

## Exercise 6: Airspace Reference

### AIRSPACE [Airspace]

A generic entity representing variously 'regions' (ICAO and otherwise), 'areas', 'zones', 'sectors' (elementary and/or consolidated) etc, as used in and by air traffic services, including those of the FUA concept, special regulated and client defined airspaces and all sorts of 'limited' airspaces.

It is also used to identify 'political' and/or 'geographical' two-dimensional areas representing countries, coastlines and so on. It should be noted that countries and the like could be regarded, without restriction of the generality, as three-dimensional areas with MSL as lower and UNL as upper levels.

#### Rules:

1. An AIRSPACE that is not related to any AIRSPACE\_BORDER or AIRSPACE\_CORRIDOR must be 'defined by' one and only one AIRSPACE\_DERIV\_GEOMETRY.
2. If CODE\_TYPE='PART', then the airspace must be used as AIRSPACE\_AGGREG\_COMP.
3. An AIRSPACE for which the lower and upper limit are not specified, must be 'defined by' one and only one AIRSPACE\_DERIV\_GEOMETRY.
4. Adjacent airspace of type FIR, UIR and/or NO-FIR should be contiguous (no gaps, no overlapping).

#### Attributes

##### **CODE\_TYPE** [Type] *mandatory*

A code indicating the type of Airspace.

E.g. UTA, CTA, TMA, CTR, OCA, Advisory Area, Limited Area, Uncontrolled Airspace, etc. .

##### Notes:

*It seems that a number of countries use the 'traditional' airspace types like FIR, CTA, etc. and others just use the 'class' instead.*

##### Rules:

1. If CODE\_TYPE is 'ICAO', 'ECAC', 'CFMU', 'IFPS', 'FIR', 'FIR-P', 'UIR', 'UIR-P', 'CTA', 'CTA-P', 'OCA', 'OCA-T', 'UTA', 'UTA-P', 'TMA', 'TMA-P', 'NO-FIR', then the airspace may not be part of an AIRSPACE\_ASSOCIATIONS of type 'TIME-DIST'.
2. This attribute is non-updateable. This means, for example, that an FIR cannot change into a sector or a danger area and vice-versa.
3. If CODE\_TYPE has the value 'FIR' or 'UIR', then CODE\_LOC\_IND is mandatory.
4. If CODE\_TYPE='CLASS', then attribute CODE\_CLASS is mandatory.

##### Domain: CODE\_TYPE\_AS\_

##### **CODE\_ID** [Coded identifier] *mandatory*

A published unique identifier associated with the airspace. Typical examples are the ID of the Danger, Prohibited, Temporary segregated Areas, etc.

##### Notes:

*For the moment, it is proposed to use some unique country code (not necessarily the ICAO one) followed by a sequence of alphanumeric characters the value of which should preferably not contain coded information such as the 'type' of the airspace.*

##### Domain: CODE\_ID\_AS\_

##### **TXT\_NAME** [Name] *optional*

This attribute is the 'name' given to an airspace by the responsible service and published (preferably in the IAIP) according to ICAO rules (Annex 11). It should be written as

published, with no significance to upper or lower case letters.

**Domain:** TXT\_NAME\_

**CODE\_CLASS** [Class] *optional*

The class of the Airspace according to Annex 11, Appendix 4.

**Domain:** CODE\_CLASS\_AS\_

**CODE\_LOC\_IND** [Location indicator [ICAO doc. 7910]] *optional*

A code indicating the Location Indicator according to ICAO Doc. 7910.

If at all, it certainly is not available for all airspaces. Most airspaces will not have a value for this attribute.

**Domain:** CODE\_LOC\_IND\_ICAO\_

**CODE\_ACTIVITY** [Activity or purpose] *optional*

A code indicating the primary activity taking place in the airspace or the reason for its establishment.

**Domain:** CODE\_ACTIVITY\_

**CODE\_MIL** [Military] *optional*

A code indicating whether the airspace is under the responsibility of a military organisation.

**Domain:** CODE\_MIL\_

**CODE\_DIST\_VER\_UPPER** [Reference for upper limit] *optional*

A code indicating the convention used to calculate the upper limit.

E.g.: Flight Level (in both feet and metres - cf. UOM\_DIST\_VERT), Altitude above MSL (QNH), Altitude above GND (QFE), Elevation, Height, etc..

**Domain:** CODE\_DIST\_VER\_

**VAL\_DIST\_VER\_UPPER** [Upper limit] *optional*

The numerical value of the upper limit.

