# GIS, AMDB & Terrain and ObstacleDatasets

NAM/CAR Data Sets Management and eCharts Workshop


# ABOUT US

# Our Mission

## AIM for Safer Skies

To enable State AIS and AIM staff to achieve their operational goals by providing Software, Services, Training and Support in the field of Aeronautical information Management.

# M-AIS ACTIVITIES

## SOFTWARE

M-AIS offer a range of effective Aeronautical Publishing and AIXM Data solutions.

## SERVICES

We provide many tailored services to our customers to ease the transition and migration to AIM.

## TRAINING

Our training specialists share their own expert knowledge and experience to ensure that each course achieves the best results.

## SUPPORT & MAINTENANCE

Customer relationships are vital to everything we do. we employ a full maintenance and support team to manage customer enquiries.

# OUR WORK WITH AERONAUTICAL DATA

## EAD

Data Integration for FrameAPS, AIP / eAIP / and DITA for more than 12 releases and 4 AIXM Data model changes

## UK NATS

AIXM 4.5 and AIXM 5.1 Suite creating, managing and publishing datasets for all UK data from 2005 until 2019.

## THALES France

Development of joint AIXM technology from 2005 until 2011. Multiple countries using the software, successful joint IPR venture.

## Global Customer Base

AIXM 4.5 and AIXM 5.1 eAIP customers for Software, Services training and support. Currently undergoing intensive AIP table data review for AIXM usage with Central European Client.

# Worldwide Projects

**Global Implementations and Training for AIXM**

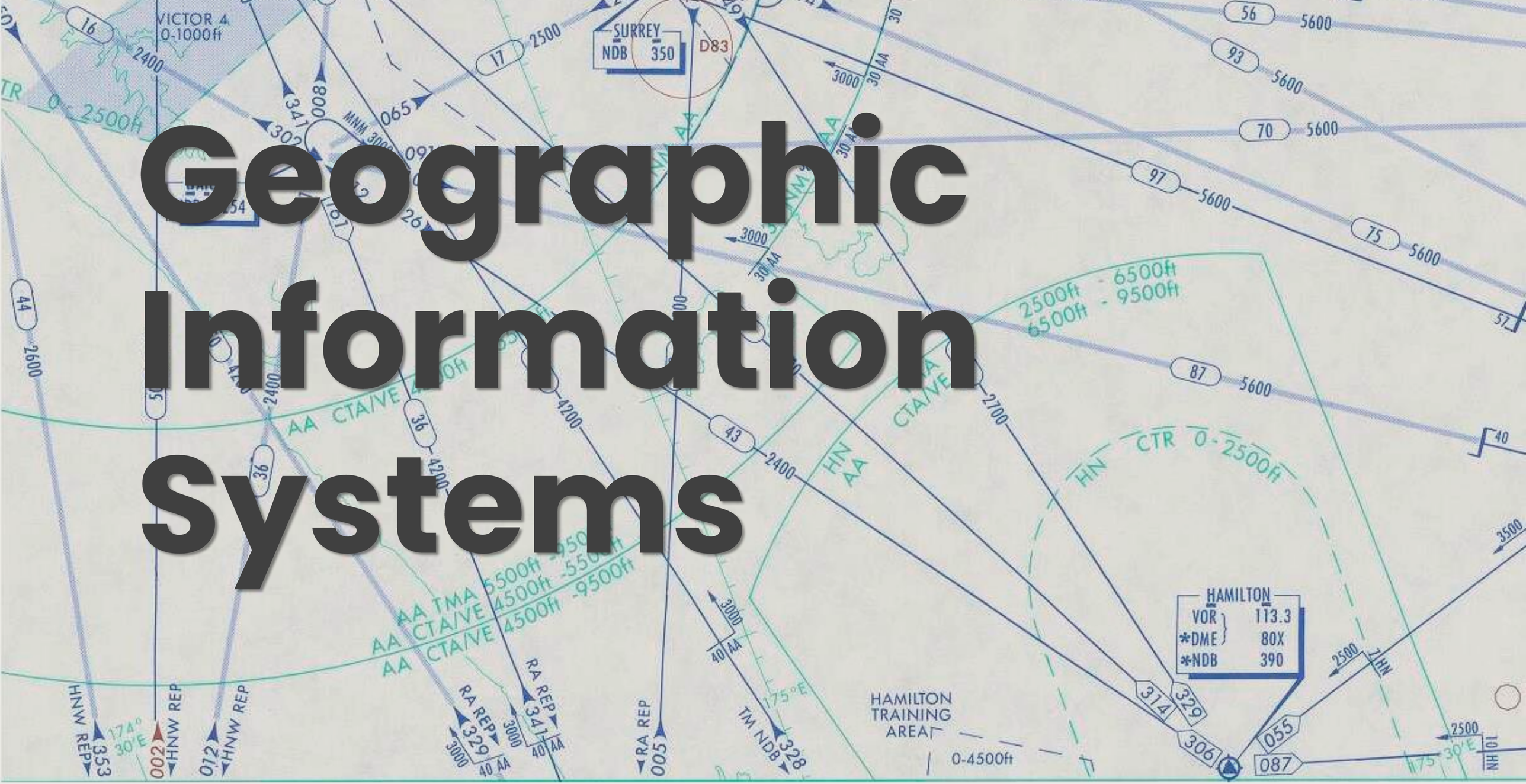
- M-AIS provid AIXM 5.1, Dataset and PANS-AIM training and consultancy to a worldwide clientele.
    - **Software** – AIXM Data Management Suite and FrameAPS
    - **Services** – eAIP and AIXM Data Migration
    - **Training** - AIM, AIXM, Cartography, eAIP and PBN Data Coding and Visualisation training.
    - **Support and Maintenance** - Multiple AIXM and eAIP support contracts

# Your Presenter:

## Antonio Locandro

- Instrument Flight Procedure Design Expert
- Aeronautical Information Expert
  - +16 Year Industry Experience
  - Aeronautical Charting & GIS Expert
  - AIM and IFP Training Expert
  - Participant of ICAO AIXM CCB and Advisor to IFAIMA for ICAO AIM WG-A
  - Participated as expert for ICAO Technical Cooperation Bureau for Obstacle Assessment for Airport Master Plan

# Geographic Information Systems



# What is a GIS?

A geographic information system (GIS) is modernly defined as a framework where you store, edit, manage and visualize in a computer system geospatial information you capture through different methods and that provides the ability to analyze that data through different operations.

GIS can show many kinds of data on one map, such as streets, buildings, and vegetation.

# Introduction to GIS

The data has coordinates that describe its location

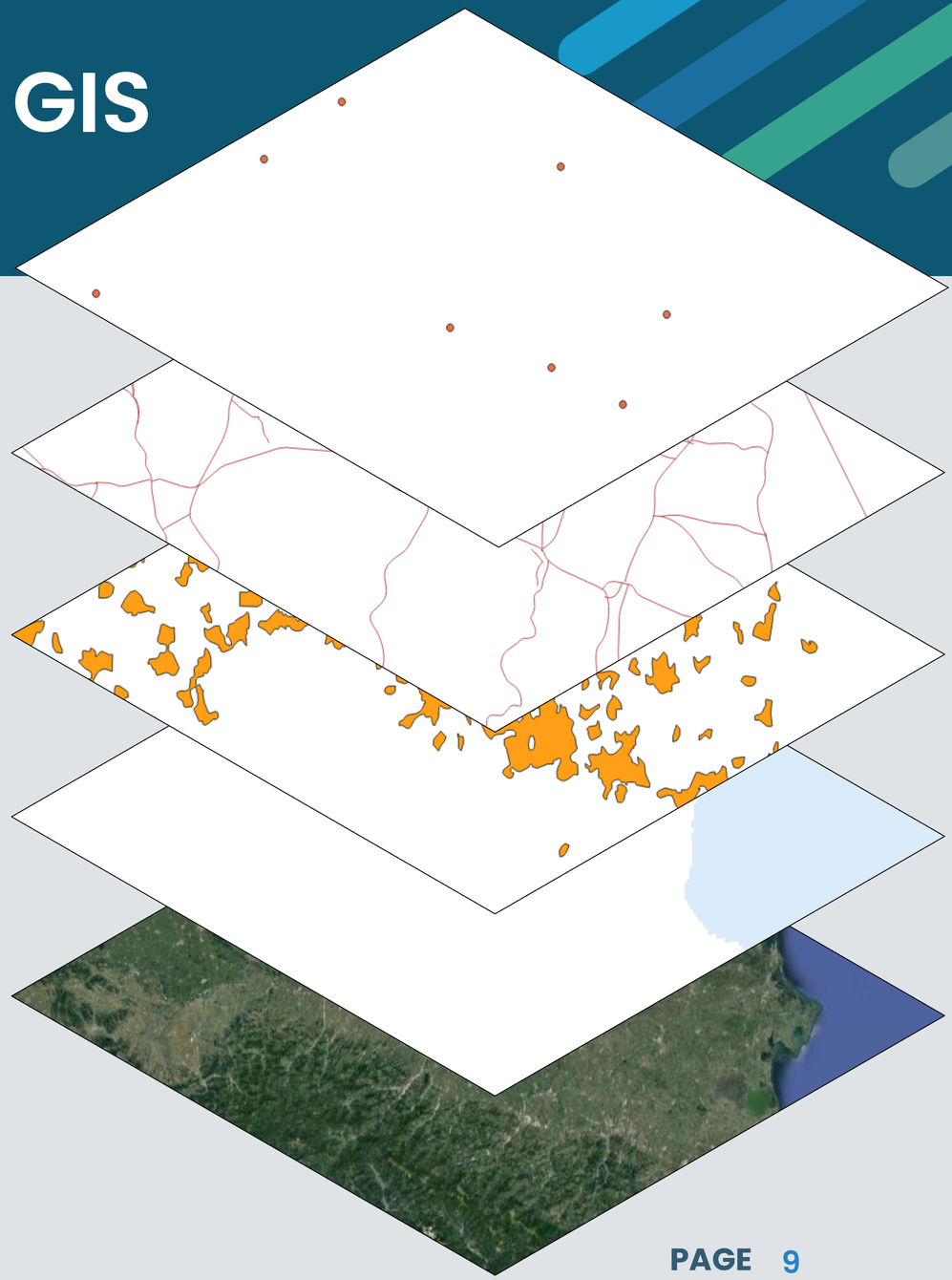
You can perform different operations on the separate layers or in combination with other layers which contain different set of features

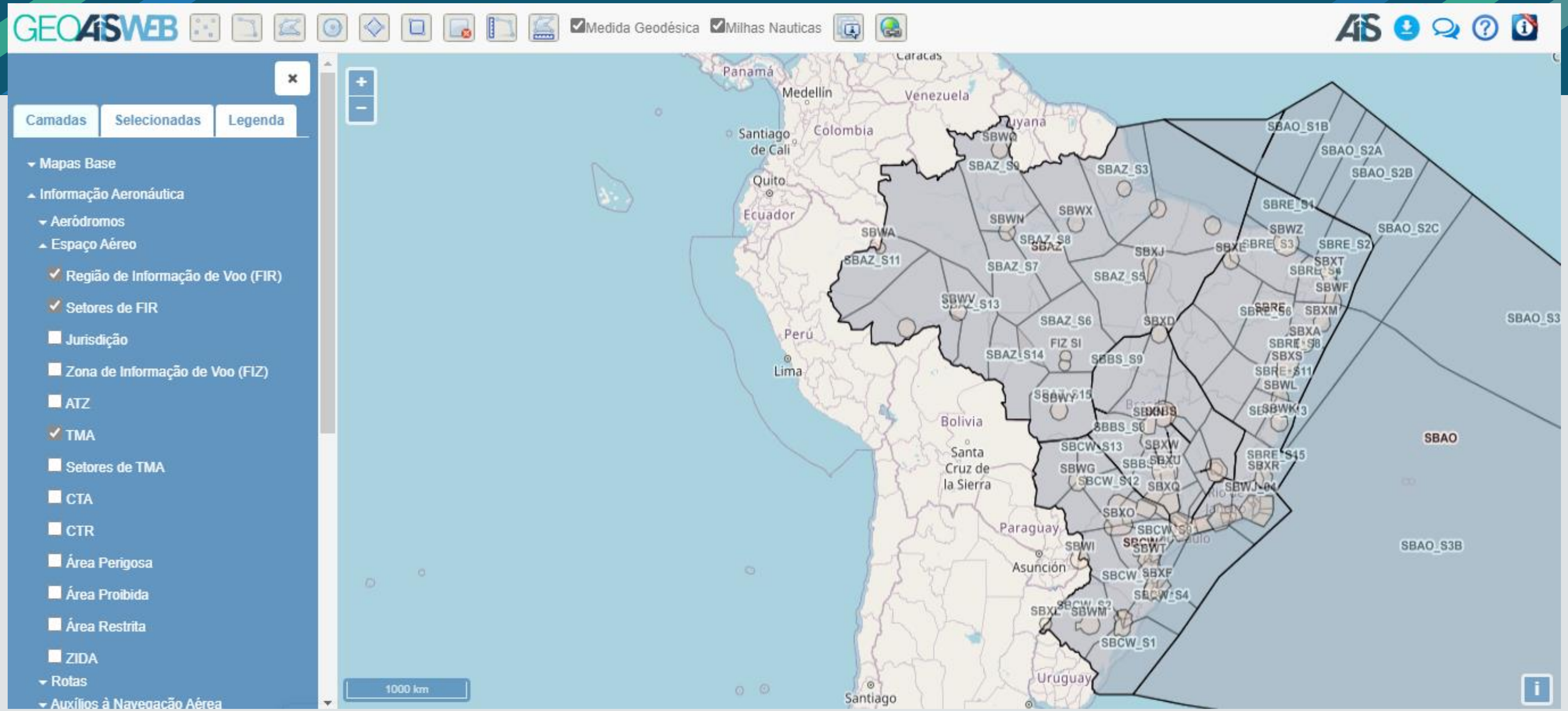
For instance:

Routes (airways) intersections will show you where fixes or navaids may be located

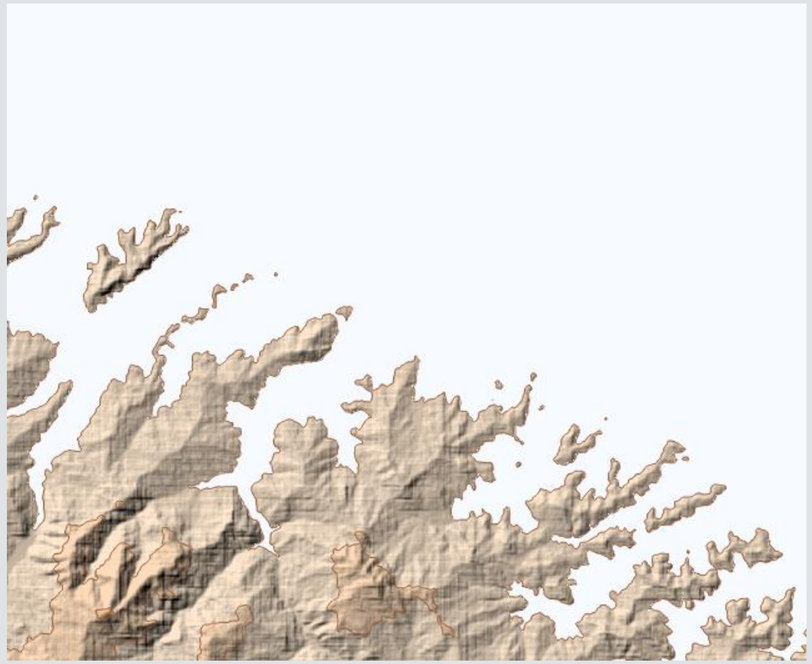
An obstacle may or may not be within an Obstacle Limitation Surface

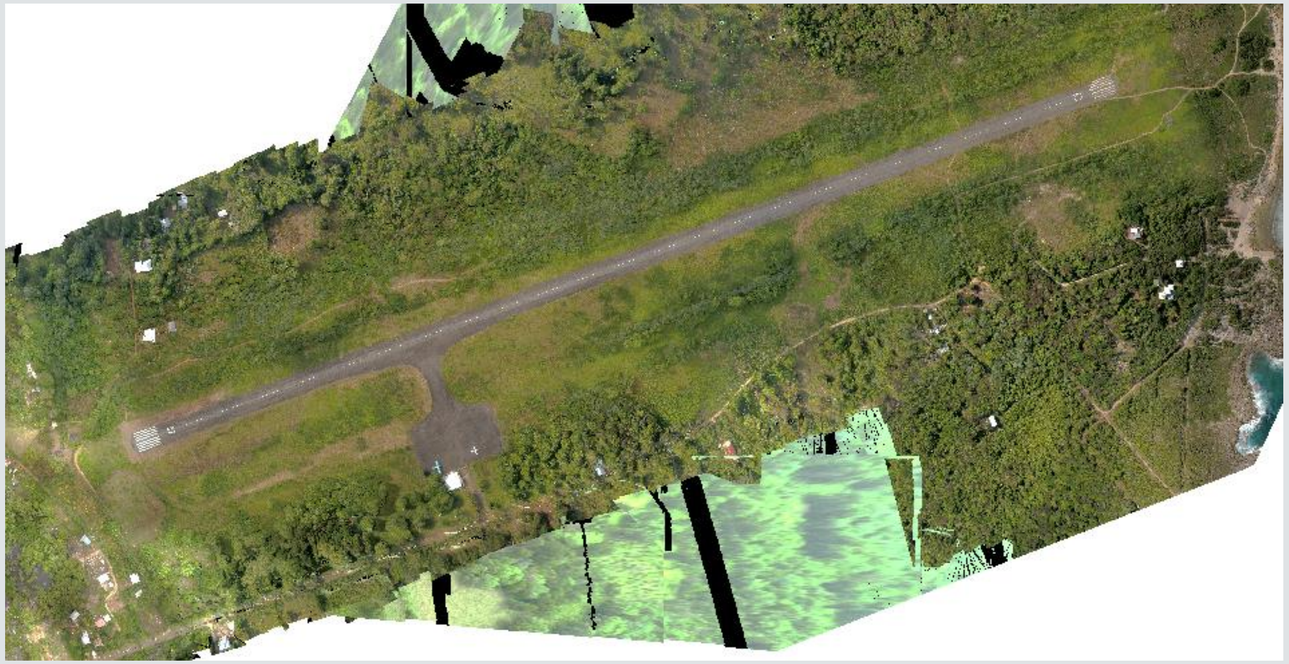
A route may be to close to a military airspace



