text 4
       */
      MSG04,
      /** EN: Code as placeholder for predefined message text 5
       */
      MSG05,
      /** EN: Code as placeholder for predefined message text 6
       */
      MSG06,
      /** EN: Code as placeholder for predefined message text 7
       */
      MSG07,
      /** EN: Code as placeholder for predefined message text 8
       */
      MSG08,
      /** EN: Code as placeholder for predefined message text 9
       */
      MSG09,
      /** EN: Code as placeholder for predefined message text 10
       */
      MSG10
    );

    /** EN: Enumeration of predefined and generic restriction text elements
     */
    Restriction = (
      /** EN: Code as placeholder for predefined restriction text 1
       */
      RST01,
      /** EN: Code as placeholder for predefined restriction text 2
       */
      RST02,
      /** EN: Code as placeholder for predefined restriction text 3
       */
      RST03,
      /** EN: Code as placeholder for predefined restriction text 4
```

```
       */
      RST04,
      /** EN: Code as placeholder for predefined restriction text 5
       */
      RST05,
      /** EN: Code as placeholder for predefined restriction text 6
       */
      RST06,
      /** EN: Code as placeholder for predefined restriction text 7
       */
      RST07,
      /** EN: Code as placeholder for predefined restriction text 8
       */
      RST08,
      /** EN: Code as placeholder for predefined restriction text 9
       */
      RST09,
      /** EN: Code as placeholder for predefined restriction text 10
       */
      RST10
    );

  /** EN: Structure containing a localised Uniform Resource Identifier (URI)
   */
  STRUCTURE LocalisedUri =
    /** EN: Standard language code (ISO639_1) based on the CHBase model convention
     */
    Language : MANDATORY InternationalCodes_V1.LanguageCode_ISO639_1;
    /** EN: Uniform Resource Identifier (URI)
     */
    Text : MANDATORY URI;
  END LocalisedUri;

  /** EN: Structure containing multilingual elements of localised Uniform Resource
Identifier (URI)
   */
  STRUCTURE MultilingualUri =
    /** EN: Text as localised Uniform Resource Identifier (URI)
     */
    LocalisedText : BAG {1..*} OF UASGeographicalZone_V1.LocalisedUri;
    /** EN: Uniqueness constraint of multilingual element language
     */
    UNIQUE (LOCAL) LocalisedText:Language;
  END MultilingualUri;

  /** EN: Topic for code list texts
   */
  TOPIC CodelistTexts =
    OID AS INTERLIS.UUIDOID;

    /** EN: Multilingual code list for messages, whose entries may be used as dis-
play texts
     */
    CLASS MessageText
    EXTENDS CatalogueObjects_V1.Catalogues.Item =
      /** EN: Message code as predefined enumeration
       */
      Code : MANDATORY UASGeographicalZone_V1.Message;
      /** EN: Multilingual description of a message code
       */
      Description : MANDATORY LocalisationCH_V1.MultilingualText;
      /** EN: Uniqueness constraint of the code
       */
      UNIQUE Code;
    END MessageText;

    /** EN: Multilingual code list for restrictions, whose entries may be used as
display
     */
    CLASS RestrictionText
    EXTENDS CatalogueObjects_V1.Catalogues.Item =
      /** EN: Restriction code as predefined enumeration
```

```
      */
    Code : MANDATORY UASGeographicalZone_V1.Restriction;
    /** EN: Multilingual description of a restriction code
     */
    Description : MANDATORY LocalisationCH_V1.MultilingualText;
    /** EN: Uniqueness constraint of the code
     */
    UNIQUE Code;
  END RestrictionText;

END CodelistTexts;

/** EN: Topic for UAS Geographical Zone
 */
TOPIC UASZones =
  OID AS INTERLIS.UUIDOID;

  DOMAIN

    /** EN: A coded list of values indicating the role that an authority has in
relation with the UAS zone
     */
    CodeAuthorityRole = (
      /** EN: The designated authority shall be contacted to get an authorisation
before accessing the UAS zone
       */
      AUTHORIZATION,
      /** EN: The designated authority is a general purpose point of contact for
the UAS in the zone (out of authorisation and notification)
       */
      INFORMATION
    );