**Rules:**

1. *When expressed using the same unit of measurement (UOM\_DIST\_VER\_\*) and the same vertical reference (CODE\_DIST\_VER\_\*), the value of VAL\_DIST\_VER\_UPPER must be higher than VAL\_DIST\_VER\_LOWER and VAL\_DIST\_VER\_MNM.*
2. *If VAL\_DIST\_VER\_UPPER is specified, then UOM\_DIST\_VER\_UPPER and CODE\_DIST\_VER\_UPPER are mandatory.*

**Domain:** VAL\_DIST\_VER\_

**UOM\_DIST\_VER\_UPPER** [Unit of measurement [upper limit]] *optional*

The unit of measurement expressing the upper limit.

**Domain:** UOM\_DIST\_VER\_

**CODE\_DIST\_VER\_LOWER** [Reference for lower limit] *optional*

A code indicating the convention used to calculate the lower limit.

For example, Flight Level (in both feet and metres - cf. UOM\_DIST\_VERT), Altitude above MSL (QNH), Altitude above GND (QFE), Elevation, Height, etc....

**Domain:** CODE\_DIST\_VER\_

**VAL\_DIST\_VER\_LOWER** [Lower limit] *optional*

The numerical value of the lower limit.

**Rules:**

1. *If VAL\_DIST\_VER\_LOWER is specified, then UOM\_DIST\_VER\_LOWER and CODE\_DIST\_VER\_LOWER are mandatory.*

**Domain:** VAL\_DIST\_VER\_

**UOM\_DIST\_VER\_LOWER** [Unit of measurement [lower limit]] *optional*

The unit of measurement expressing the lower limit.

**Domain:** UOM\_DIST\_VER\_

**CODE\_DIST\_VER\_MNM** [Reference for minimum limit] *optional*

A code indicating the convention used to calculate the minimum limit.  
E.g. Flight Level (in both feet and metres - cf. UOM\_DIST\_VERT), Altitude above MSL (QNH), Altitude above GND (QFE), Elevation, Height, etc. (the minimum altitude provides an overriding of the lower one if necessary, like in 'Salzburg CTA: Upper FL245, Lower 11500 FT MSL but at least 2000 FT GND').

**Domain:** CODE\_DIST\_VER\_

**VAL\_DIST\_VER\_MNM** [Minimum limit] *optional*

The numerical value of the minimum limit.

**Rules:**

1. If VAL\_DIST\_VER\_MNM is specified, then UOM\_DIST\_VER\_MNM and CODE\_DIST\_VER\_MNM are mandatory.

**Domain:** VAL\_DIST\_VER\_

**UOM\_DIST\_VER\_MNM** [Unit of measurement [minimum limit]] *optional*

Unit of measurement expressing the minimum limit.

**Domain:** UOM\_DIST\_VER\_

**VAL\_LOWER\_LIMIT** [Lower/upper separation] *optional*

The limit between the upper and the lower airspace.

**Notes:**

1) The concept of 'upper airspace' is not uniformly applied through the ECAC area. Some States declare Upper Flight Information Region(s) - UIRs. Other States just declare Flight Information Region(s) -FIR, but also indicate that there is a separation between the upper and the lower airspace inside the FIR. In order to accommodate these two situations, VAL\_LOWER\_LIMIT may be specified only for airspace of type 'FIR'. If there is an UIR above, this value is equal to the VAL\_DIST\_VER\_UPPER value (the upper limit) of that FIR.

**Rules:**

1. This value may be specified only if CODE\_TYPE = 'FIR'.

**Domain:** VAL\_FL\_

**TXT\_RMK** [Remark] *optional*

**Domain:** TXT\_RMK\_

**CODE\_TYPE\_AS** Format: CHARACTER1(1,10)

Allowed types of Airspace.

**Allowable values:**

**ICAO DEPRECATED-4.0** [ICAO Region (for example, EUR, NAT, etc.)]

**ECAC DEPRECATED-4.0** [ECAC Region.]

**CFMU DEPRECATED-4.0** [CFMU Area.]

**IFPS DEPRECATED-4.0** [IFPS Area.]

**TACT DEPRECATED-4.0** [TACT Area.]

**NAS DEPRECATED-4.0** [National Airspace System.]

*[note: The airspace within which a State provides Air Traffic Services is usually composed of:1) the territories over which the State has jurisdiction;2) those portions of the airspace over the high seas or in airspace of undetermined sovereignty where the provision of ATS are provided as determined by regional agreements.It can usually be determined by the UNION of FIRs (including, where appropriate, NO-FIRs) of the UNION of NAS-P. .]*

**NAS-P DEPRECATED-4.0** [A part of a National Airspace System.]

*[note: It might be necessary to define 'parts' of NAS. An example might be the division of the conterminous US into smaller 'airspaces' (K1, K2...) for a number of reasons. .]*

