Obstacle – Requirements Analysis

AIXM 5 Public Design Review
February 7-8, 2006
Washington DC

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Requirements analysis

- ICAO
  - Annex 15 – Aeronautical Information Services
  - ANNEX 4 – Aeronautical Charts
  - ANNEX 14 – Aerodromes
  - DOC 8126 - AIS Manual - NOTAM Selection Criteria
- RTCA/EUROCAE
  - DO-276/ED-98 – User Requirements for Terrain and Obstacle Data
- AICM version 4.5
  - change proposals to version 4.5
- IATA
  - Standard Format

2.2.1 - What is an obstacle

Obstacle (ICAO) = All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight

This picture comes from my home Country – Romania. It is a monument built in the honour of the soldiers that have died in the 1st World War.

2.2.2 Obstacle Identifier

ENR 5.4 AIR NAVIGATION OBSTACLES (HGT 100 m AGL or more)

ID	Designation / Location	Type of obstacle	Co-ordinates	HGT/ELEV in m/ft AGL	AMSL	OBST LGT Type/Colour
1		2	3	4		5
003	Amsterdam	2 chimneys	52°24'23"N 004°50'38"E	178/584	179/587	OBST/R
004a	Amsterdam	2 high tension masts joined by cables	52°22'03"N 004°59'00"E	133/436	133/436	OBST/R
004b			52°22'22"N 004°58'58"E	133/436	133/436	OBST/R
005	Amsterdam	concrete tower with an-tenna	52°20'11"N 004°53'15"E	106/348	106/348	OBST/R
006	Amsterdam	chimney	52°24'19"N 004°50'50"E	175/574	176/577	OBST/R
007	Amsterdam	building	52°20'42"N 004°55'01"E	149/489	151/495	OBST/FLGW
008	Amsterdam	chimney	52°23'09"N 004°56'07"E	102/335	104/341	-
009	Amsterdam	chimney	52°23'59"N 004°47'34"E	102/335	103/338	OBST/R
010	Amsterdam	building	52°20'16"N 004°52'27"E	105/344	105/344	OBST/R
011a, 011b, 011c	Amsterdam	moveable harbour cranes	BTN 52°25'12"N 004°46'07"E and 52°25'32"N 004°45'56"E and 52°25'28"N 004°45'36"E	125/410	127/416	OBST/R
198	Amsterdam	antenna mast	52°23'11"N 004°55'45"E	100/328	101/331	OBST/R

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"003" is not unique world-wide

"EH-003" could be unique world-wide

Computer generated from a central system - "1245-5454-5428-3665-4424-5442" could be unique world-wide (first group could be a Country identifier, following groups could be timestamps, etc.)

2.2.3 Obstacle designator (name)

AIP SLOVENIA · **ENR 5.4-1**

ENR 5.4 AIR NAVIGATION OBSTACLES - EN-ROUTE

Designation	Type of obstacle	Coordinates	ELEV/HGT GND (M)	OBST LGT Type/Colour

AIP Specimen

ENR 5.4-1
10 JUN 2004

ENR 5.4 Air navigation obstacles - en-route

1 (elevation/height 100m AGL or more)

Designation	Type of obstacle	Coordinates	ELEV/HGT GND (M)	OBST LGT Type/Colour
1	2	3	4	5
Justine	Mast	510136N 0311932W	277/163	OBST/R
Rainby	Chimney	553208N 0310225W	178/136	OBST/R
Kipol	Antenna mast	462021N 0250000W	505/454	Hazard light/ FLG W
Woodbank	Bridge tower	425015N 0364952W	170/110	Illuminated (flood light)

ANDERL				
ANLIE				
ANTWER				
ANTWER.	Chimneys (5)	51°17'01"00N 004°19'57"00E	12m/128m	NO
ANTWERPEN	Chimney	51°16'15"00N 004°19'21"00E	120m/126m	NO
ANTWERPEN	Tower with mast	51°13'07"00N 004°24'14"00E	110m/111m	YES