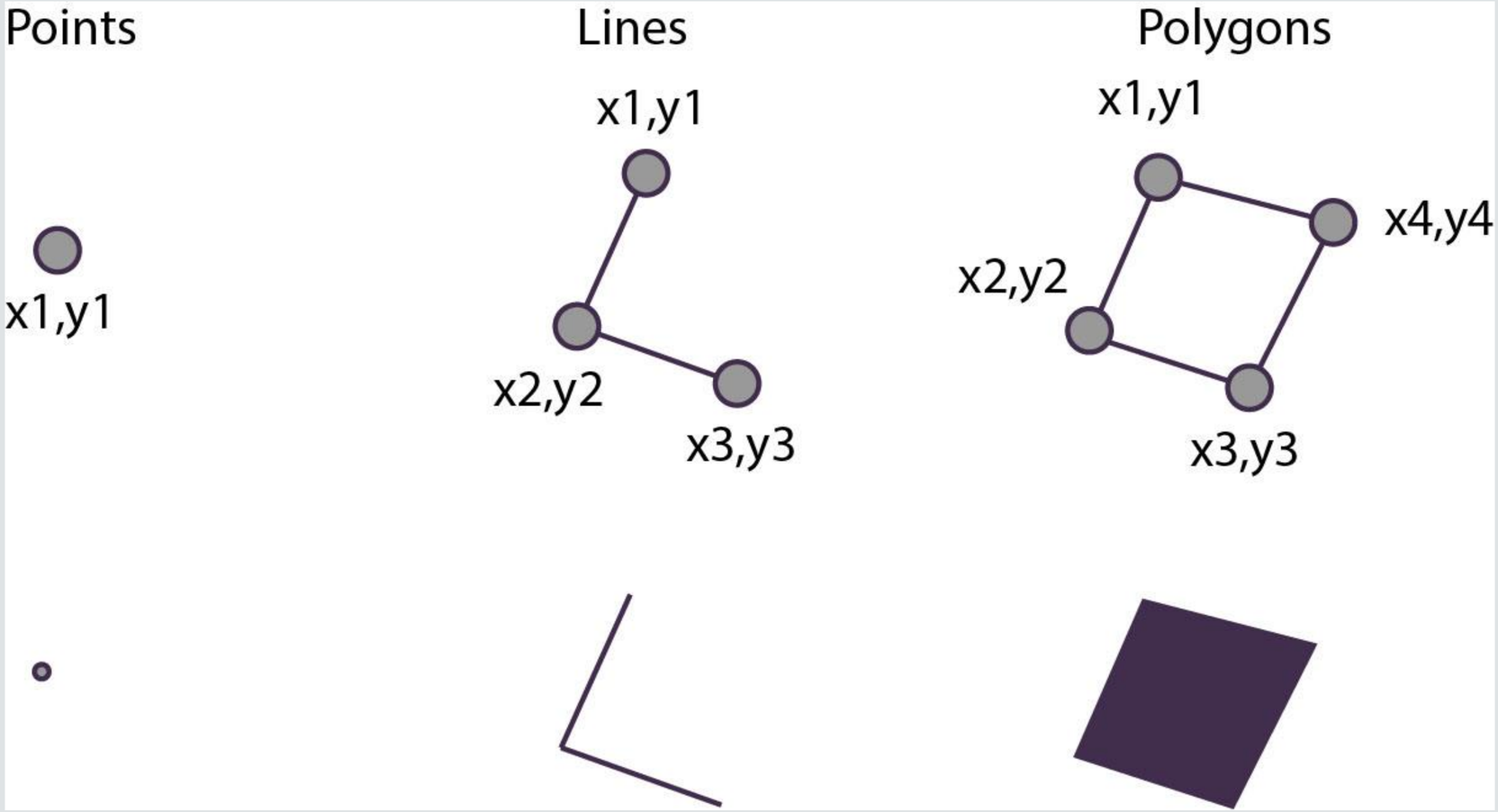

GEOAISWEB
Medida Geodésica
Milhas Nauticas
Camadas
Selecionadas
Legenda
Mapas Base
Informação Aeronáutica
Aeródromos
Espaço Aéreo
Região de Informação de Voo (FIR)
Setores de FIR
Jurisdição
Zona de Informação de Voo (FIZ)
ATZ
TMA
Setores de TMA
CTA
CTR
Área Perigosa
Área Proibida
Área Restrita
ZIDA
Rotas
Auxílios à Navegação Aérea
Panamá
Medellin
Venezuela
Santiago de Cali
Colombia
Quito
Ecuador
Perú
Lima
Bolivia
Santa Cruz de la Sierra
Paraguay
Asunción
Uruguay
Santiago
1000 km
SBAO
SBAO_S1B
SBAO_S2A
SBAO_S2B
SBAO_S2C
SBAO_S3
SBAO_S3B
SBAZ_S3
SBAZ_S5
SBAZ_S6
SBAZ_S7
SBAZ_S8
SBAZ_S9
SBAZ_S11
SBAZ_S13
SBAZ_S14
SBRE_S1
SBRE_S2
SBRE_S3
SBRE_S6
SBRE_S11
SBWL
SBWF
SBXM
SBXA
SBXS
SBXT
SBXD
SBXJ
SBWX
SBWZ
SBWN
SBWA
SBWV
SBWY
SBBS_S9
SBCW_S13
SBCW_S12
SBCW_S1
SBCW_S4
SBXF
SBXW
SBXU
SBXQ
SBXO
SBWG
SBWI
SBWT
SBWM
SBXL
SBRE_S15
SBXR

# Raster data



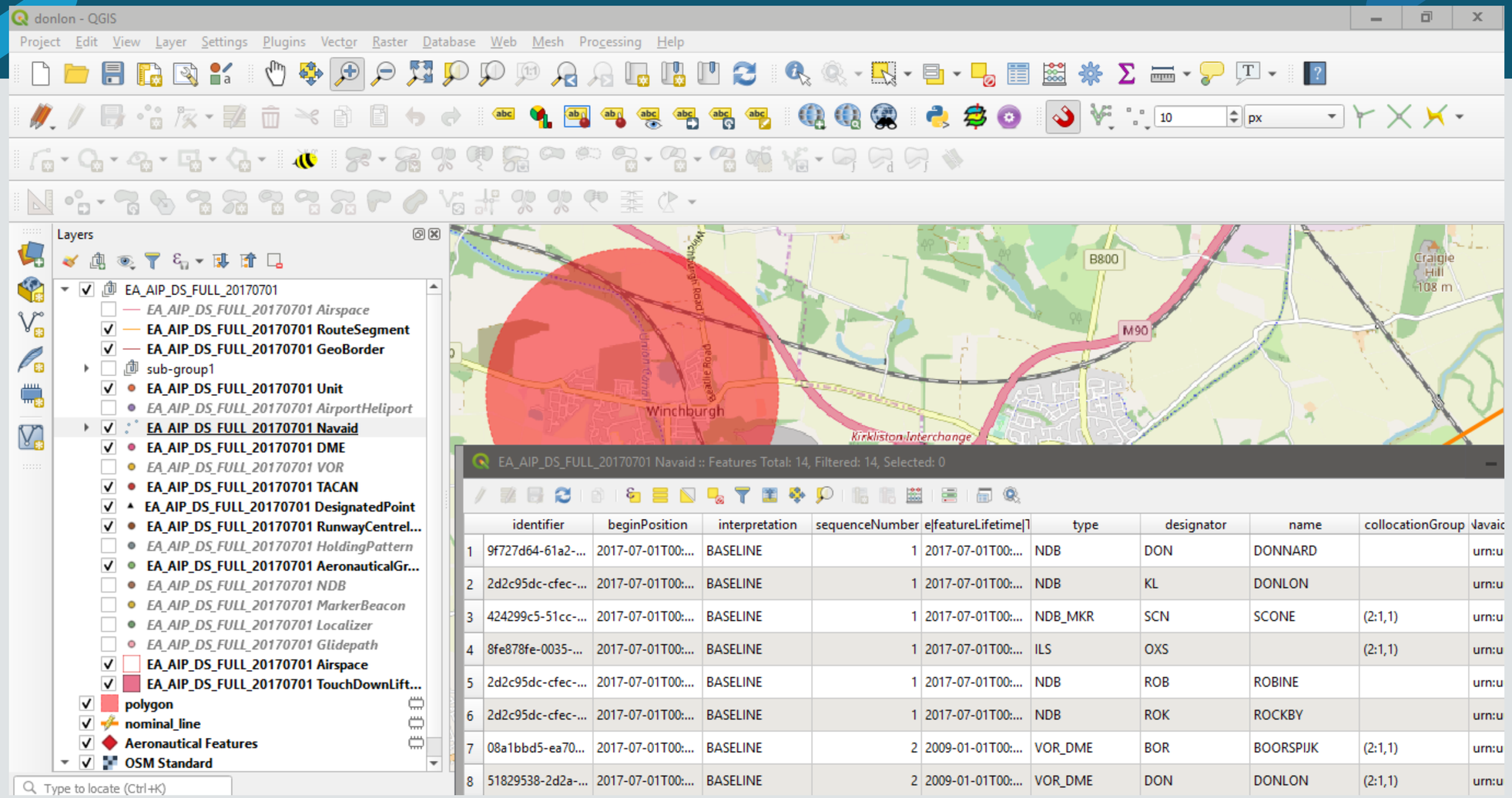


# Vector Data


Points
x1,y1
Lines
x1,y1
x2,y2
x3,y3
Polygons
x1,y1
x4,y4
x2,y2
x3,y3

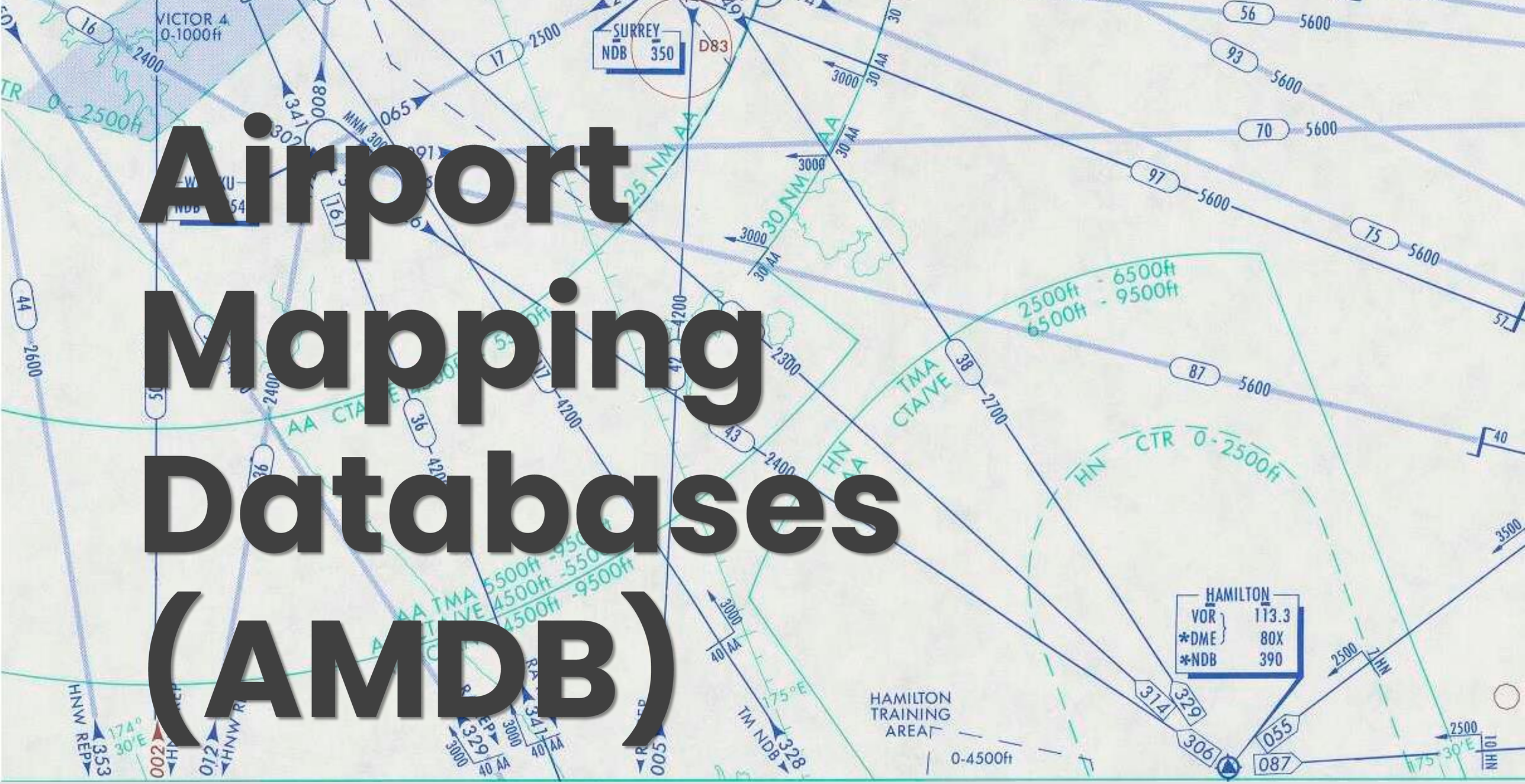
# Attribute Data

| Text or String | Airport |
|---|---|
| Integers | 19000 |
| Decimals | 119.8 |
| Dates | 2020-08-18 |
| Boolean | 1 |
| Binary |  |




| | identifier | beginPosition | interpretation | sequenceNumber | e\|featureLifetime\|1 | type | designator | name | collocationGroup | Navaic |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 9f727d64-61a2-... | 2017-07-01T00:... | BASELINE | 1 | 2017-07-01T00:... | NDB | DON | DONNARD | | urn:u |
| 2 | 2d2c95dc-cfec-... | 2017-07-01T00:... | BASELINE | 1 | 2017-07-01T00:... | NDB | KL | DONLON | | urn:u |
| 3 | 424299c5-51cc-... | 2017-07-01T00:... | BASELINE | 1 | 2017-07-01T00:... | NDB_MKR | SCN | SCONE | (2:1,1) | urn:u |
| 4 | 8fe878fe-0035-... | 2017-07-01T00:... | BASELINE | 1 | 2017-07-01T00:... | ILS | OXS | | (2:1,1) | urn:u |
| 5 | 2d2c95dc-cfec-... | 2017-07-01T00:... | BASELINE | 1 | 2017-07-01T00:... | NDB | ROB | ROBINE | | urn:u |
| 6 | 2d2c95dc-cfec-... | 2017-07-01T00:... | BASELINE | 1 | 2017-07-01T00:... | NDB | ROK | ROCKBY | | urn:u |
| 7 | 08a1bbd5-ea70... | 2017-07-01T00:... | BASELINE | 2 | 2009-01-01T00:... | VOR_DME | BOR | BOORSPIJK | (2:1,1) | urn:u |
| 8 | 51829538-2d2a-... | 2017-07-01T00:... | BASELINE | 2 | 2009-01-01T00:... | VOR_DME | DON | DONLON | (2:1,1) | urn:u |

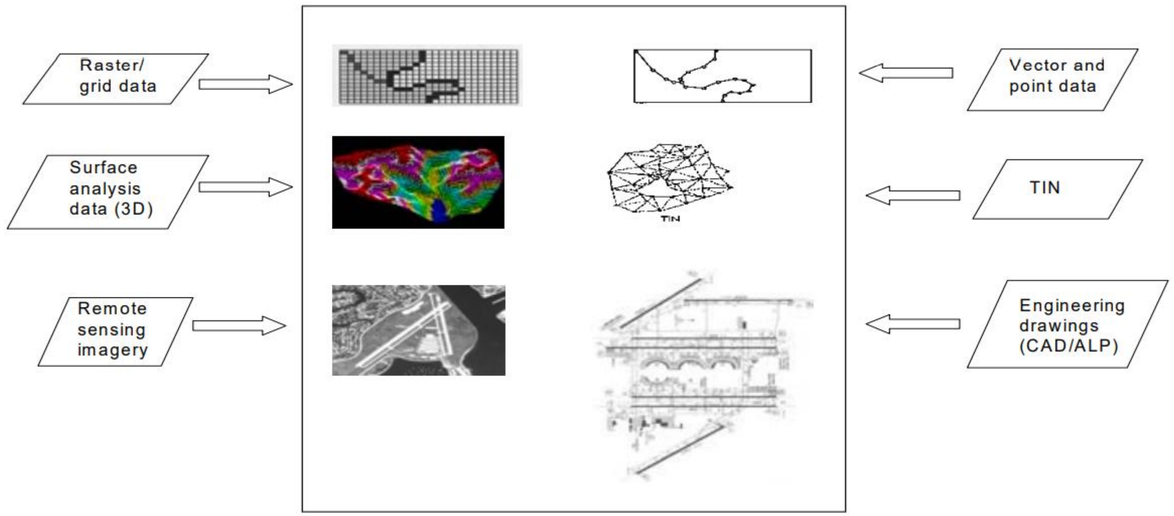
# Airport Mapping Databases (AMDB)

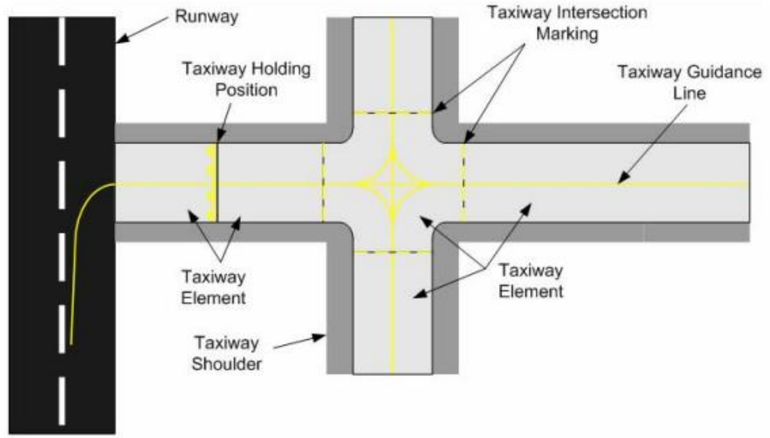


# Background

## Aerodrome mapping database (AMDB)

A collection of aerodrome mapping data organized and arranged as a structured data set.