**FIR** [Flight Information Region.]

**FIR-P** [Part of an FIR.]

*[note: Might, for example, be used if service provided by more than one unit. .]*

**UIR** [Upper Flight Information Region.]

**UIR-P** [Part of a UIR.]

*[note: Might, for example, be used if more than one unites provide service in different parts of a UIR .]*

**CTA** [Control Area.]

**CTA-P** [Part of a CTA.]

**OCA** [Oceanic Control Area.]

**OCA-P** [Partial OTA.]

**UTA** [Upper Control Area.]

**UTA-P** [Part of UTA.]

**TMA** [Terminal Control Area.]

**TMA-P** [Part of TMA.]

**CTR** [Control Zone.]

**CTR-P** [Part of CTR.]

**CLASS** [Airspace having a specified class.]

**ATZ DEPRECATED-4.0** [Aerodrome Traffic Zone.]

**ATZ-P DEPRECATED-4.0** [Part of ATZ.]

**MNPSA DEPRECATED-4.0** [Minimum Navigation Performance Specifications Area.]

**MNPSA-P DEPRECATED-4.0** [Part of MNPSA.]

**OTA** [Oceanic Transition Area.]

**SECTOR** [Control Sector.]

**SECTOR-C** [Temporarily Consolidated (Collapsed ) Sector.]

**TSA** [Temporary Segregated Area (FUA).]

**TRA** [Temporary Reserved Area (FUA).]

**CBA** [Cross Border Area (FUA).]

**RCA** [Reduced Co-ordination Area (FUA).]

**RAS** [Regulated Airspace (not otherwise covered).]

**CDA DEPRECATED-4.0** [Client Defined Airspace.]

**AWY** [Airway (corridor)..]

*[note: (ICAO) A control area or portion thereof established in the form of a corridor equipped with radio navigation aids. .]*

**RTECL DEPRECATED-4.0** [Route Centreline.]

*[note: (EURO) A route segment that is not in the form of a corridor but a centreline yet is controlled and is equipped with a series of radio navigation aids. .]*

**P** [Prohibited Area.]

**R** [Restricted Area.]

**R-AMC** [AMC Manageable Restricted Area.]

<p><b>D</b> [Danger Area.]</p> <p><b>D-AMC</b> [AMC Manageable Danger Area.]</p> <p><b>D-OTHER</b> [Activities of dangerous nature (other than a Danger Area).]</p> <p><b>MIL DEPRECATED-4.0</b> [Military Training/Exercise Area.]</p> <p><b>ADIZ</b> [Air Defense Identification Zone.]</p> <p><b>HTZ DEPRECATED-4.0</b> [Helicopter Traffic Zone.]</p> <p><b>OIL DEPRECATED-4.0</b> [Oil Field.]</p> <p><b>BIRD DEPRECATED-4.0</b> [Bird Migration Area.]</p> <p><b>SPORT DEPRECATED-4.0</b> [Aerial Sporting/Recreational Area.]</p> <p><b>LMA DEPRECATED-4.0</b> [Limited Airspace (in general).]</p> <p><b>A</b> [Alert Area.]</p> <p><b>W</b> [Warning Area.]</p> <p><b>PROTECT</b> [Airspace protected from specific air traffic.]</p> <p><b>AMA</b> [Minimum Altitude Area.]</p> <p><b>ASR</b> [Altimeter Setting Region.]</p> <p><b>NO-FIR</b> [Airspace for which not even an FIR is defined.]</p> <p><i>[note: There are parts in the world for which there is neither an FIR nor any other airspace-type is defined. These airspaces will be marked as NO-FIR .]</i></p> <p><b>POLITICAL</b> [Political/administrative area.]</p> <p><b>PART</b> [Part of an airspace (used in airspace associations of type BOM).]</p>
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<b>CODE_DIST_VER</b> Format: <u>ALPHANUMERIC(1,3)</u>	
	A code indicating the reference for a vertical distance. Two series of values exist: 1) real distance: from GND, from the MSL, from the WGS-84 ellipsoid 2) pressure distance: QFE, QNH, STD.
	<p><b>Allowable values:</b></p> <p><b>HEI</b> [The distance measured from GND..]</p> <p><b>ALT</b> [The distance measured from MSL..]</p> <p><b>W84</b> [The distance measured from WGS-84 ellipsoid..]</p> <p><b>QFE</b> [A reading of 0 on the altimeter setting which occurs on GND..]</p> <p><b>QNH</b> [Altimeter setting gives field elevation on GND (~ 0 at MSL)..]</p> <p><b>STD</b> [The altimeter setting is set to standard atmosphere..]</p>