    /** EN: A coded indicator of the restriction level for the zone
     */
    CodeRestrictionType = (
      /** EN: Indicates that the flight of UAS is subject to explicit authorisa-
tion requirements during the time of applicability
       */
      REQ_AUTHORISATION(
        /** EN: Indicates that the flight of UAS (independent of their weight) is
subject to explicit authorisation requirements during the time of applicability
         */
        MTOM_ALL,
        /** EN: Indicates that the flight of UAS (from a specific weight) is sub-
ject to explicit authorisation requirements during the time of applicability
         */
        MTOM_FROM,
        /** EN: Indicates that the flight of UAS within CTR (above 120m AGL) is
subject to explicit authorisation requirements during the time of applicability
         */
        CTR
      ),
      /** EN: Indicates that the zone may be used during the applicability time
without any special permissions or restrictions
       */
      NO_RESTRICTION
    );

    /** EN: A coded value that indicates a vertical reference system
     */
    CodeVerticalReferenceType = (
      /** EN: Height above ground/surface level
       */
      AGL,
      /** EN: Altitude above mean sea level
       */
      AMSL
    );

    /** EN: A coded value indicating a day of the week
     */
```

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```
     CodeWeekDayType = (
       /** EN: Monday
        */
       MON,
       /** EN: Tuesday
        */
       TUE,
       /** EN: Wednesday
        */
       WED,
       /** EN: Thursday
        */
       THU,
       /** EN: Friday
        */
       FRI,
       /** EN: Saturday
        */
       SAT,
       /** EN: Sunday
        */
       SUN,
       /** EN: Any day of the week
        */
       Any
     );

     /** EN: A coded value that indicates a choice between a positive (yes) or a
negative (no) applicability
      */
     CodeYesNoType = (
       /** EN: The situation is true, according to the property default definition
        */
       Yes,
       /** EN: The situation is not true
        */
       No
     );

     /** EN: A coded identifier of a UAS zone
      */
     CodeZoneIdentifierType = TEXT*7;

     /** EN: A coded indication of a reason that justifies the existence of an UAS
zone
      */
     CodeZoneReasonType = (
       /** EN: Due to the presence of air traffic
        */
       AIR_TRAFFIC,
       /** EN: Due to the presence of a wildelife/nature sanctuary or another area
with sensitive nature/fauna
        */
       NATURE,
       /** EN: Due to the presence of a sensitive site, in the vicinity of which
the presence of drones could be considered a potential risk
        */
       SENSITIVE
     );

     /** EN: A code that indicates that a zone is provided with its common defini-
tion
      */
     CodeZoneType = (
       /** EN: The zone is provided with its common definition, valid for any UAS
and operator
        */
       COMMON
     );

     /** EN: A date and time instant according to ISO 8601
      */
```

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```
        DateTimeType = FORMAT INTERLIS.XMLDateTime "1900-1-1T0:0:0.0" .. "2099-12-
31T23:59:59.0";

        /** EN: A geometrical shape by means of single polygons using the Swiss pro-
jection (EPSG:2056)
         */
        !!@ CRS=2056
        GeoShapeType = SURFACE WITH (STRAIGHTS) VERTEX GeometryCHLV95_V1.Coord2 WITH-
OUT OVERLAPS>0.05;

        /** EN: A string of maximum 200 characters
         */
        TextShortType = TEXT*200;

        /** EN: A period of time expressed according to the ISO 8601 rules for time
intervals
         */
        TimeInterval = TEXT*11;

        /** EN: A time instant type according to ISO 8601
         */
        TimeType = FORMAT INTERLIS.XMLTime "0:0:0.0" .. "23:59:59.999";

        /** EN: A list of units of measurement used for distances
         */
        UomDistance = (
          /** EN: Meter
           */
          M
        );
    STRUCTURE CodeWeekDayType_ = value : MANDATORY CodeWeekDayType; END CodeWeek-
DayType_;

    /** EN: The definition of the airspace volume comprised by the zone, in the form
of a cylinder with a horizontal projection and vertical limits
     */
    CLASS AirspaceVolume =
      /** EN: The unit of measurement used for the vertical dimensions and also for
the horizontal projection
       */
      uomDimensions : MANDATORY UomDistance;
      /** EN: The lowest level included in the zone; if not specified, it means that
the zone starts from surface (ground)
       */
      lowerLimit : 0 .. 99999 [INTERLIS.m];
      /** EN: The vertical reference system used for expressing the lower limit
       */
      lowerVerticalReference : MANDATORY CodeVerticalReferenceType;
      /** EN: The highest level included in the zone; if not specified, it means
that the zone extends to any possible level (unlimited)
       */
      upperLimit : 0 .. 99999 [INTERLIS.m];
      /** EN: The vertical reference system used for expressing the upper limit
       */
      upperVerticalReference : MANDATORY CodeVerticalReferenceType;
      /** EN: The shape of the area in the Swiss projection
       */
      horizontalProjection : MANDATORY GeoShapeType;
      /** EN: If lowerLimit is not defined, then lowerVerticalReference has to be
set to "AGL"
       */
      MANDATORY CONSTRAINT NOT (NOT (DEFINED (lowerLimit))) OR (lowerVerticalRefer-
ence == #AGL);
    END AirspaceVolume;