# Background

An AMDB is a Geographic Information System (GIS) database of an airport describing:

- the spatial layout of an airport
- the geometry of features (e.g. runways, taxiways, buildings) described as points, lines and polygons
- further information characterising the features and their functions which are stored as attributes (e.g. surface type, name/object identifier, runway slope).

AMDB are used in a wide variety of applications but mostly in on-board applications such as Electronic Flight Bags (EFBs). These applications are intended primarily to improve the user's situational awareness and/or to supplement surface navigation, thereby increasing safety margins and operational efficiency.

Multiple user groups, such as pilots, controllers, aerodrome managers, aerodrome emergency/security personnel etc, can benefit from using AMDBs.

# PANS AIM DOC 10066

Aerodrome mapping data includes aerodrome geographic information that supports applications which improve the user's situational awareness or supplements surface navigation, thereby increasing safety margins and operational efficiency.

Aerodrome mapping data sets with appropriate data element accuracy support requirements for collaborative decision making, common situational awareness and aerodrome guidance applications are intended to be used, among others, in the following air navigation applications:

a) position and route awareness including moving maps with own ship position, surface guidance and navigation (e.g. A-SMGCS);

b) traffic awareness including surveillance and runway incursion detection and alerting;

c) facilitation of aerodrome-related aeronautical information, including NOTAM;

d) resource and aerodrome facility management; and

e) aeronautical chart production

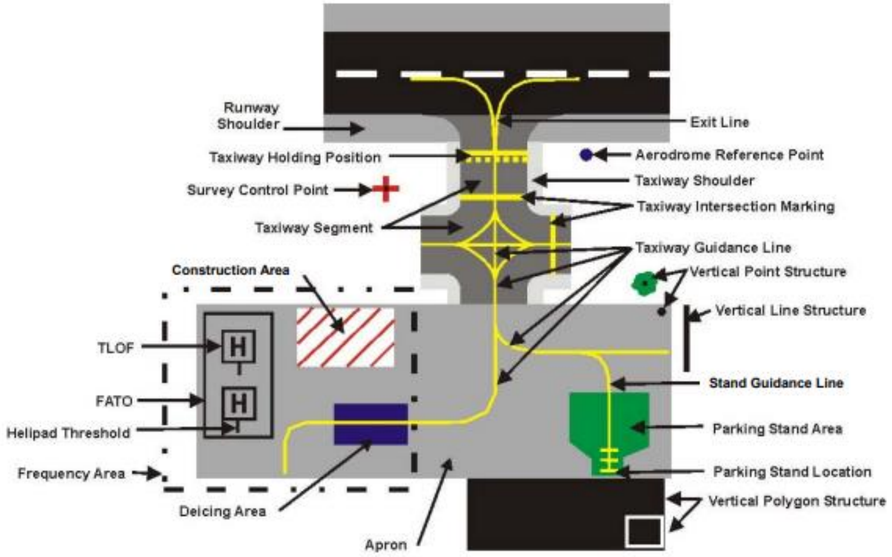
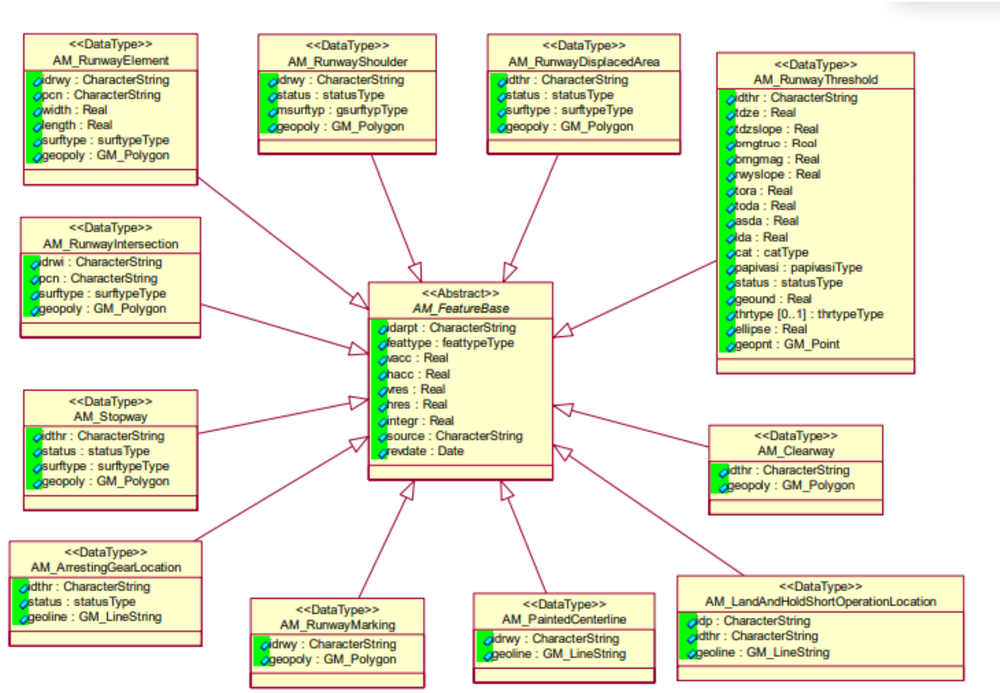
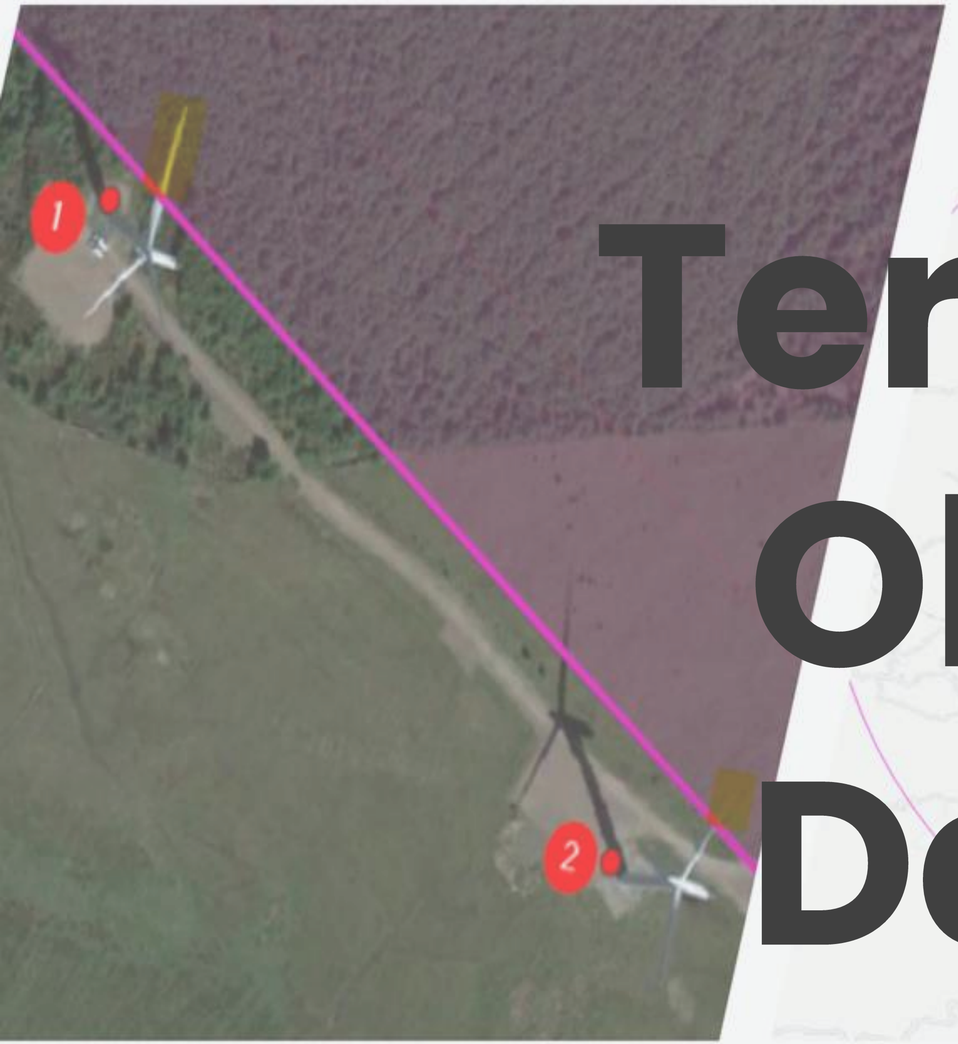



**Figure 4-22. Aerodrome features**

| Item Name | Definition | Obligation/ Condition | Multi. | Data Type | Domain |
|---|---|---|---|---|---|
| Title | title of data product | M | 1 | Character String | Free text |
| alternateTitle | other name by which the data product is known | O | N | Character String | Free text |
| Abstract | brief narrative summary of the content of the data product | M | 1 | Character String | Free text |
| Purpose | summary of the intentions with which the data product is developed | O | 1 | Character String | Free text |
| TopicCategory | main theme(s) of the data set | M | N | Class | MD_TopicCategoryCode <<CodeList>> |
| spatialRepresentationType | form of spatial representation | O | N | Class | MD_Spatial RepresentationTypeCode |
| spatialResolution | factor which provides a general understanding of the density of spatial data in the data set | O | N | Class | MD_Resolution <<Union>> |
| geographicDescription | description of the geographic area within which data is available | M | N | Class | EX_GeographicDescription |
| supplementalInformation | any other descriptive information about the data set | O | 1 | Character String | Free text |



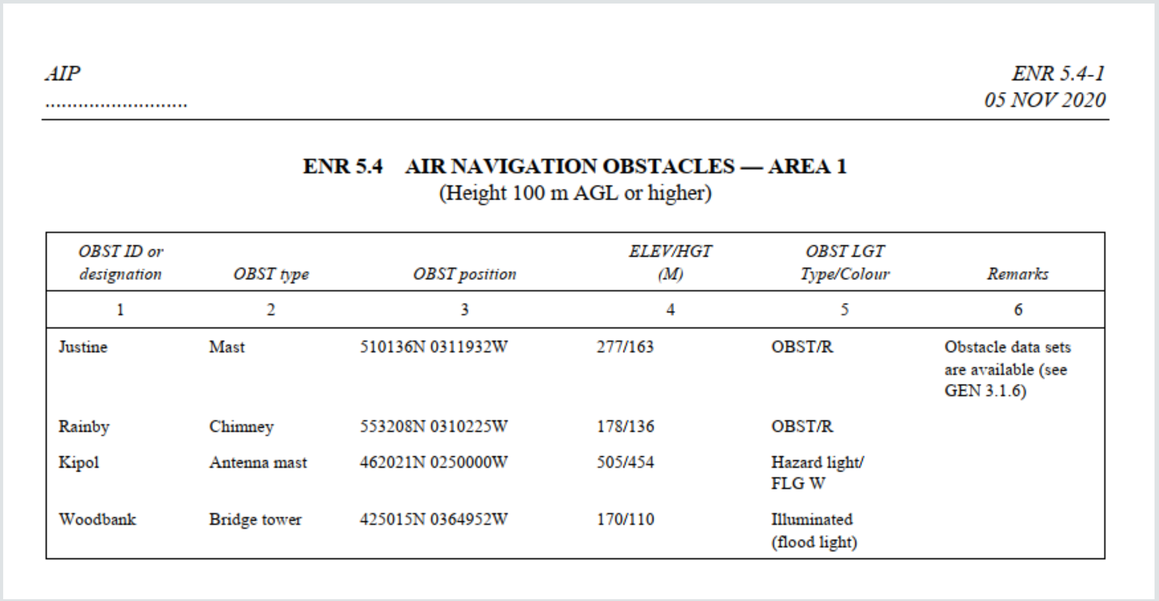



# Terrain and Obstacle Datasets

# Background

Obstacle data has been published in the AIP traditionally to fulfill ICAO requirements by providing this data in tables within it

- ENR 5.4



*AIP* .....

*ENR 5.4-1*
*05 NOV 2020*

**ENR 5.4 AIR NAVIGATION OBSTACLES — AREA 1**
(Height 100 m AGL or higher)

| *OBST ID or designation* | *OBST type* | *OBST position* | *ELEV/HGT (M)* | *OBST LGT Type/Colour* | *Remarks* |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Justine | Mast | 510136N 0311932W | 277/163 | OBST/R | Obstacle data sets are available (see GEN 3.1.6) |
| 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) | |

# Background

Obstacle data has been published in the AIP traditionally to fulfill ICAO requirements by providing this data in tables within it

➘ ENR 5.4

➘ AD 2.10:  Area 2 /Area 3



**ENR 5.4 AIR NAVIGATION OBSTACLES — AREA 1**
(Height 100 m AGL or higher)

| *OBST ID or designation* | *OBST type* | *OBST position* | *ELEV/HGT (M)* | *OBST LGT Type/Colour* | *Remarks* |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Justine | Mast | 510136N 0311932W | 277/163 | OBST/R | Obstacle data sets are available (see GEN 3.1.6) |
| 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) | |



**EADD AD 2.10 AERODROME OBSTACLES**

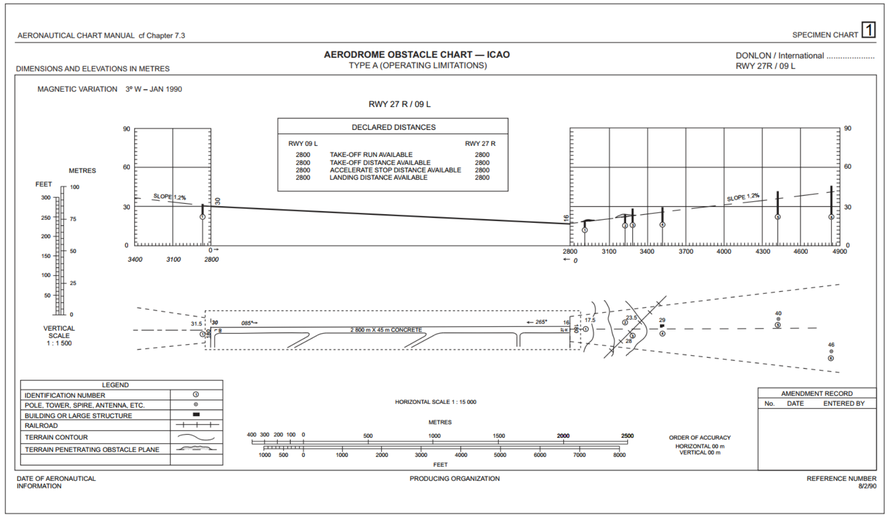
| *In Area 2* | | | | | |
|---|---|---|---|---|---|
| *OBST ID/ Designation* | *OBST type* | *OBST position* | *ELEV/HGT* | *Markings/ Type, colour* | *Remarks* |
| a | b | c | d | e | f |
| EADDOB001 | Antenna | 522142.17N 0320215.24W | 93/60 M | MARKED/FLS W | Obstacle data sets are available (see GEN 3.1.6) |
| EADDOB002 | Power line | 522151.82N 0315845.12W | 65/15 M | MARKED | |
| EADDOB003 | Tower | 522203.36N 0315457.22W | 40/12 M | LGTD | |
| EADDOB004 | Mobile OBST | 522243.85N 0315455.58W | 28/3 M | NIL | |