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2.2.4 Obstacle type

Arch	Elevator	Transmission Line	Cable Car/Railway
Tethered Balloon	Monument	Tower	Fence
Bridge	Power Plant	Tramway	Grain Elevator
Building	Pole	Windmill	Lighthouse
Catenary	Rig	Antenna	Navaid
Cooling Tower	Refinery	Tree	Nuclear Reactor
Crane	Sign	Vegetation	Water Tower
Control Tower	Spire	Natural Highpoint	Stadium
Dam	Stack	Windmill Farms	
Dome	Tank	Wall	

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2.2.5 Obstacle horizontal geometry

2.2.6 Obstacle horizontal geometry - reference system
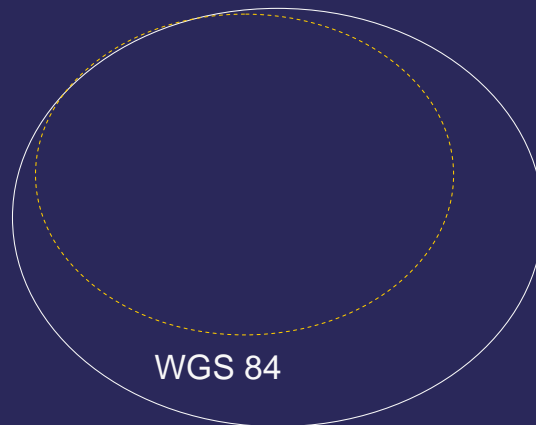
WGS 84

Although the Annex 15 requires that "published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum", the obstacle data published world-wide does not yet comply with this requirement. Therefore, for this model, it is still necessary to recognise the use of other datum.
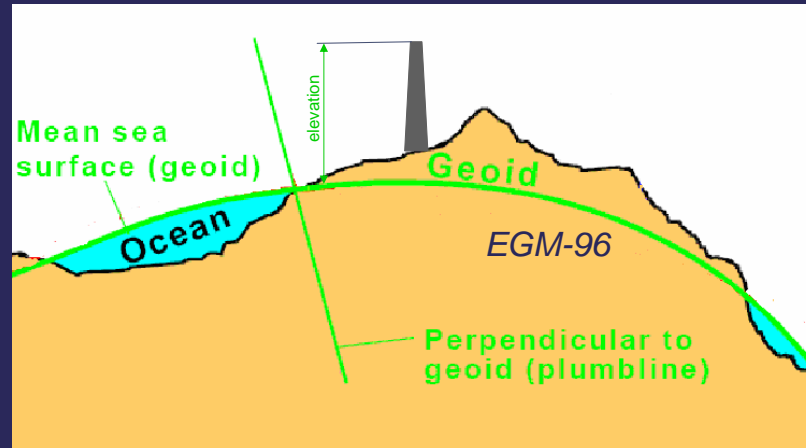
2.2.7 Obstacle horizontal geometry
- data quality