    /** EN: A relevant authority that is in charge for authorising or providing in-
formation for UAS operations in the UAS zone
     */
    CLASS Authority =
      /** EN: The official multilingual name of a public or private authority
       */
      name : MANDATORY LocalisationCH_V1.MultilingualText;
```

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```
        /** EN: The multilingual name of a specific department or service within the
organisation
         */
        service : LocalisationCH_V1.MultilingualText;
        /** EN: The name or role of a specific person that needs to be contacted
within the organisation
         */
        contactName : TextShortType;
        /** EN: The multilingual URL of the public internet site through which the or-
ganisation may be contacted
         */
        siteURL : MANDATORY UASGeographicalZone_V1.MultilingualUri;
        /** EN: The e-mail address by which the organisation may be contacted
         */
        email : TextShortType;
        /** EN: A phone number at which the organisation may be contacted
         */
        phone : TextShortType;
    END Authority;

    /** EN: Specifies a daily applicability schedule of the zone and its eventual
permissions/restrictions, within the time when the area exists according to the
TimePeriod information
     */
    CLASS DailyPeriod =
      /** EN: The day of the week
       */
      day : BAG {1..6} OF CodeWeekDayType_;
      /** EN: The daily start time
       */
      startTime : MANDATORY TimeType;
      /** EN: The daily end time
       */
      endTime : MANDATORY TimeType;
    END DailyPeriod;

    /** EN: Defines the applicability dates and times of the zone, including its
eventual usage permissions/restrictions
     */
    CLASS TimePeriod =
      /** EN: An indication that the area is permanent; 'Yes' means: always active,
no start nor end date; 'No' means: consider the start and end date provided just af-
ter
       */
      permanent : MANDATORY CodeYesNoType;
      /** EN: The date and time when the area starts to exist
       */
      startDateTime : DateTimeType;
      /** EN: The date and time when the area ceases to exist
       */
      endDateTime : DateTimeType;
      /** EN: If permanent is "No", the start and end date must be definied. If per-
manent is "Yes", no start nor end date must be definied.
       */
      MANDATORY CONSTRAINT ((permanent == #No) AND (DEFINED (startDateTime) AND DE-
FINED (endDateTime))) OR ((permanent == #Yes) AND NOT (DEFINED (startDateTime) OR
DEFINED (endDateTime)));
    END TimePeriod;

    /** EN: An airspace of defined dimensions, above the land areas or territorial
waters of a state, within which a particular restriction or condition for UAS
flights applies
     */
    CLASS UASZoneVersion =
      /** EN: A string of characters that uniquely identifies the UAS zone within
the state/territory identified by the country attribute
       */
      identifier : MANDATORY CodeZoneIdentifierType;
      /** EN: The state that has the authority to declare the zone
       */
      country : MANDATORY InternationalCodes_V1.CountryCode_ISO3166_1;
```

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```
    /** EN: A multilingual text name by which the zone may be known by the public
or by the UAS community
     */
    name : MANDATORY LocalisationCH_V1.MultilingualText;
    /** EN: An indication that the zone is provided with its common definition
     */
    type : MANDATORY CodeZoneType;
    /** EN: An indication if flying in the zone is restricted or unrestricted
     */
    restriction : MANDATORY CodeRestrictionType;
    /** EN: An indication of the conditions under which the zone can be used
     */
    restrictionConditions : MANDATORY UASGeographicalZone_V1.Restriction;
    /** EN: A coded indication for the reason that led to the establishment of the
zone
     */
    reason : MANDATORY CodeZoneReasonType;
    /** EN: A message to be displayed to the user of the zone
     */
    message : MANDATORY UASGeographicalZone_V1.Message;
    /** EN: This is an extension point, that allows adding additional attributes
of national interest through this element
     */
    regulationExemption : CodeYesNoType;
    /** EN: Indicates that exemptions from the national or European regulations
are allowed in the UAS zone, that will be detailed via the "message" property
     */
    additionalProperties : TEXT;
  END UASZoneVersion;

  /** EN: Information that qualifies and provides traceability for the zone opera-
tional data
   */
  CLASS Metadata =
    /** EN: Indicates when the zone was initially created
     */
    creationDateTime : MANDATORY DateTimeType;
    /** EN: Indicates when the characteristics of the zone have been last time up-
dated
     */
    updateDateTime : MANDATORY DateTimeType;
    /** EN: Indicates who has last updated the information about the zone
     */
    author : MANDATORY TextShortType;
  END Metadata;