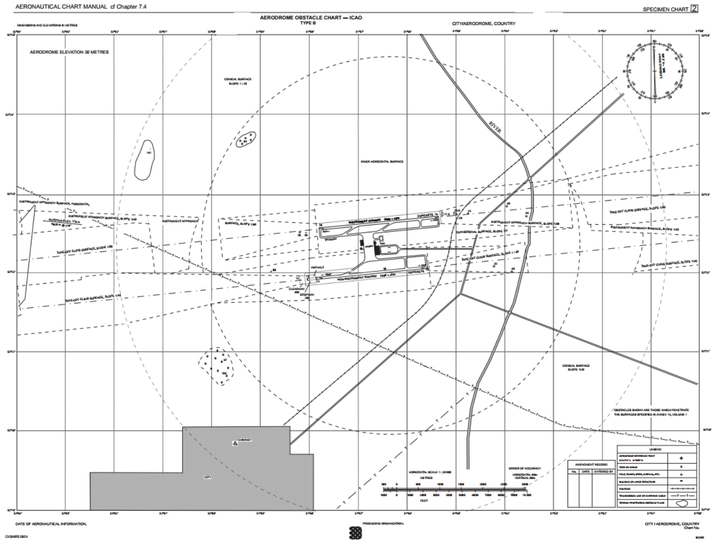
| *In Area 3* | | | | | |
|---|---|---|---|---|---|
| *OBST ID/ Designation* | *OBST type* | *OBST position* | *ELEV/HGT* | *Markings/ Type, colour* | *Remarks* |
| a | b | c | d | e | f |
| EADDOB005 | Terminal building | 522124.86N 0315452.18W | 31.5/15 M | MARKED/HI R | Obstacle data sets are available (see GEN 3.1.6) |
| EADDOB006 | Hangar | 522115.34N 0315532.17W | 55/20 M | LGTD | |
| EADDOB007 | Antenna | 522138.15N 0315425.48W | 37/4 M | LGTD | |

# Background

Terrain data has been provided in a more limited way using one of the following aeronautical charts

➘ Aerodrome Obstacle Charts Type A and B



# AERODROME OBSTACLE CHART — ICAO
TYPE A (OPERATING LIMITATIONS)

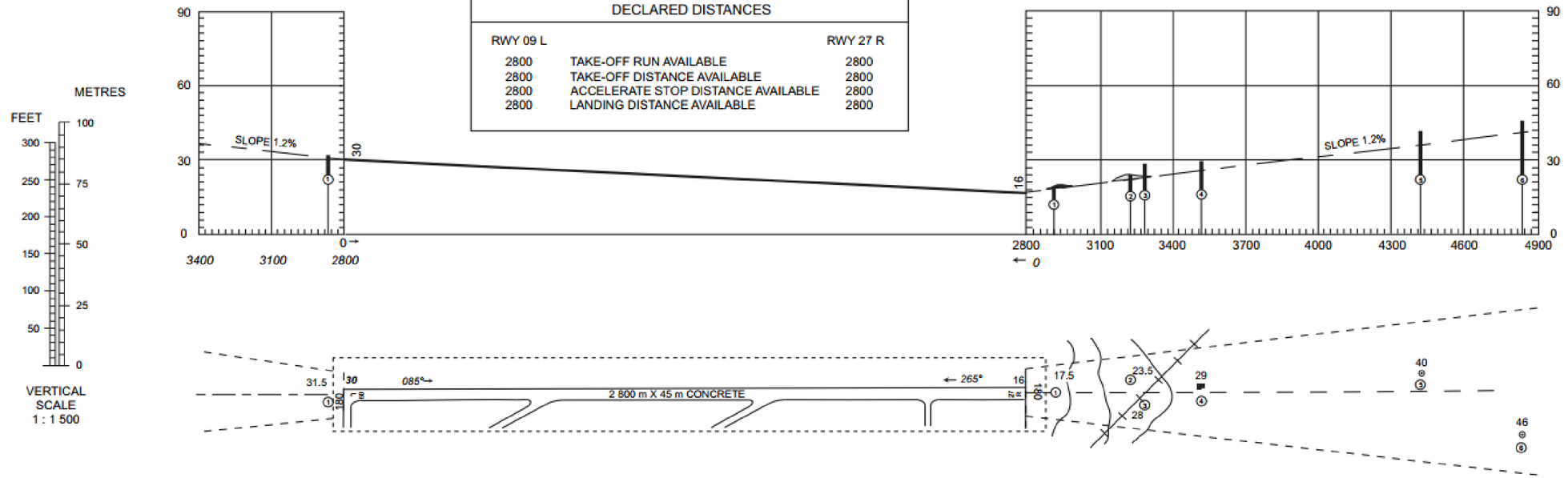
DIMENSIONS AND ELEVATIONS IN METRES

DONLON / International .....
RWY 27R / 09 L

MAGNETIC VARIATION 3° W – JAN 1990

RWY 27 R / 09 L

| DECLARED DISTANCES | | |
|---|---|---|
| RWY 09 L | | RWY 27 R |
| 2800 | TAKE-OFF RUN AVAILABLE | 2800 |
| 2800 | TAKE-OFF DISTANCE AVAILABLE | 2800 |
| 2800 | ACCELERATE STOP DISTANCE AVAILABLE | 2800 |
| 2800 | LANDING DISTANCE AVAILABLE | 2800 |




| LEGEND | |
|---|---|
| IDENTIFICATION NUMBER | ① |
| POLE, TOWER, SPIRE, ANTENNA, ETC. | ⊙ |
| BUILDING OR LARGE STRUCTURE | ■ |
| RAILROAD | |
| TERRAIN CONTOUR | |
| TERRAIN PENETRATING OBSTACLE PLANE | |
| | |

HORIZONTAL SCALE 1 : 15 000

METRES
400 300 200 100 0 500 1000 1500 2000 2500

FEET
1000 500 0 1000 2000 3000 4000 5000 6000 7000 8000

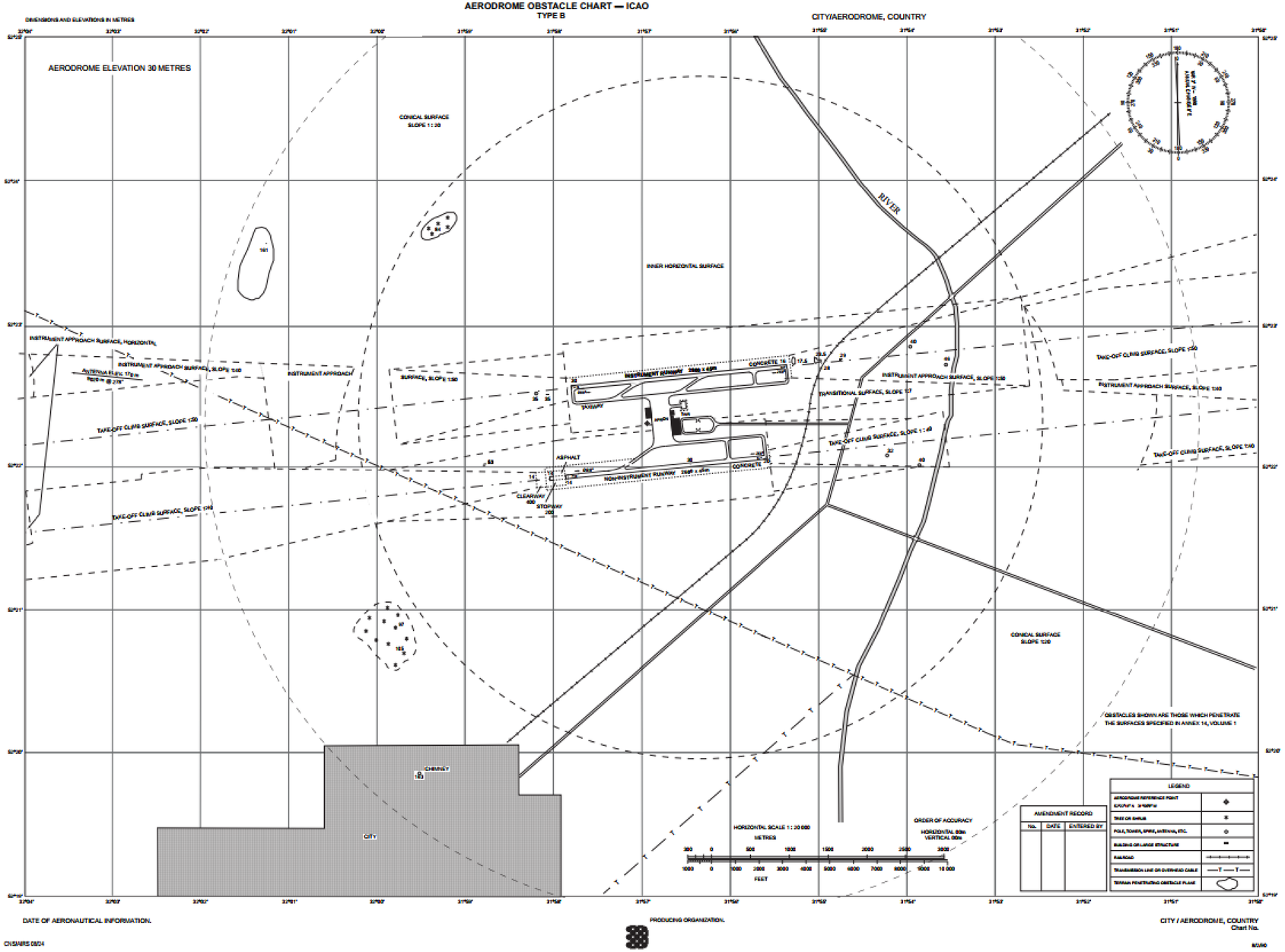
ORDER OF ACCURACY
HORIZONTAL 00 m
VERTICAL 00 m

| AMENDMENT RECORD | | |
|---|---|---|
| No. | DATE | ENTERED BY |
| | | |

DATE OF AERONAUTICAL INFORMATION

PRODUCING ORGANIZATION

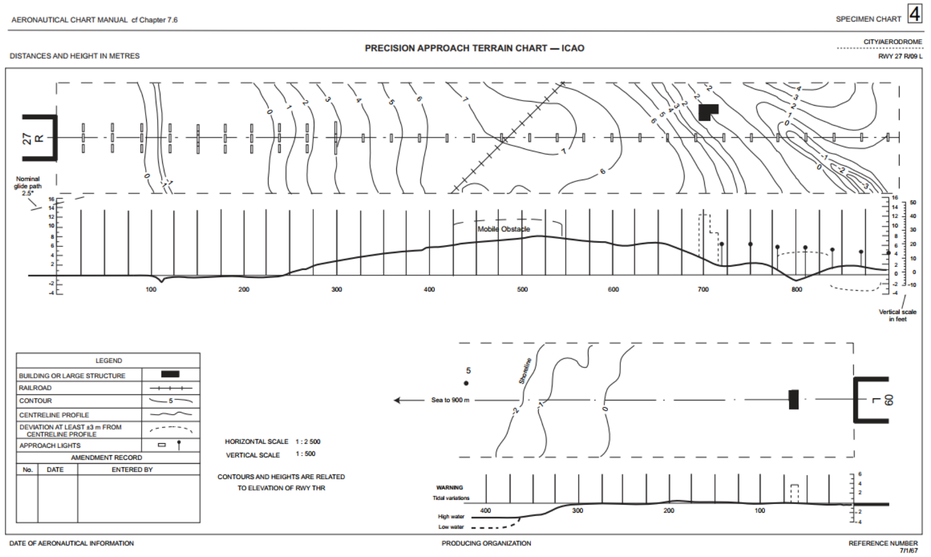
REFERENCE NUMBER
8/2/90


AERODROME OBSTACLE CHART — ICAO
TYPE B
CITY/AERODROME, COUNTRY
DIMENSIONS AND ELEVATIONS IN METRES
AERODROME ELEVATION 30 METRES
CONICAL SURFACE SLOPE 1:20
INNER HORIZONTAL SURFACE
RIVER
INSTRUMENT APPROACH SURFACE, HORIZONTAL
INSTRUMENT APPROACH SURFACE, SLOPE 1:50
INSTRUMENT APPROACH
SURFACE, SLOPE 1:50
TAKE-OFF CLIMB SURFACE, SLOPE 1:50
TAKE-OFF CLIMB SURFACE, SLOPE 1:40
TRANSITIONAL SURFACE, SLOPE 1:7
INSTRUMENT APPROACH SURFACE, SLOPE 1:30
TAKE-OFF CLIMB SURFACE, SLOPE 1:40
Instrument Approach Surface, Slope 1:50
TAKE-OFF CLIMB SURFACE, SLOPE 1:40
CONCRETE
ASPHALT
NON-INSTRUMENT RUNWAY
CLEARWAY 60m
STOPWAY 60m
CONICAL SURFACE SLOPE 1:20
OBSTACLES SHOWN ARE THOSE WHICH PENETRATE THE SURFACES SPECIFIED IN ANNEX 14, VOLUME 1
CHIMNEY
CITY
HORIZONTAL SCALE 1 : 20 000
METRES
FEET
ORDER OF ACCURACY
HORIZONTAL 20m
VERTICAL 50m
AMENDMENT RECORD
No.
DATE
ENTERED BY
LEGEND
DATE OF AERONAUTICAL INFORMATION
PRODUCING ORGANIZATION
CITY / AERODROME, COUNTRY
Chart No.

# Background

Terrain data has been provided in a more limited way using one of the following aeronautical charts

- ↘ Aerodrome Obstacle Charts Type A and B
- ↘ Precision Approach Terrain Charts for ILS CAT II/III

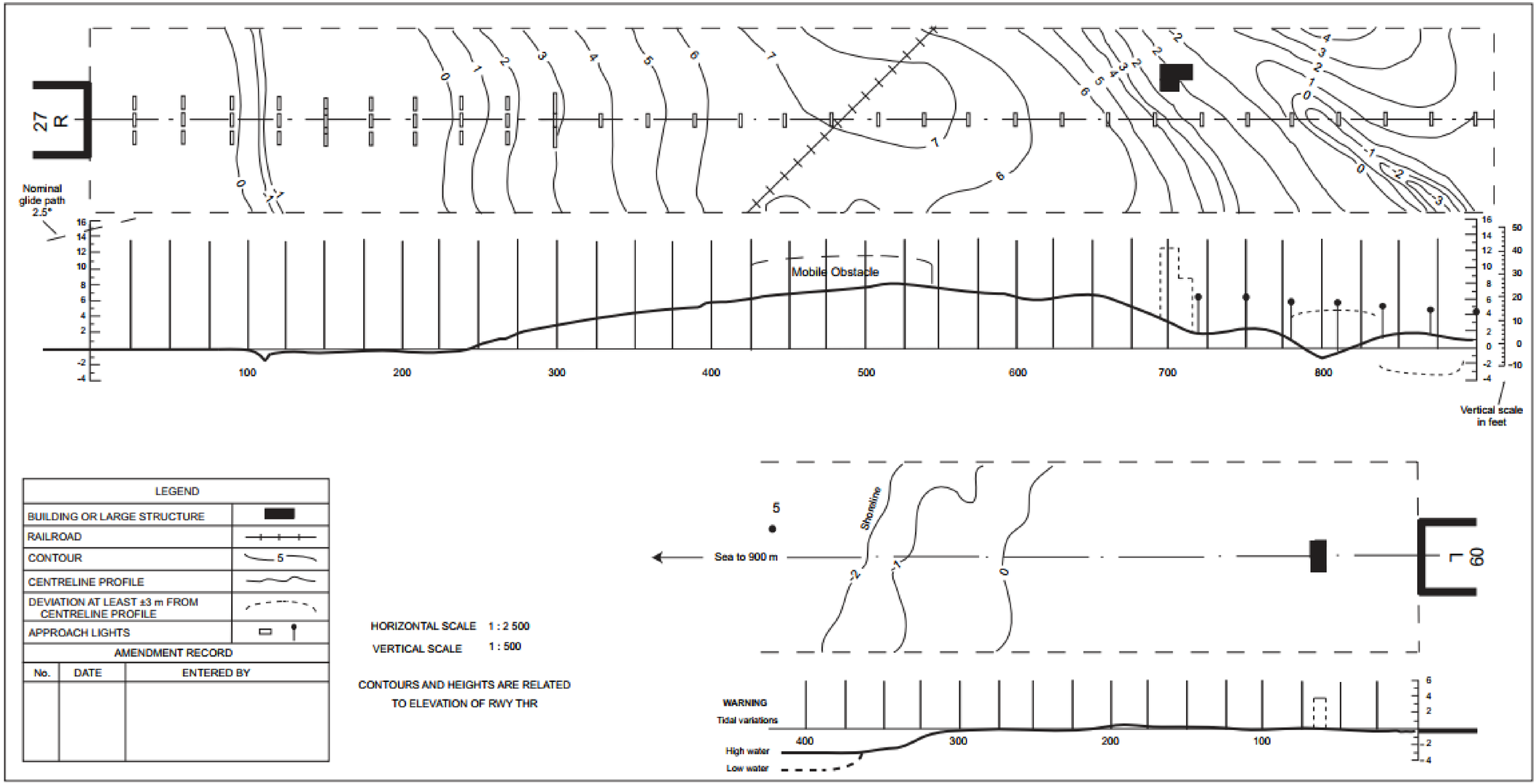


DISTANCES AND HEIGHT IN METRES

## PRECISION APPROACH TERRAIN CHART — ICAO

CITY/AERODROME

RWY 27 R/09 L




| LEGEND | |
|---|---|
| BUILDING OR LARGE STRUCTURE | |
| RAILROAD | |
| CONTOUR | 5 |
| CENTRELINE PROFILE | |
| DEVIATION AT LEAST ±3 m FROM CENTRELINE PROFILE | |
| APPROACH LIGHTS | |