25° 14′ 40.7
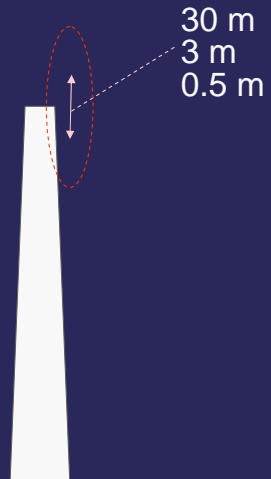44° 14′ 00.8

25.24463
44.23355

50 m
5 m
0.5 m
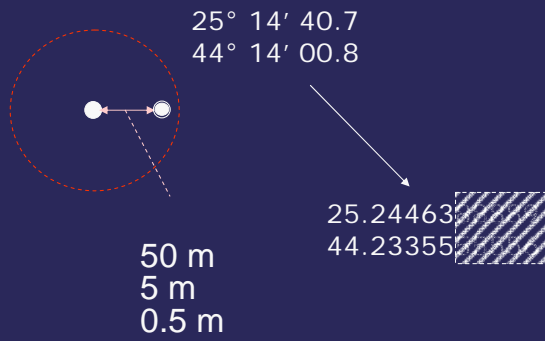
2.2.8 Obstacle elevation
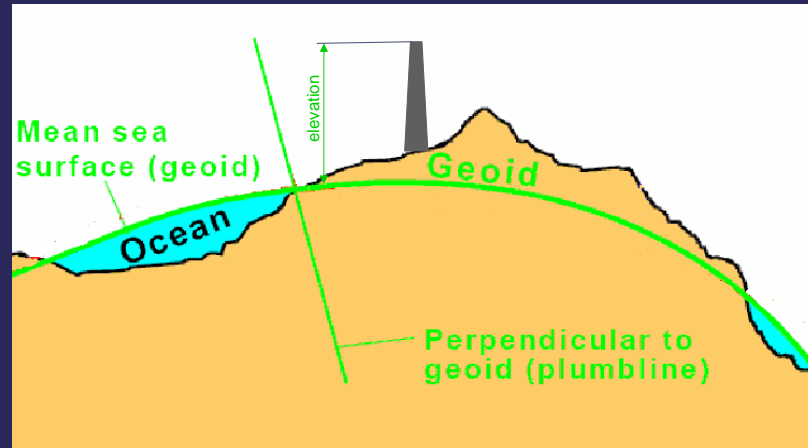
2.2.9 Obstacle elevation
- reference system

2.2.10 Obstacle height
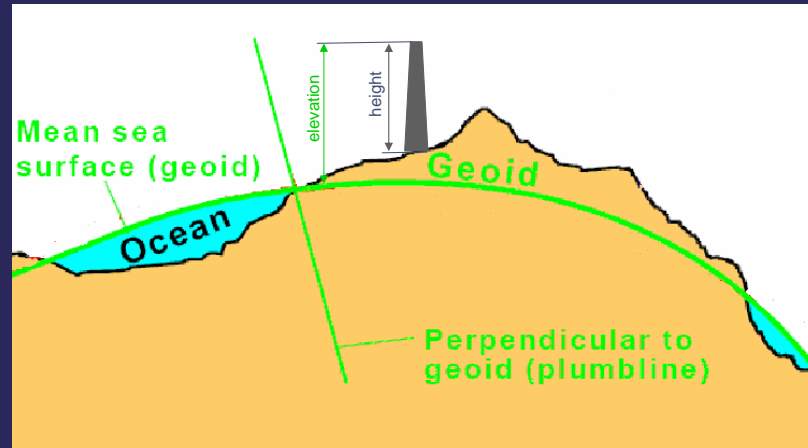
2.2.11 Obstacle vertical
- data quality

30 m
3 m
0.5 m

2.2.12 Obstacle geoid undulation
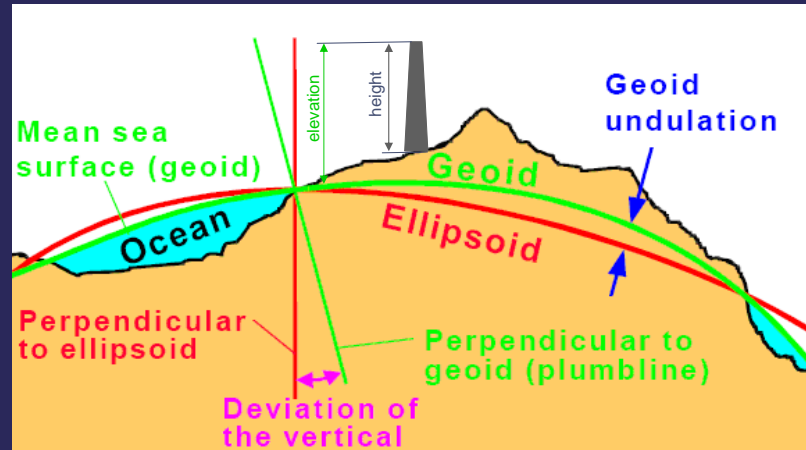
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2.2.14 Obstacle marking