  /** EN: Indicates the role of an authority in relation with an UAS zone and re-
lated requirements, such as the lead time before the actual use of the zone
   */
  ASSOCIATION AuthorityRequirements =
    zoneAuthority -- {1..*} Authority;
    requiresToContact -<#> {1} UASZoneVersion;
    /** EN: The role of the authority in relation with the zone
     */
    purpose : MANDATORY CodeAuthorityRole;
    /** EN: The minimal time interval required between notification or authorisa-
tion request and starting to operate in the zone
     */
    intervalBefore : TimeInterval;
  END AuthorityRequirements;

  /** EN: Aggregation from DailyPeriod to TimePeriod
   */
  ASSOCIATION hasDailySchedule =
    schedule -- {0..*} DailyPeriod;
    hasDailySchedule -<#> {1} TimePeriod;
  END hasDailySchedule;

  /** EN: Aggregation from AirspaceVolume to UASZoneVersion
   */
  ASSOCIATION hasGeometry =
    geometry -- {1..*} AirspaceVolume;
```

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```
        hasGeometry -<#> {1} UASZoneVersion;
     END hasGeometry;

     /** EN: Aggregation from TimePeriod to UASZoneVersion
      */
     ASSOCIATION isApplicable =
       applicability -- {1..*} TimePeriod;
       isApplicable -<#> {1} UASZoneVersion;
     END isApplicable;

     /** EN: Aggregation from Metadata to UASZoneVersion
      */
     ASSOCIATION has =
       dataSource -- {1} Metadata;
       has -<#> {1} UASZoneVersion;
     END has;

   END UASZones;

END UASGeographicalZone_V1.
```

7.4 Éléments du modèle non utilisés

Types de données/de domaines de valeurs de l'« UAS Geographical Zone Data Model » [1] qui ont été ignorés

ConditionExpressionType	
An expression / indication that provides information about what is forbidden in a zone.	
Type	**Description**
TEXT*10000	A string of maximum 10'000 characters.

CodeUSpaceClassType	
A coded identifier for a category or class of the zone applying a "USpace concept".	
Type	**Description**
TEXT*100	A string of maximum 100 characters.

CodeAuthorityRole	
A coded list of values indicating the role that an authority has in relation with the UAS zone.	
Valeurs	**Description**
NOTIFICATION	The designated Authority shall be notified of the UAS flight prior to accessing the UAS Zone.

UomDistance	
A list of units of measurement used for distances.	
Valeurs	**Description**
FT	Feet

CodeCountryISOType	
A 3 letter identifier of a country or territory using the ISO 3166-1 alpha-3 standard.	
Valeurs	**Description**
CHE	A 3 letter identifier

CodeZoneType	
A coded list of values which allows indicating that the definition of a UAS zone is specifically customised for a particular UAS or operator.	
Valeurs	**Description**
CUSTOMIZED	The zone is provided with a customised definition, for a particular UAS or operator.

CodeRestrictionType	
A coded indicator of the restriction level for the zone.	
Valeurs	**Description**
PROHIBITED	Indicates that the flight of UAS is prohibited during the applicability time.
CONDITIONAL	Indicates that access in the UAS zone is allowed only to operators fulfilling a special condition, which is defined as a logical expression.

CodeZoneReasonType	
A coded indication of a reason that justifies the existence of an UAS zone.	
Valeurs	**Description**
PRIVACY	Due to the presence of a site for which the presence of drones could rise privacy concerns.
POPULATION	Due to the presence of a significantly populated area.
NOISE	Due to noise abatement regulations.
FOREIGN_TERRITORY	Indicates a "fake" zone that is created automatically and which corresponds to the territory of a neighboring country.
EMERGENCY	Due to activity related to a situation that requires urgent intervention (such as an accident).
OTHER	Due to another reason, which may be specified in the otherReasonInfo property.

Attributs de classes de l'« UAS Geographical Zone Data Model » [1] qui ont été ignorés

UASZoneVersion

Attribut	Multiplicité	Type de donnée (domaine de valeur)	Description
region	0..1	Number (0..65535)	Where applicable, identifies a region inside a State where the UAS Zone is located. This attribute is intended to facilitate extracting sub-sets of data, for specific regions.
otherReasonInfo	0..1	TextShortType	A free text description of the reason that led to the establishment of the zone, when not covered by a pre-defined coded value.
uSpaceClass	0..*	CodeUSpaceClassType	A code that identifies the category or class of the zone applying a "USpace concept".