| AMENDMENT RECORD | | |
|---|---|---|
| No. | DATE | ENTERED BY |
| | | |

HORIZONTAL SCALE 1 : 2 500

VERTICAL SCALE 1 : 500

CONTOURS AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

DATE OF AERONAUTICAL INFORMATION

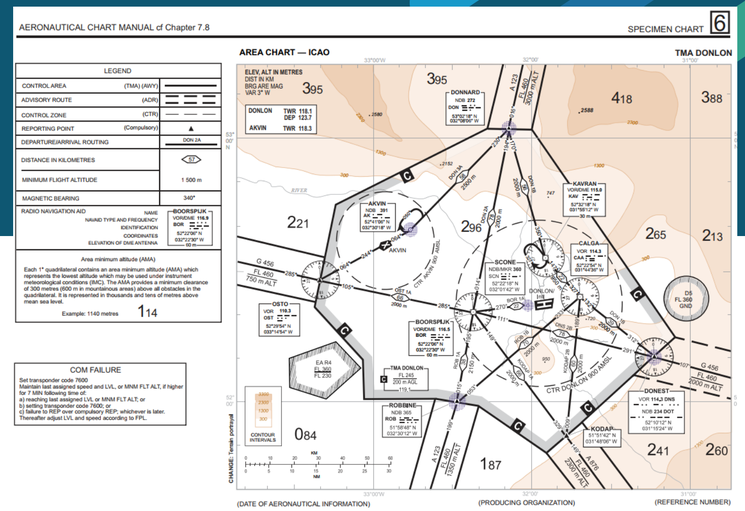
PRODUCING ORGANIZATION

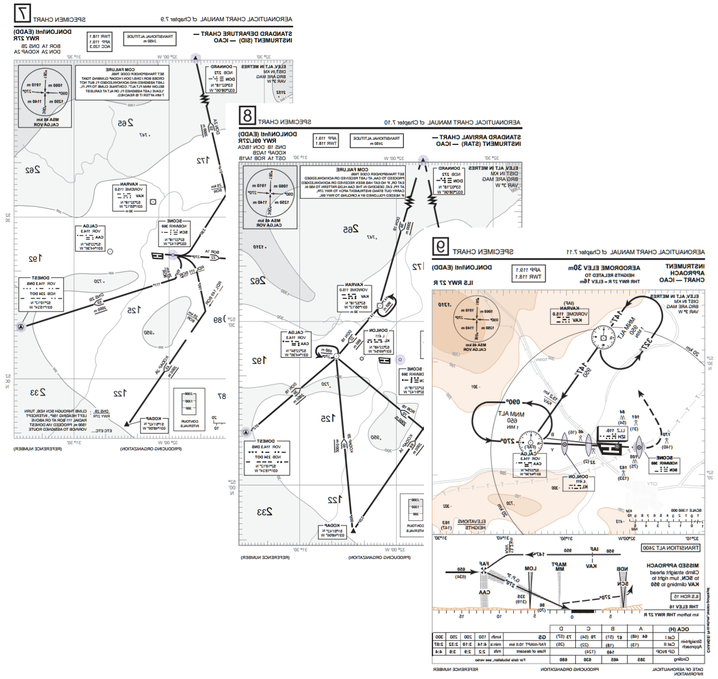
REFERENCE NUMBER 7/1/67

# Background

Terrain data has been provided in a more limited way using one of the following aeronautical charts

- Aerodrome Obstacle Charts Type A and B
- Precision Approach Terrain Charts for ILS CAT II/III
- Depiction on IAC, SID, STAR and VFR charts



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## AREA CHART — ICAO

**TMA DONLON**

| LEGEND | | |
|---|---|---|
| CONTROL AREA | (TMA) (AWY) | |
| ADVISORY ROUTE | (ADR) | |
| CONTROL ZONE | (CTR) | |
| REPORTING POINT | (Compulsory) | ▲ |
| DEPARTURE/ARRIVAL ROUTING | | DON 2A |
| DISTANCE IN KILOMETRES | | 57 |
| MINIMUM FLIGHT ALTITUDE | | 1 500 m |
| MAGNETIC BEARING | | 340° |
| RADIO NAVIGATION AID | NAME<br>NAVAID TYPE AND FREQUENCY<br>IDENTIFICATION<br>COORDINATES<br>ELEVATION OF DME ANTENNA | BOORSPIJK<br>VOR/DME 116.9<br>BOR<br>52°22'06" N<br>032°22'30" W<br>60 m |

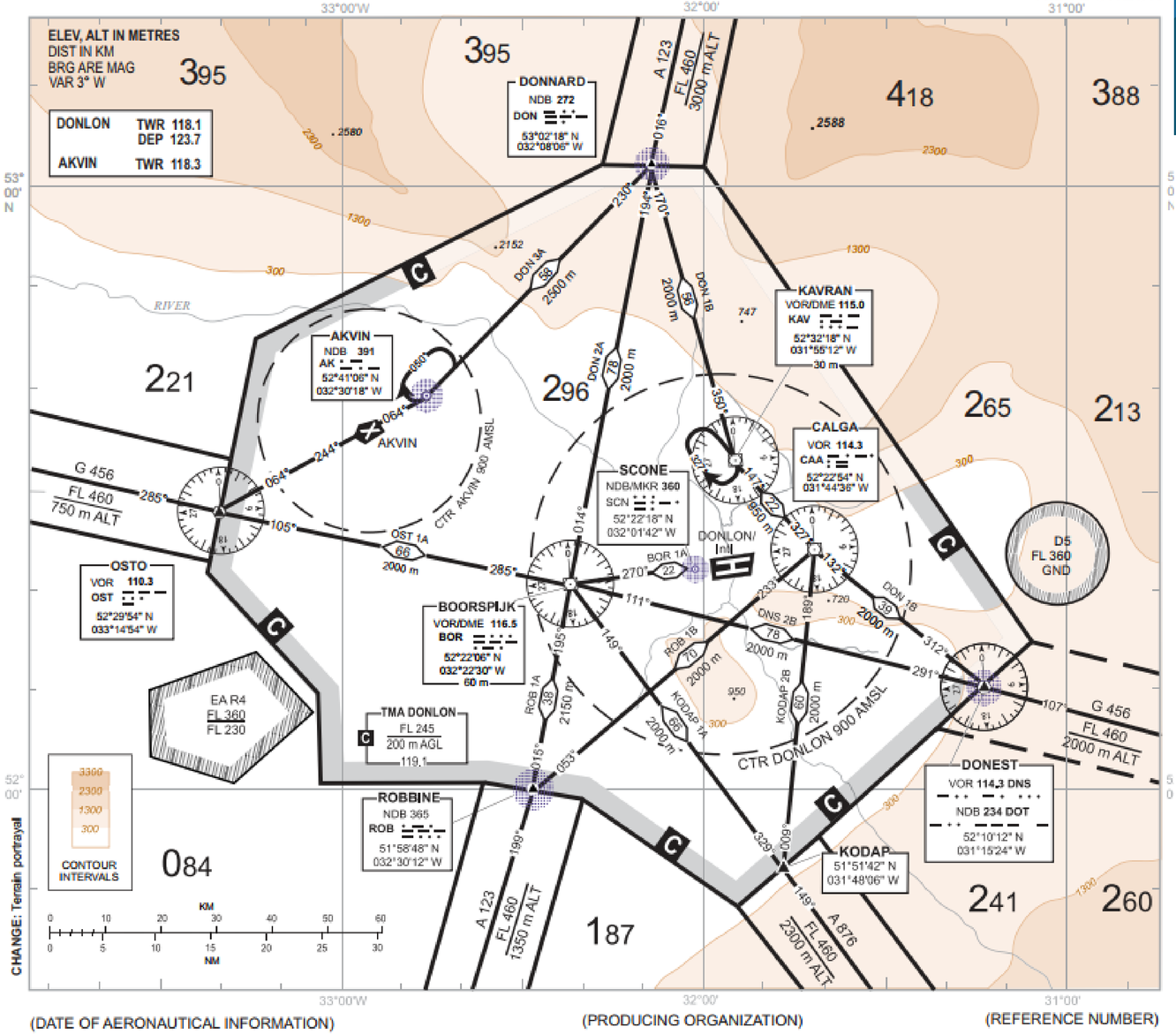
Area minimum altitude (AMA)

Each 1° quadrilateral contains an area minimum altitude (AMA) which represents the lowest altitude which may be used under instrument meteorological conditions (IMC). The AMA provides a minimum clearance of 300 metres (600 m in mountainous areas) above all obstacles in the quadrilateral. It is represented in thousands and tens of metres above mean sea level.

Example: 1140 metres 114

### COM FAILURE

Set transponder code 7600
Maintain last assigned speed and LVL, or MNM FLT ALT, if higher for 7 MIN following time of:
a) reaching last assigned LVL or MNM FLT ALT; or
b) setting transponder code 7600; or
c) failure to REP over compulsory REP; whichever is later.
Thereafter adjust LVL and speed according to FPL.

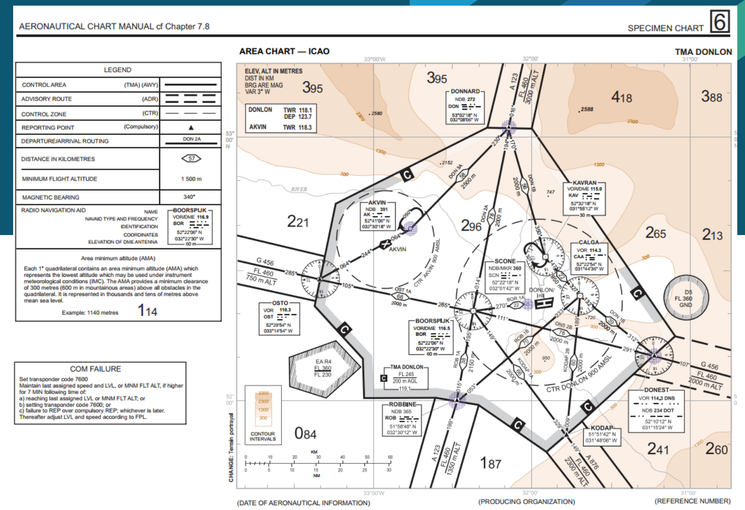


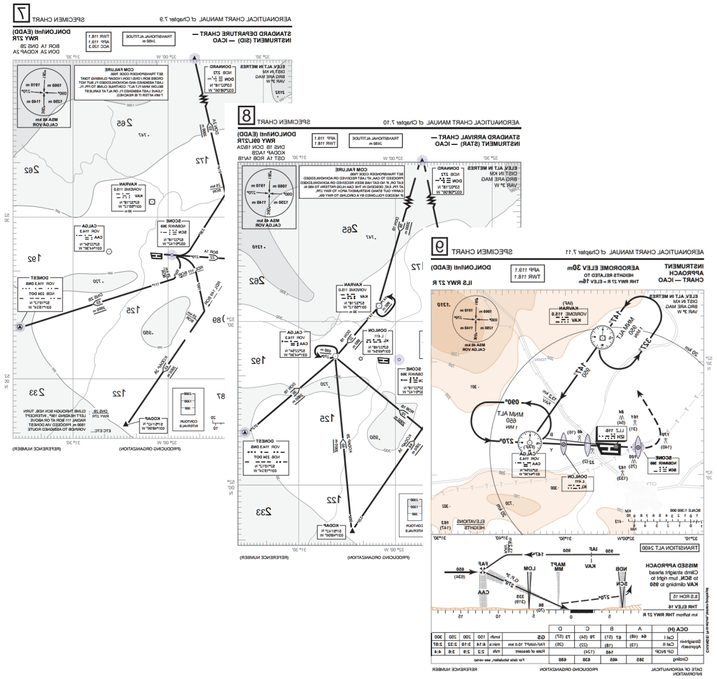

(DATE OF AERONAUTICAL INFORMATION) (PRODUCING ORGANIZATION) (REFERENCE NUMBER)

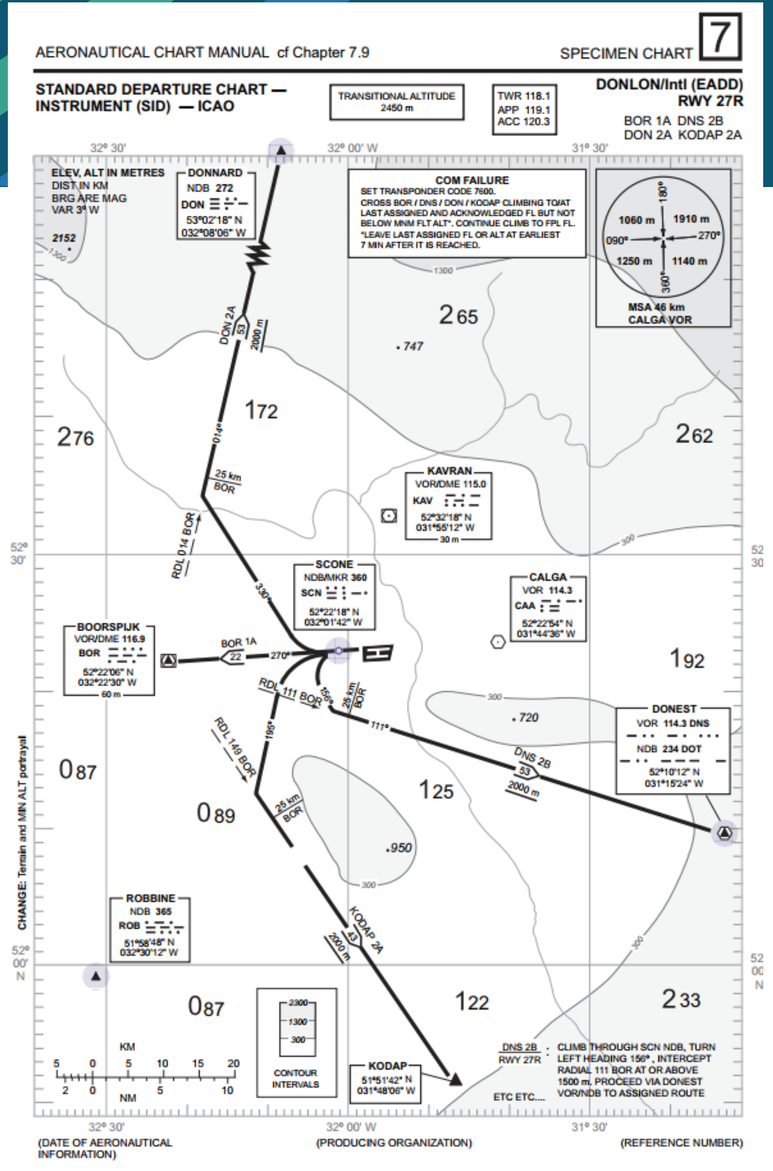
# Background

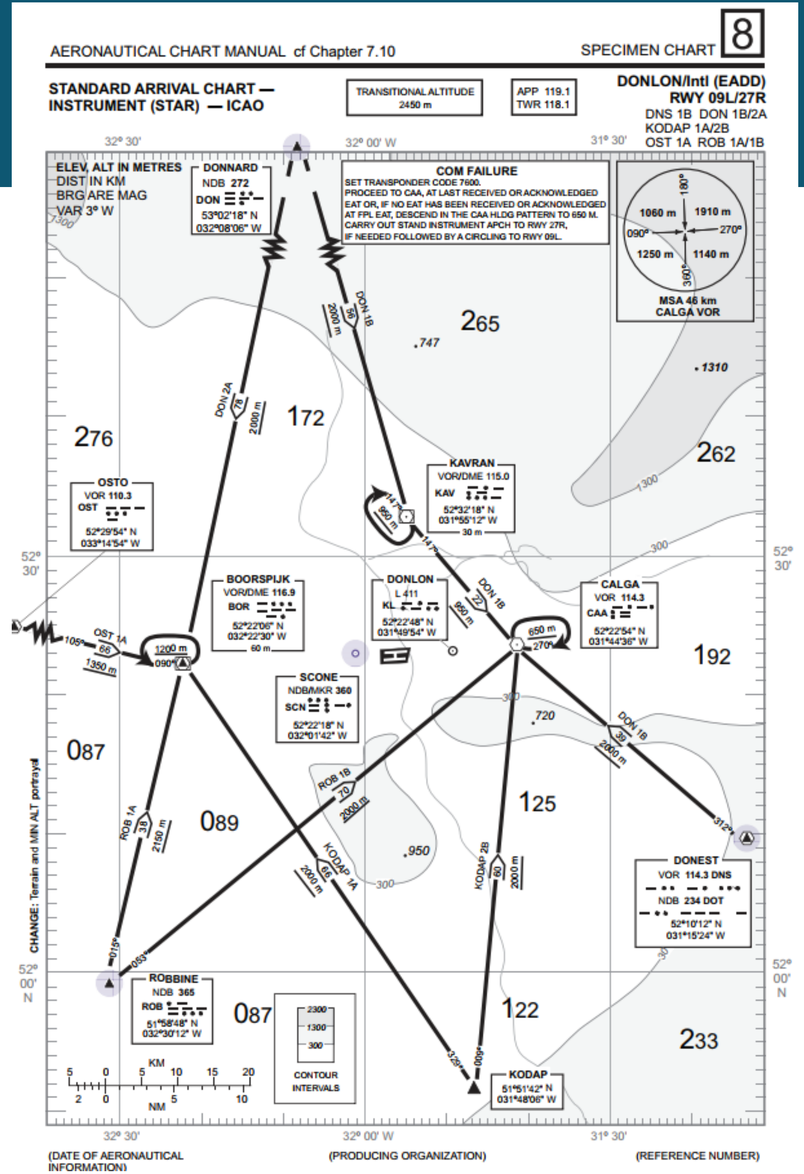
Terrain data has been provided in a more limited way using one of the following aeronautical charts