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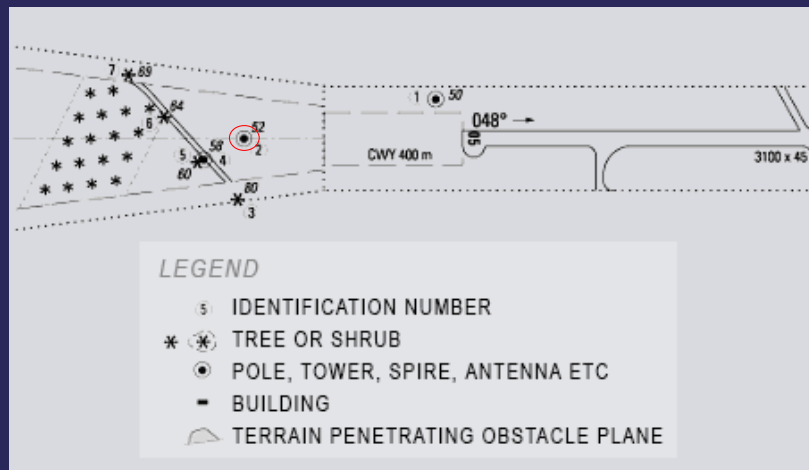
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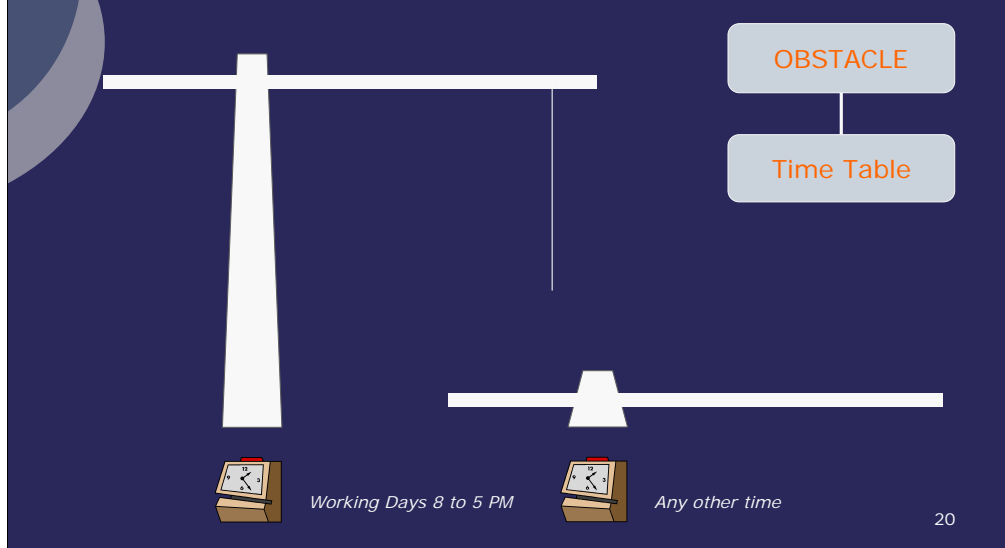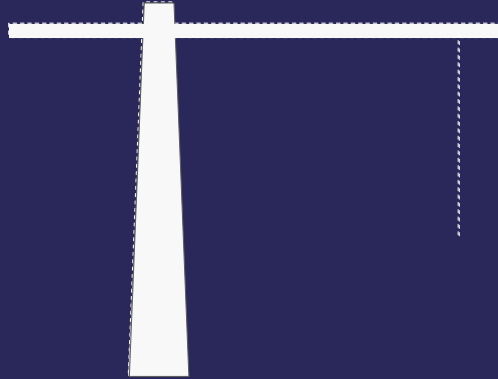
2.2.16 Controlling Obstacle