<b>UOM_DIST_VER</b> Format: <u>ALPHA(1,2)</u>	
	A unit of measurement for a vertical distance. For example, Flight Level, metres, feet.
	<p><b>Allowable values:</b></p> <p><b>FT</b> [Feet.]</p> <p><i>[note: Feet .]</i></p> <p><b>M</b> [Metres.]</p> <p><i>[note: Metres .]</i></p>

	<b>FL</b> [Flight level in hundreds of feet.] <b>SM</b> [Standard metres (tens of metres).]
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**CODE\_ACTIVITY** Format: CHARACTER1(1,15)

A code indicating a type of activity, a situation or a reason, on the ground or in the air, which may have an impact on one or more categories of air traffic.

- Allowable values:**
- TFC-AD** [Aerodrome traffic.]
  - TFC-HELI** [Helicopter/Gyrocopter traffic.]
  - TRG** [Training.]
  - ACROBAT** [Acrobatic flights, aerobatics.]
  - AIRSHOW** [Air show.]
  - SPORT** [Aerial sporting.]
  - ULM** [Ultra light flights.]
  - GLIDER** [Gliding.]
  - PARAGLIDER** [Paragliding.]
  - HANGGLIDER** [Hanggliding.]
  - PARACHUTE** [Parachute jumping.]
  - DROP** [Droppings.]
  - BALLOON** [Hot air balloons.]
  - ASCENT** [Ascent of radio probe, radiosonde, meteorological balloons.]
  - SPACEFLT** [Space flight operations.]
  - UAV** [Unmanned aerial vehicle.]
  - WORK** [Aerial work.]
  - DUSTING** [Seasonal crop dusting.]
  - FIRE** [Heavy fire suppression work.]
  - MILOPS** [Military operations.]
  - REFUEL** [Refuelling.]
  - JETCLIMB** [Climb-out sector for jet aircraft.]
  - EXERCISE** [Air combat and exercises.]
  - TOWING** [Target towing.]
  - NAVAL** [Ship exercises.]
  - MISSILES** [Flight of guided missiles.]
  - AIRGUN** [Aerial gunnery.]
  - ARTILERY** [Artillery firing.]
  - SHOOT** [Shooting from ground.]
  - BLAST** [Blasting operations.]
  - WATERBLAST** [Underwater explosions.]
  - ANTIHAILE** [Anti-hail rocket firing.]
  - BIRD** [Bird hazard.]
  - BIRD-MGR** [Bird migration.]
  - FIREWORK** [Fireworks.]
  - HI-RADIO** [High intensity radio transmission (HIRTA).]
  - HI-LIGHT** [High intensity lights.]
  - LASER** [Laser light activity.]

<p><b>NATURE</b> [Natural reserve.]</p> <p><b>FAUNA</b> [Sensitive fauna.]</p> <p><b>NO-NOISE</b> [Noise abatement.]</p> <p><b>ACCIDENT</b> [Accident investigation area.]</p> <p><b>POPULATION</b> [Highly populated area.]</p> <p><b>VIP</b> [VIP, public figures.]</p> <p><b>VIP-PRES</b> [President.]</p> <p><b>VIP-VICE</b> [Vice-President.]</p> <p><b>OIL</b> [Oil field.]</p> <p><b>GAZ</b> [Gas field or gasoline vaporization.]</p> <p><b>IND-OIL</b> [Oil refinery.]</p> <p><b>IND-CHEM</b> [Chemical plant.]</p> <p><b>IND-NUCLEAR</b> [Nuclear energy plant/activity.]</p> <p><b>TECHNICAL</b> [Technical activity.]</p> <p><b>ATS</b> [Air traffic services.]</p> <p><b>EQUIPMENT</b> [Special equipment.]</p> <p><b>PROCEDURE</b> [Special procedure.]</p> <p><b>OTHER</b> [Other activities/reasons.]</p>
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<p><b>AIRSPACE_CIRCLE_VERTEX</b> [Airspace circular vertex]</p>	
	<p>A type of airspace border consisting of a full circle.</p> <p><b>Notes:</b></p> <p><i>Currently, there are no clear statements in AIPs on how arcs and circles, when used as (part of) airspace borders, shall be interpreted.</i></p> <p><i>One possible interpretation is that such airspace borders were drawn using a map (into a specific projection, which is not published), thus representing the points of equal distance from the arc centre, on that specific projection. Of course, such arcs are not real arcs on the surface of the earth or in another projection.</i></p> <p><i>Another interpretation is that arcs represent points on the surface of the Earth (ellipsoid) situated at equal distance from a given point (the centre). In specific projections, such arcs are represented as irregular shapes (very likely not arcs).</i></p> <p><i>As such arcs typically have a radius comprised between 1 NM and 200 NM, it is possible to avoid the problems associated with the complicated calculations implied by the use of an ellipsoid as representation for the Earth. Therefore, for the purpose of this model, it is assumed that arcs and circles represent points on the surface of the Earth (approximated as a sphere) situated at equal distance from an arc centre, which is also a point on the surface of the Earth (sphere). In other words, arcs and circles represent the intersection of two sphere (one being an approximation of the Earth.)</i></p>
	<p><b>Attributes</b></p> <p><b>GEO_LAT_CEN</b> [Latitude of centre] <i>mandatory</i></p> <p>The latitude of the centre of the circle.</p> <p><b>Domain: GEO_LAT_</b></p> <p><b>GEO_LONG_CEN</b> [Longitude of centre] <i>mandatory</i></p> <p>The longitude of the centre of the circle.</p> <p><b>Domain: GEO_LONG_</b></p> <p><b>CODE_DATUM</b> [Datum] <i>mandatory</i></p>