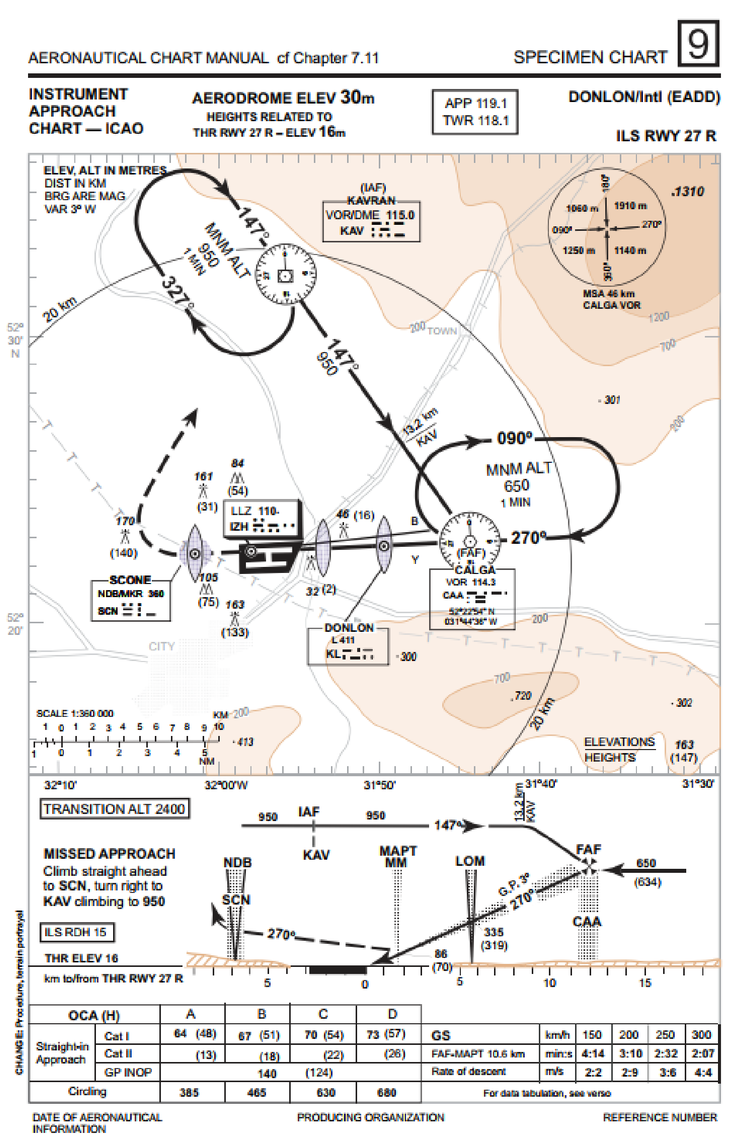
- Aerodrome Obstacle Charts Type A and B
- Precision Approach Terrain Charts for ILS CAT II/III
- Depiction on IAC, SID, STAR and VFR charts




AERONAUTICAL CHART MANUAL cf Chapter 7.9
SPECIMEN CHART 7
STANDARD DEPARTURE CHART — INSTRUMENT (SID) — ICAO
TRANSITIONAL ALTITUDE 2450 m
TWR 118.1
APP 119.1
ACC 120.3
DONLON/Intl (EADD)
RWY 27R
BOR 1A DNS 2B
DON 2A KODAP 2A
ELEV, ALT IN METRES
DIST IN KM
BRG ARE MAG
VAR 3° W
DONNARD
NDB 272
DON
53°02'18" N
032°08'06" W
COM FAILURE
SET TRANSPONDER CODE 7600.
CROSS BOR / DNS / DON / KODAP CLIMBING TO/AT LAST ASSIGNED AND ACKNOWLEDGED FL BUT NOT BELOW MNM FLT ALT*. CONTINUE CLIMB TO FPL FL.
*LEAVE LAST ASSIGNED FL OR ALT AT EARLIEST 7 MIN AFTER IT IS REACHED.
MSA 46 km
CALGA VOR
1060 m
1910 m
1250 m
1140 m
KAVRAN
VOR/DME 115.0
KAV
52°32'18" N
031°55'12" W
SCONE
NDB/MKR 360
SCN
52°22'18" N
032°01'42" W
CALGA
VOR 114.3
CAA
52°22'54" N
031°44'36" W
BOORSPIJK
VOR/DME 116.9
BOR
52°22'06" N
032°22'30" W
DONEST
VOR 114.3 DNS
NDB 234 DOT
52°10'12" N
031°15'24" W
ROBBINE
NDB 365
ROB
51°58'48" N
032°30'12" W
KODAP
51°51'42" N
031°48'06" W
CONTOUR INTERVALS
DNS 2B RWY 27R : CLIMB THROUGH SCN NDB, TURN LEFT HEADING 156°, INTERCEPT RADIAL 111 BOR AT OR ABOVE 1500 m. PROCEED VIA DONEST VOR/NDB TO ASSIGNED ROUTE
ETC ETC....
CHANGE: Terrain and MIN ALT portrayal
(DATE OF AERONAUTICAL INFORMATION)
(PRODUCING ORGANIZATION)
(REFERENCE NUMBER)


AERONAUTICAL CHART MANUAL cf Chapter 7.10
SPECIMEN CHART 8
STANDARD ARRIVAL CHART — INSTRUMENT (STAR) — ICAO
TRANSITIONAL ALTITUDE 2450 m
APP 119.1
TWR 118.1
DONLON/Intl (EADD)
RWY 09L/27R
DNS 1B DON 1B/2A
KODAP 1A/2B
OST 1A ROB 1A/1B
ELEV, ALT IN METRES
DIST IN KM
BRG ARE MAG
VAR 3° W
DONNARD
NDB 272
DON
53°02'18" N
032°08'06" W
COM FAILURE
SET TRANSPONDER CODE 7600.
PROCEED TO CAA, AT LAST RECEIVED OR ACKNOWLEDGED EAT OR, IF NO EAT HAS BEEN RECEIVED OR ACKNOWLEDGED AT FPL EAT, DESCEND IN THE CAA HLDG PATTERN TO 650 M. CARRY OUT STAND INSTRUMENT APCH TO RWY 27R, IF NEEDED FOLLOWED BY A CIRCLING TO RWY 09L.
MSA 46 km
CALGA VOR
1060 m
1910 m
1250 m
1140 m
OSTO
VOR 110.3
OST
52°29'54" N
033°14'54" W
KAVRAN
VOR/DME 115.0
KAV
52°32'18" N
031°55'12" W
BOORSPIJK
VOR/DME 116.9
BOR
52°22'06" N
032°22'30" W
DONLON
L 411
KL
52°22'48" N
031°49'54" W
CALGA
VOR 114.3
CAA
52°22'54" N
031°44'36" W
SCONE
NDB/MKR 360
SCN
52°22'18" N
032°01'42" W
DONEST
VOR 114.3 DNS
NDB 234 DOT
52°10'12" N
031°15'24" W
ROBBINE
NDB 365
ROB
51°58'48" N
032°30'12" W
KODAP
51°51'42" N
031°48'06" W
CONTOUR INTERVALS
CHANGE: Terrain and MIN ALT portrayal
(DATE OF AERONAUTICAL INFORMATION)
(PRODUCING ORGANIZATION)
(REFERENCE NUMBER)


AERONAUTICAL CHART MANUAL cf Chapter 7.11
SPECIMEN CHART 9
INSTRUMENT APPROACH CHART — ICAO
AERODROME ELEV 30m
HEIGHTS RELATED TO THR RWY 27 R – ELEV 16m
APP 119.1
TWR 118.1
DONLON/Intl (EADD)
ILS RWY 27 R
ELEV, ALT IN METRES
DIST IN KM
BRG ARE MAG
VAR 3° W
(IAF)
KAVRAN
VOR/DME 115.0
KAV
MNM ALT 650 1 MIN
MSA 46 km
CALGA VOR
SCONE
NDB/MKR 360
SCN
LLZ 110-
IZH
CALGA
VOR 114.3
CAA
DONLON
L 411
KL
(FAF)
ELEVATIONS
HEIGHTS
TRANSITION ALT 2400
MISSED APPROACH
Climb straight ahead to SCN, turn right to KAV climbing to 950
ILS RDH 15
THR ELEV 16
km to/from THR RWY 27 R
NDB
SCN
IAF
KAV
MAPT
MM
LOM
FAF
CAA
G.P. 3°
OCA (H)
A
B
C
D
Straight-in Approach
Cat I
Cat II
GP INOP
Circling
GS
FAF-MAPT 10.6 km
Rate of descent
For data tabulation, see verso
CHANGE: Procedure, terrain portrayal
DATE OF AERONAUTICAL INFORMATION
PRODUCING ORGANIZATION
REFERENCE NUMBER

# ICAO requirements

**AMDT 33**
**ANNEX 15**

Introduced the requirements for digital datasets, Area 1 and Area 4 until Nov 20th, 2008 and Area 2 and Area 3 Nov 18th, 2010

**AMDT 36**
**ANNEX 15**

Applicable Nov 18th, 2010 introduced the subdivision of Area 2 into sub-areas for cost savings (2a,2b, 2c and 2d)

**AMDT 37**
**ANNEX 15**

Applicable Nov 14th, 2013 brought the requirement split between terrain and obstacle data and introduced new concepts like AIM and Airport Mapping Databases.

**AMDT 40**
**ANNEX 15**

Applicable Nov 8th, 2018

Introduced PANS AIM ICAO Doc 10066 and the Aeronautical Data catalogue (repository of data quality requirements)

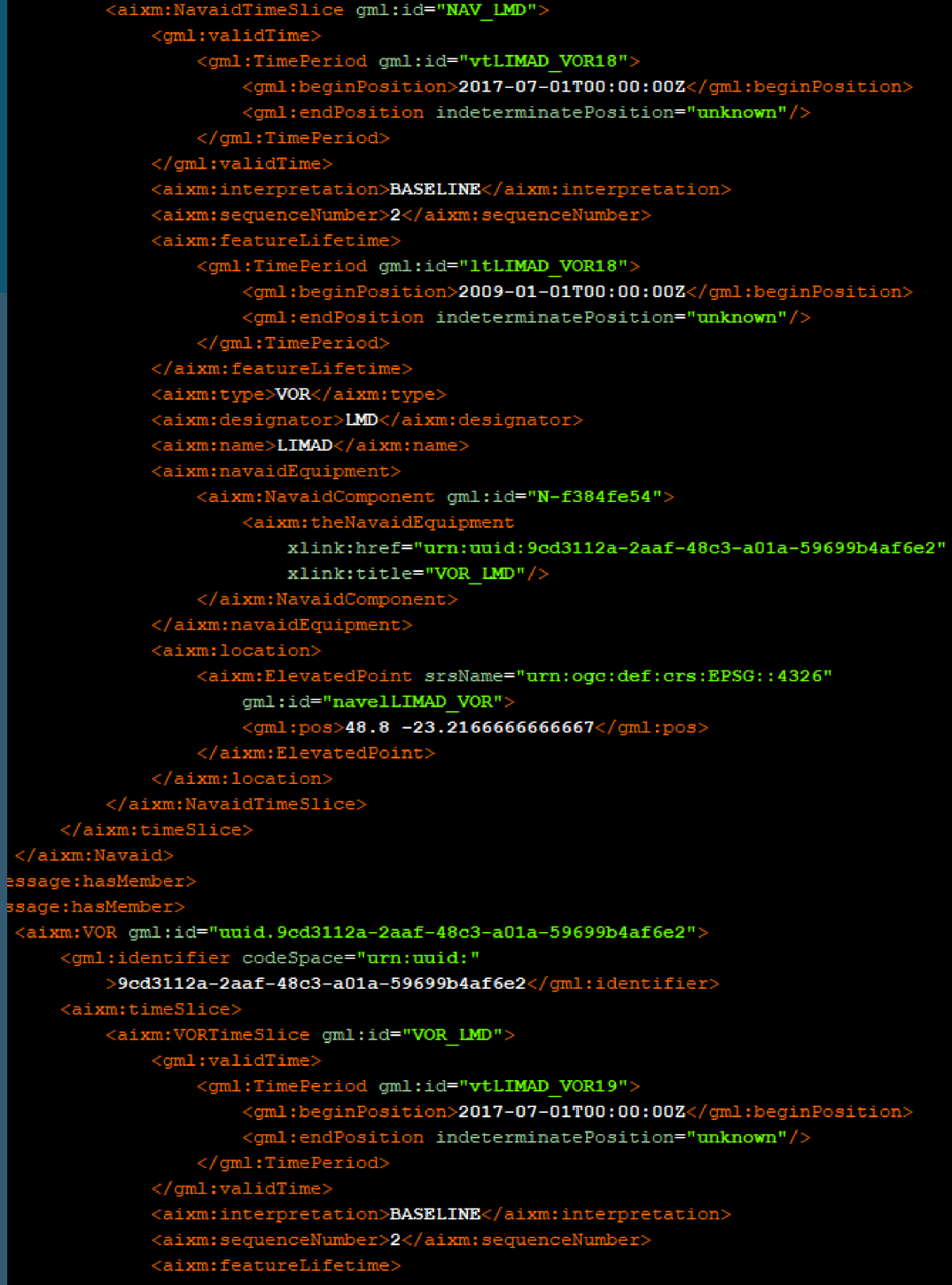
TOD is to be provided as a digital dataset



# What has changed?

# Digital transformation

Terrain and Obstacle data in a digital form is more important moving forward



# Why Terrain and Obstacle Data is important?

- Aircraft use them in their terrain awareness and warning systems (TAWS) and Minimum Safe Altitude Warning (MSAW)

- Used for calculation of the minimum obstacle clearance altitudes for aircrafts during the different phases of flight in Instrument Flight Procedures (PANS OPS)

# Why Terrain and Obstacle Data is important?

- Abnormal operations (engine-out and emergency enroute contingency procedures including drift-down procedures)
- Used to determine minimum vectoring altitude by ATC and monitor aircraft height
- Airport Advanced Surface Movement Guidance and Control Systems (A-SMGCS) to control aircraft and vehicles in complex aerodrome layouts with low visibility

# Why Terrain and Obstacle Data is important?

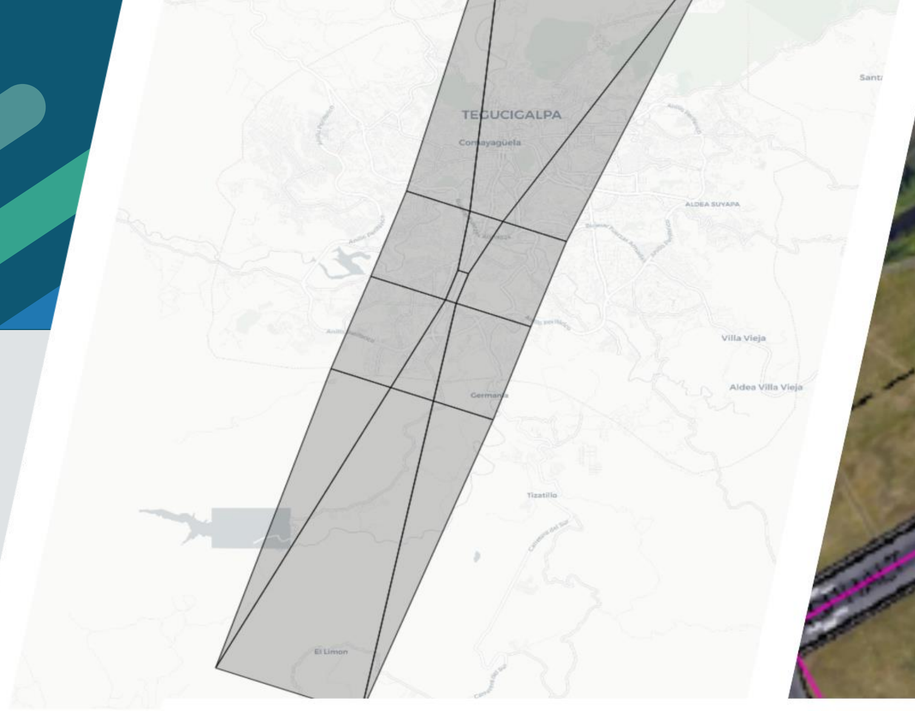
Aeronautical charting uses these type of data as displays for awareness, used also for production of Aerodrome Obstacle Charts Type A, B and electronic charts