LEGEND

⑤ IDENTIFICATION NUMBER
✳ ✳ TREE OR SHRUB
⊙ POLE, TOWER, SPIRE, ANTENNA ETC
▬ BUILDING
◠ TERRAIN PENETRATING OBSTACLE PLANE

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2.2.17 Obstacle temporality

- The general temporality model of AIXM 5 shall be applied

2.2.18 Obstacle effectivity

OBSTACLE

Time Table

Working Days 8 to 5 PM   *Any other time*

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2.2.19 Obstacle status

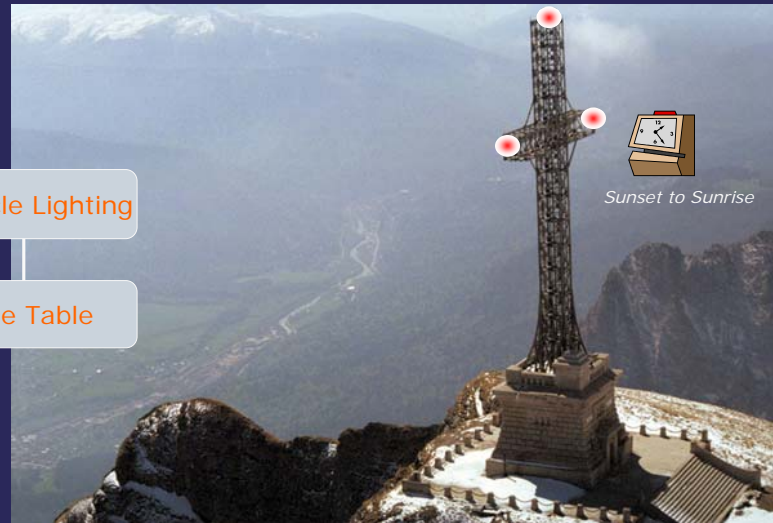# 2.2.20 Obstacle lighting status

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2.2.21 Obstacle lighting effectivity

Obstacle Lighting

Time Table

Sunset to Sunrise

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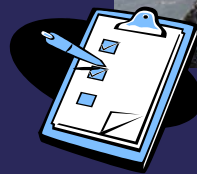
2.2.22 Obstacle data originator
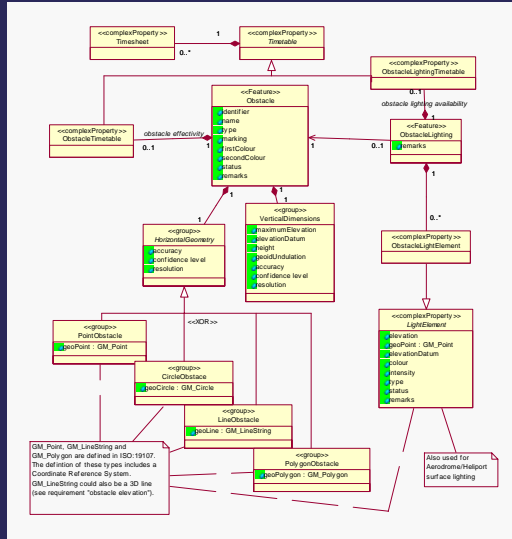
Obstacle

?

Organisation

2.23 – 2.25 Other requirements

- Area of coverage (for obstacle data set)
- Group indicator
- Obstacle association with aerodrome/runway

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Not retained as requirements

- 2.3.1 Aggregated obstacle
- 2.3.2 Annex 15 – Table A.8-4 "Elevation reference"
- 2.3.3 Data integrity as attribute of the obstacle
- 2.3.4 Moving obstacles
- 2.3.5 Obstacles with variable geometry
- 2.3.6 Obstacle operations
- 2.3.7 Obstacle associated with State/Territory

Proposed conceptual schema

Proposed conceptual schema