A code indicating the geodetic datum in which the geographical co-ordinates are expressed.

**Rules:**

1. All geographical coordinates should be expressed in the WGS 84 system.

**Domain: CODE\_DATUM\_**

**VAL\_GEO\_ACCURACY** [Geographical accuracy] *optional*

The horizontal distance from the stated geographical position within which there is a defined confidence of the true position falling.

**Rules:**

1. If VAL\_GEO\_ACCURACY is specified, then UOM\_GEO\_ACCURACY is mandatory.

**Domain: VAL\_DIST\_HORZ\_**

**UOM\_GEO\_ACCURACY** [Unit of measurement [geographical accuracy]] *optional*

The unit of measurement for the value expressing the accuracy of the geographical co-ordinates.

**Domain: UOM\_DIST\_HORZ\_**

**VAL\_RADIUS** [Radius] *mandatory*

The value of the circle radius.

**Rules:**

1. The radius of the arc shall not exceed 500 NM (plausibility value).

**Domain: VAL\_DIST\_HORZ\_**

**UOM\_RADIUS** [Unit of measurement [radius]] *mandatory*

The unit of measurement used for the circle radius.

**Domain: UOM\_DIST\_HORZ\_**

**VAL\_CRC** [Cyclic redundancy check] *optional*

Hexadecimal value of a 32-bit polynomial cyclic redundancy check (CRC) over the values of a selected set of attributes that model critical, essential and routine data, according to ICAO Annex 15, item 3.2.10.

**Notes:**

Applications implementing the model shall decide and notify the specific attributes which are used for the CRC calculations, taking into consideration the requirements of the ICAO Annex 15.

**Domain: VAL\_HEX\_**

**TXT\_RMK** [Remark] *optional*

**Domain: TXT\_RMK\_**

**UOM\_DIST\_HORZ** Format: ALPHA(1,2)

A unit of measurement for a horizontal distance.  
For example, metres, feet, nautical miles, kilometres, etc. .

**Allowable values:**

**NM** [Nautical Miles.]

**KM** [Kilometres.]

**M** [Metres.]

	<b>FT</b> [Feet.]
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<b>AIRSPACE_AGGREG_COMP</b> [Airspace Aggregation Component]	
	An airspace, the geometry of which is used as component in an airspace aggregation.
	<p><b>Attributes</b></p> <p><b>CODE_OPR</b> [Operation type] <i>mandatory</i></p> <p>A code indicating how the component participates in the aggregation, such as addition, subtraction or intersection.</p> <p><b>Domain: CODE_OPR_</b></p> <p><b>NO_SEQ</b> [Sequence number] <i>mandatory</i></p> <p>A number indicating the order of the component in the aggregation.</p> <p><b>Rules:</b></p> <p>1. <i>If CODE_OPR = 'BASE', then NO_SEQ must be '1' (first).</i></p> <p><b>Domain: NO_SEQ_</b></p>

<b>CODE_OPR</b> Format: <u>ALPHA(1,6)</u>	
	An 'operator' in coded form according to which two 'operands' will be 'associated' in order to produce a result.
	<p><b>Allowable values:</b></p> <p><b>BASE</b> ["parent" airspace is the basis for subsequent operations.]</p> <p><b>UNION</b> ["parent" airspace is second operand in "reunion" operation.]</p> <p><b>INTERS</b> ["parent" airspace is second operand in intersection operation.]</p> <p><b>SUBTR</b> ["parent" airspace is second operand in "subtraction" operation.]</p>