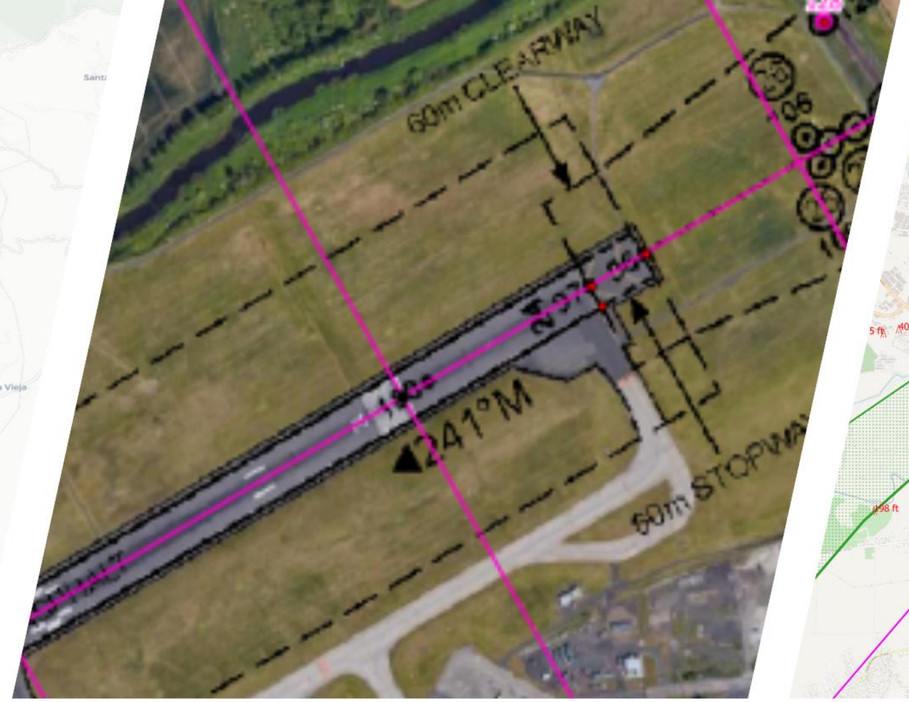
Annex 14 Obstacle Limitation Surfaces compliance monitoring

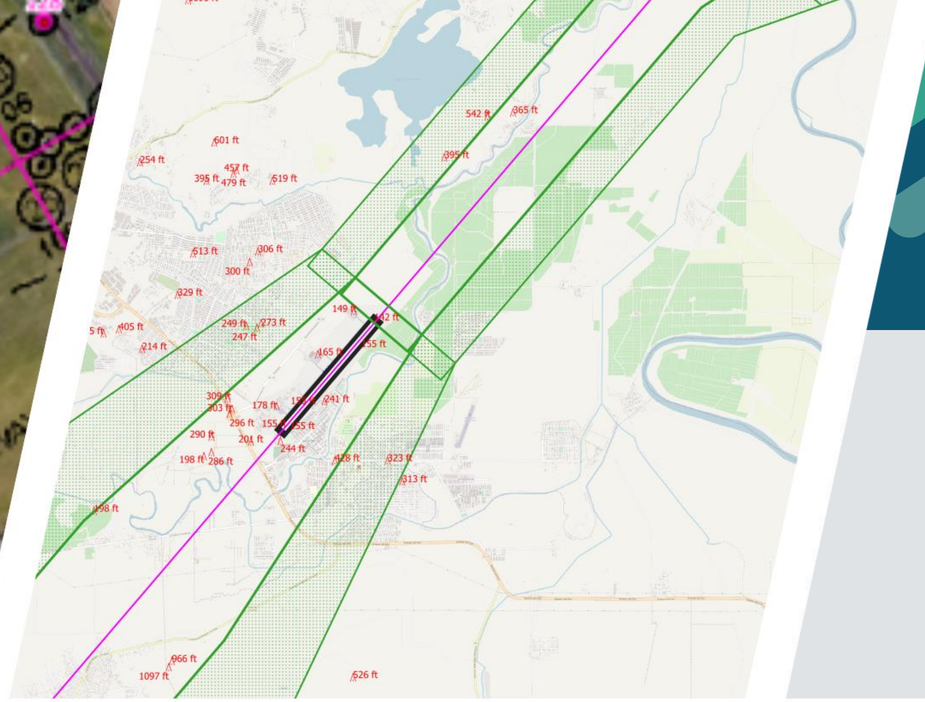
Electronic Flight Bags, Synthetic Vision, Flight Simulators, etc

# Obstacle definition

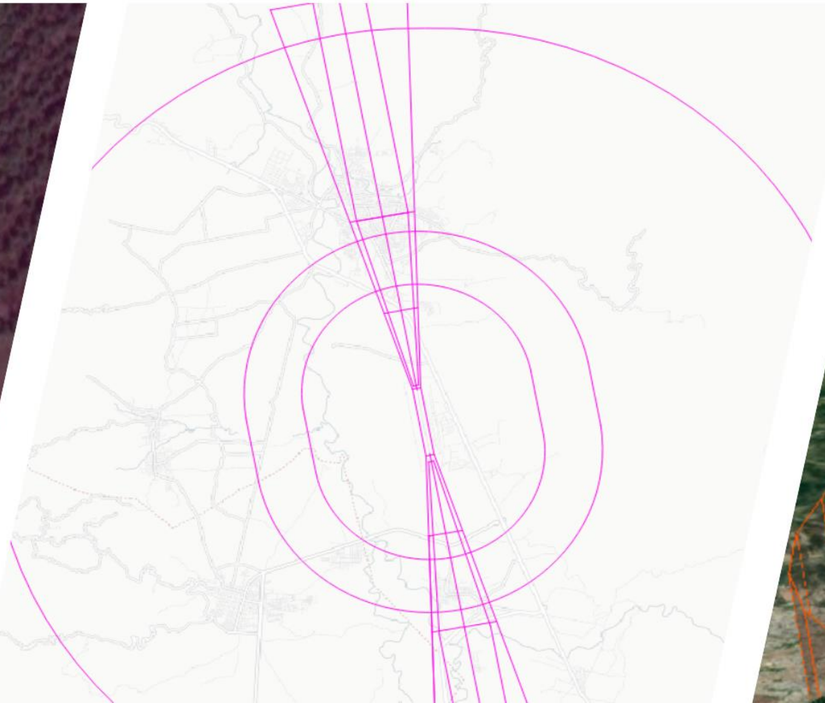
All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:
a) are located on an area intended for the surface movement of aircraft; or
b) extend above a defined surface intended to protect aircraft in flight; or
c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

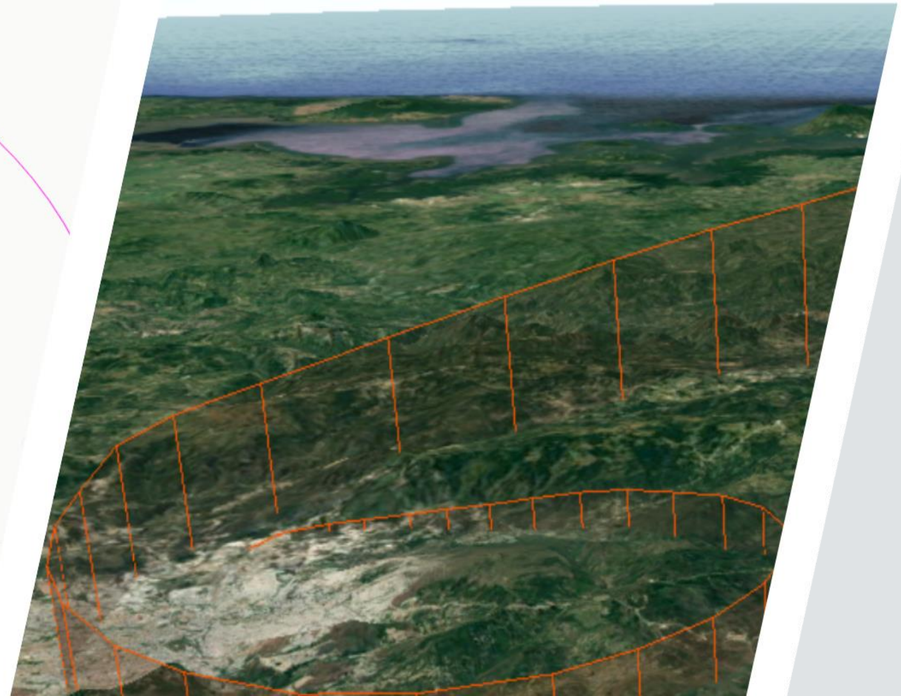

TEGUCIGALPA
Comayagüela
ALDEA SUYAPA
Villa Vieja
Aldea Villa Vieja
Tizatillo
El Limon

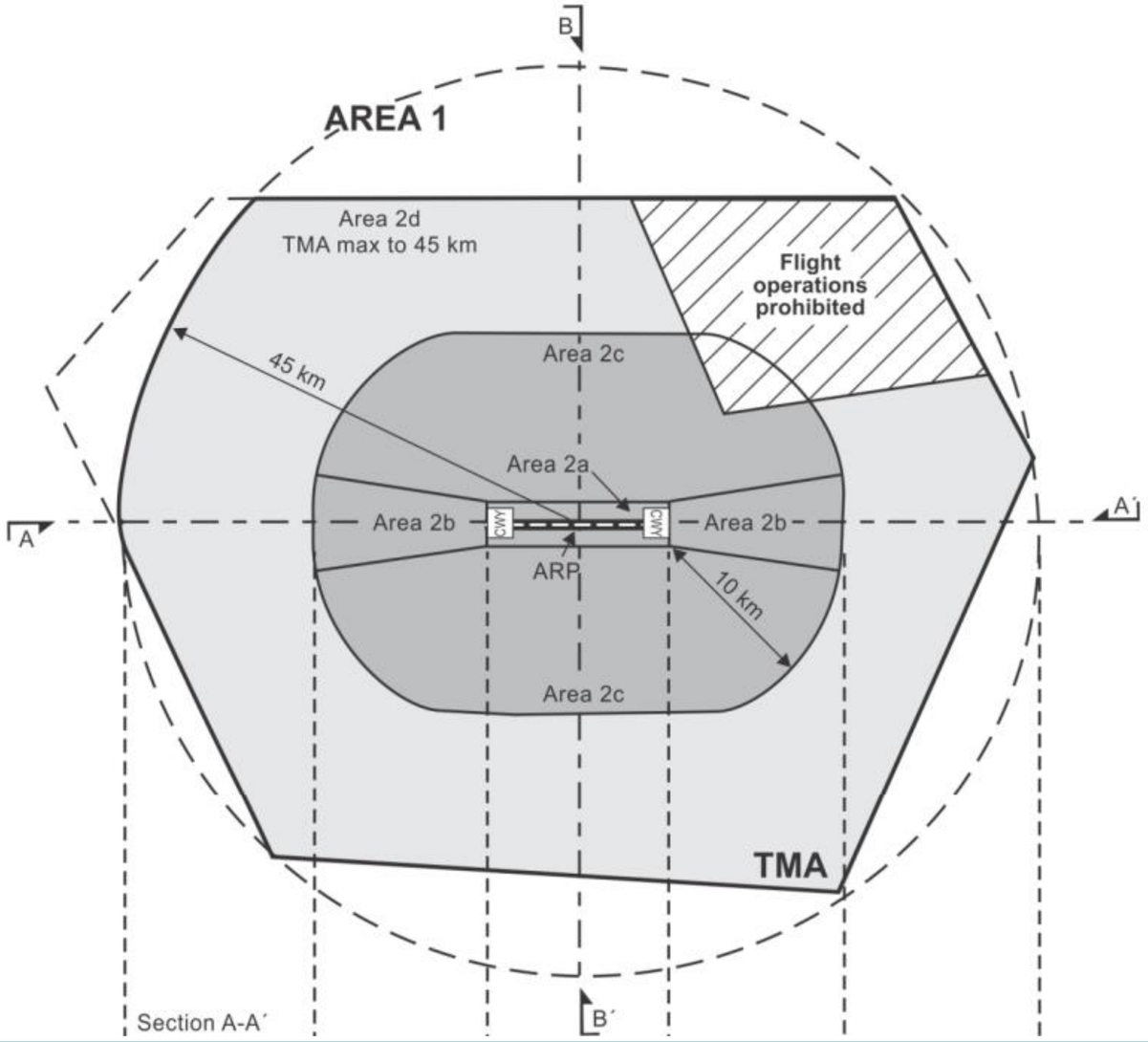

60m CLEARWAY
241°M
60m STOPWAY




1
2



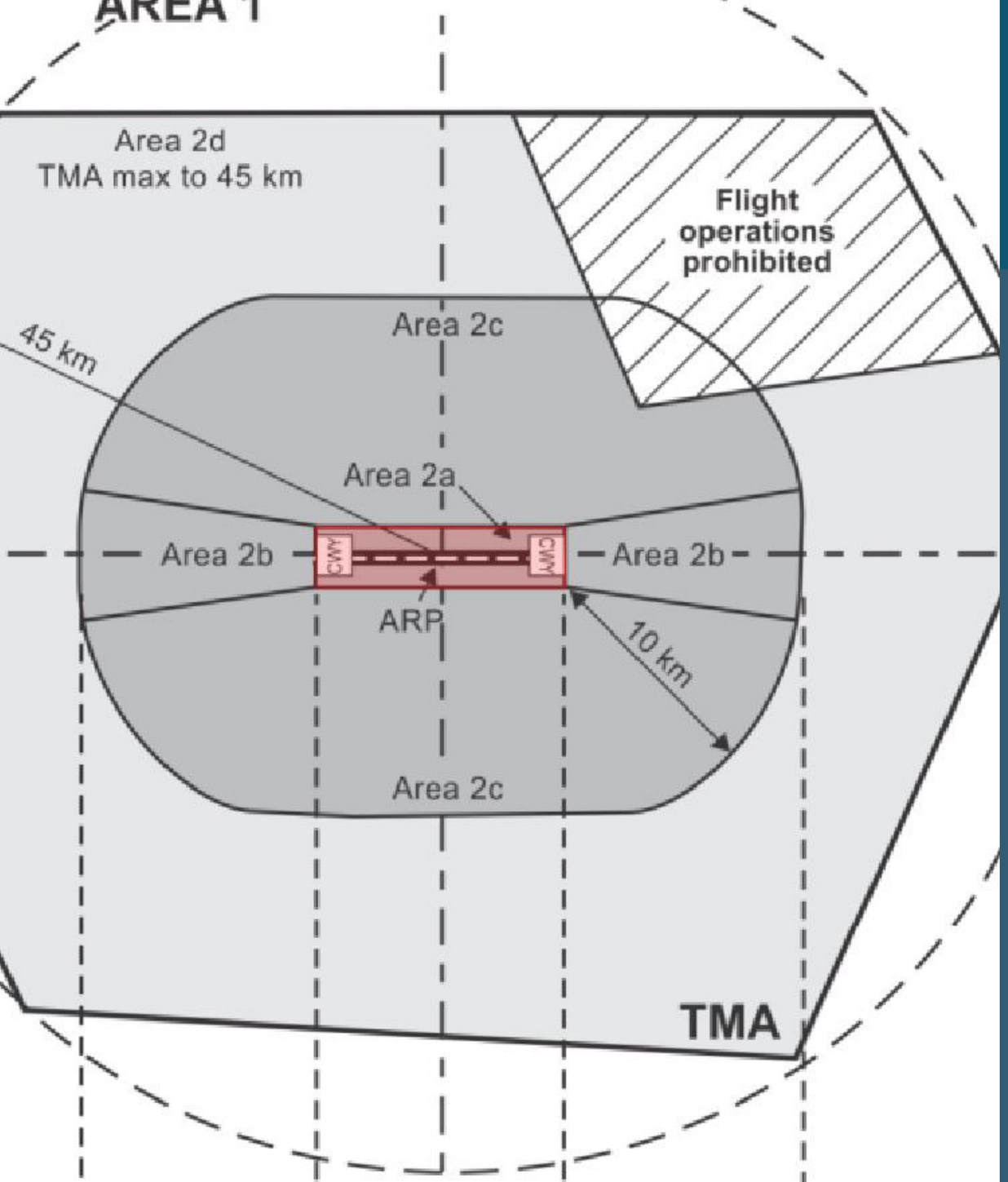





# Terrain and Obstacle Areas

# Area 1

Entire territory of a State




# Area 2

Within the vicinity of an aerodrome, subdivided as follows:

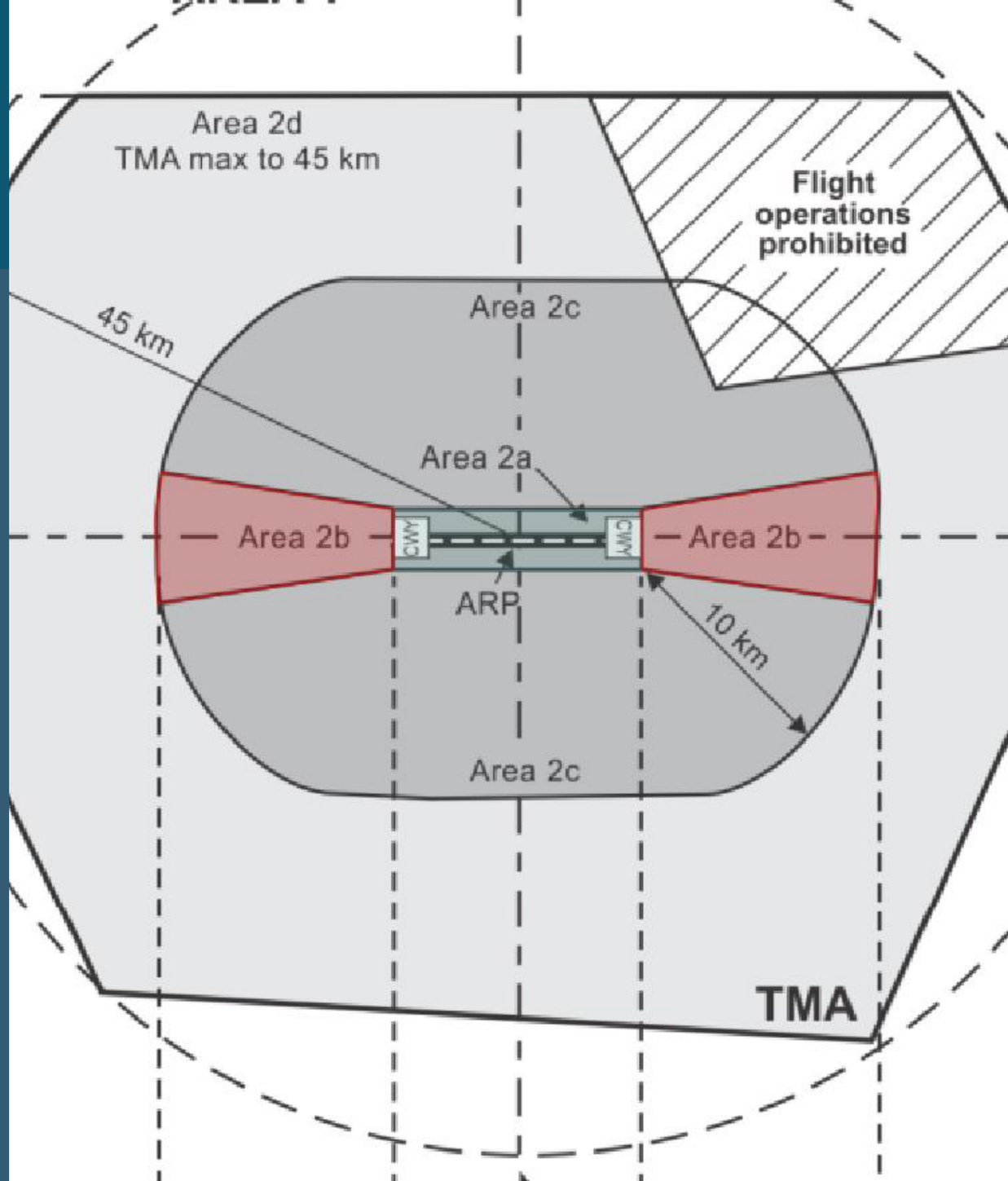
## Area 2a (mandatory)

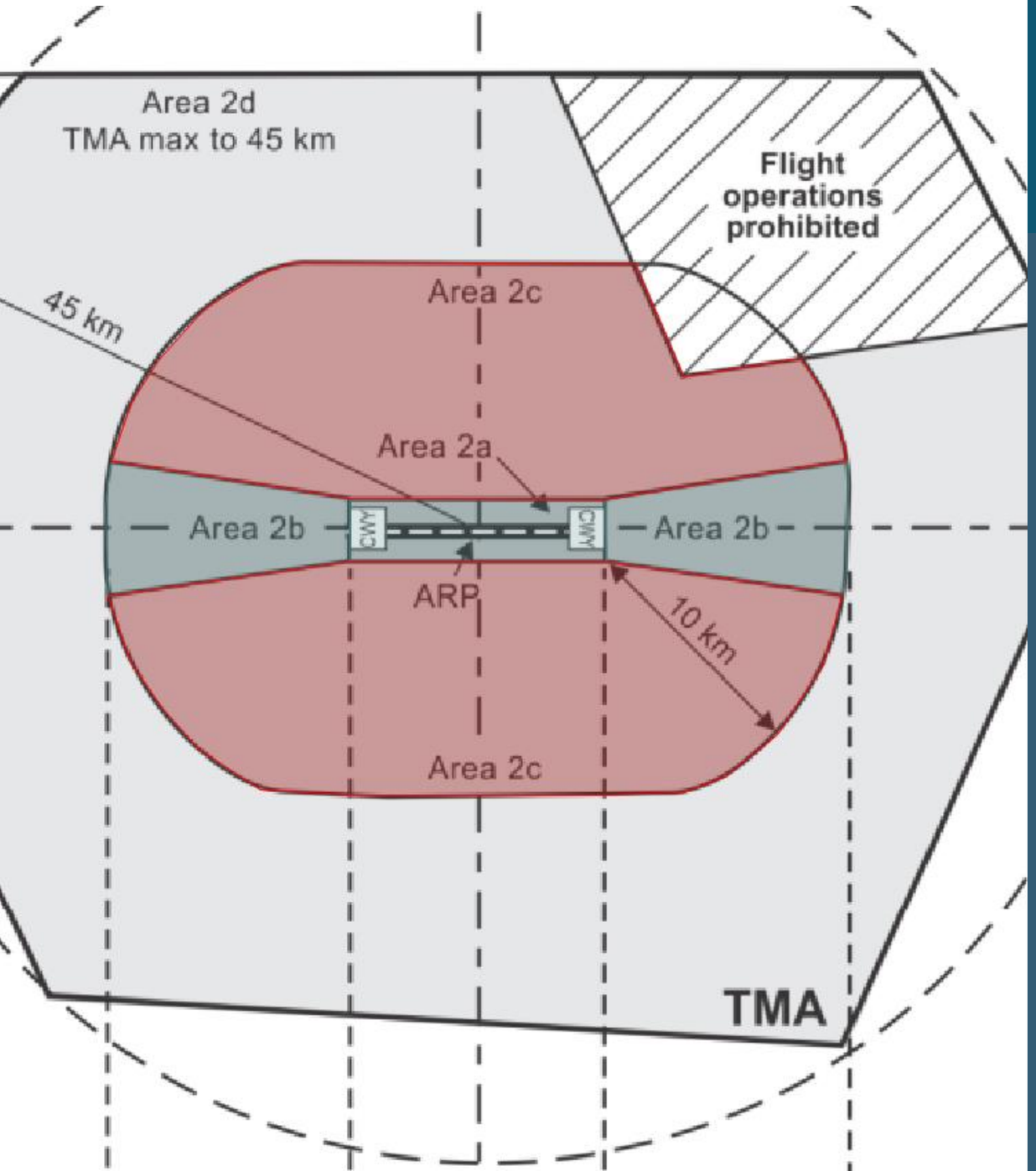
A rectangular area around a runway that comprises the runway strip plus any clearway that exists

# Area 2

## Area 2b (recommended)

An area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15% to each side






# Area 2

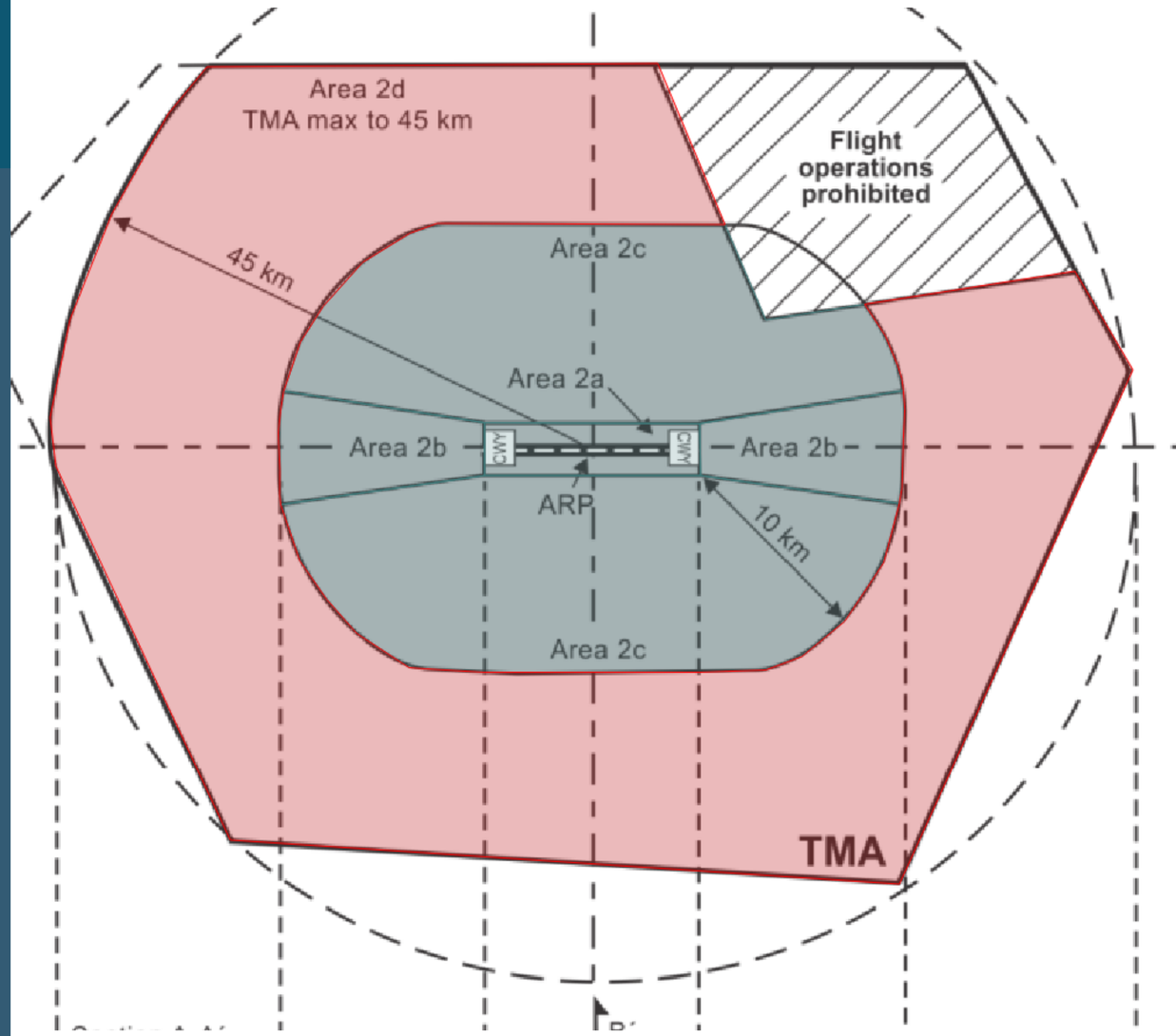
## Area 2c (recommended)

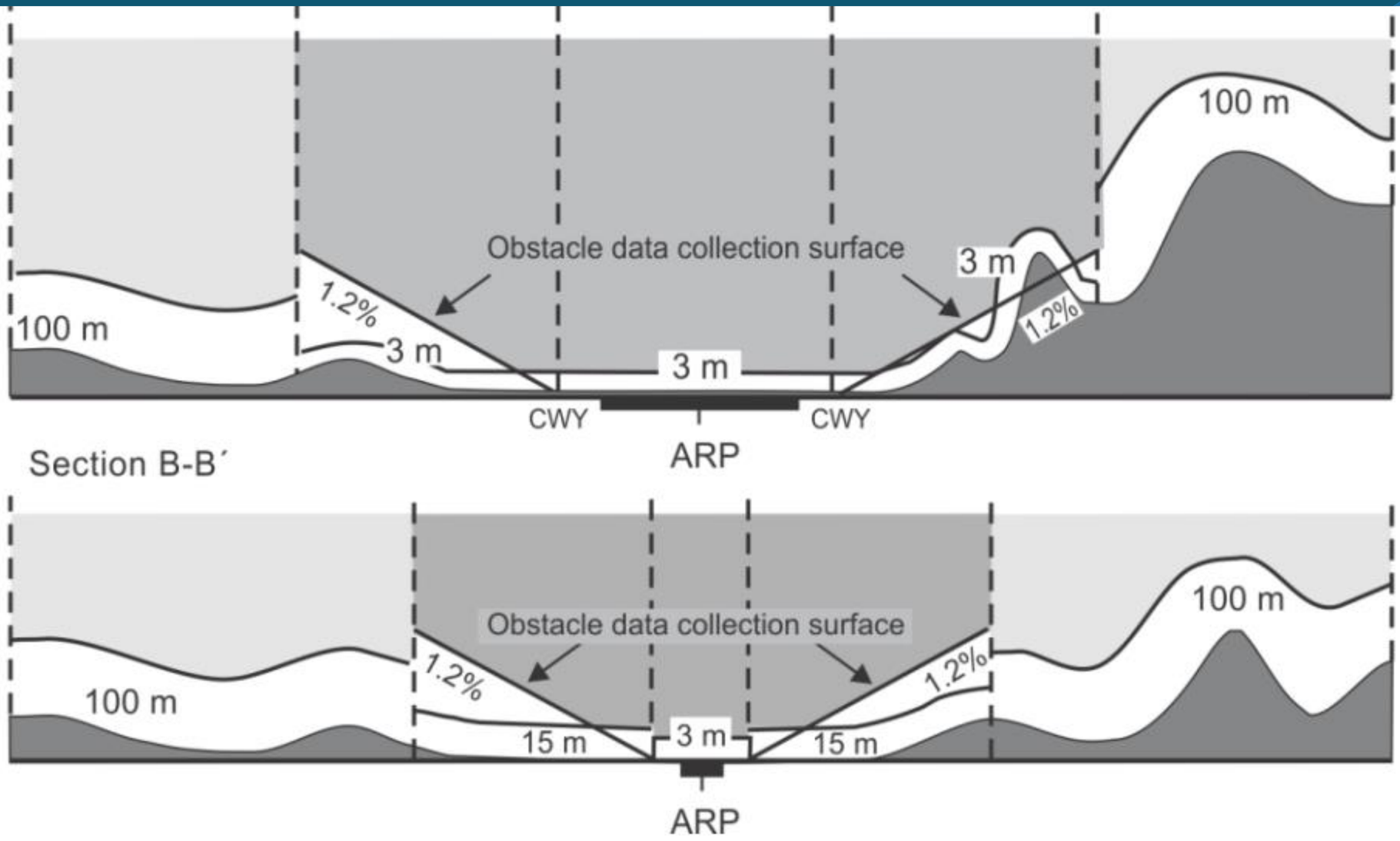
An area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a

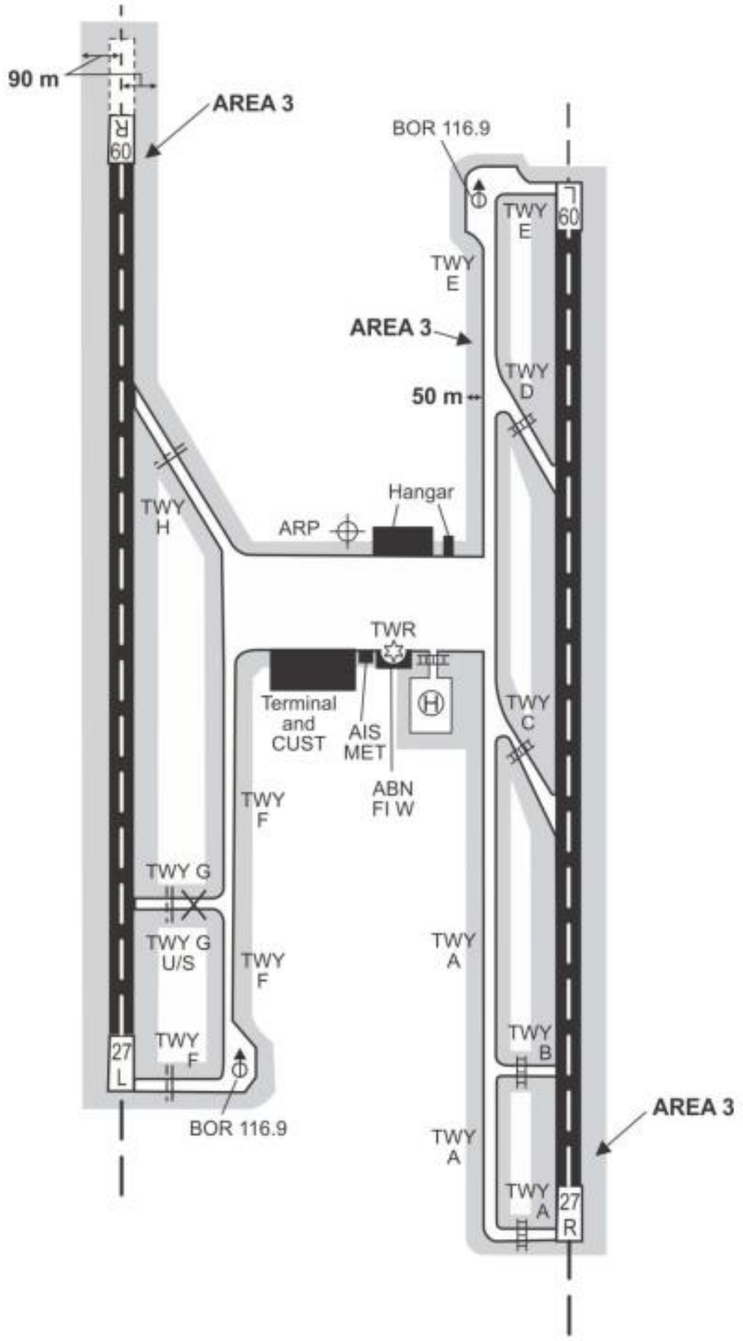
# Area 2

## Area 2d (recommended)

An area outside the Areas 2a, 2b and 2c up to 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest.




100 m
1.2%
3 m
Obstacle data collection surface
3 m
1.2%
100 m
3 m
CWY
CWY
ARP
Section B-B´
100 m
1.2%
Obstacle data collection surface
1.2%
100 m
15 m
3 m
15 m
ARP

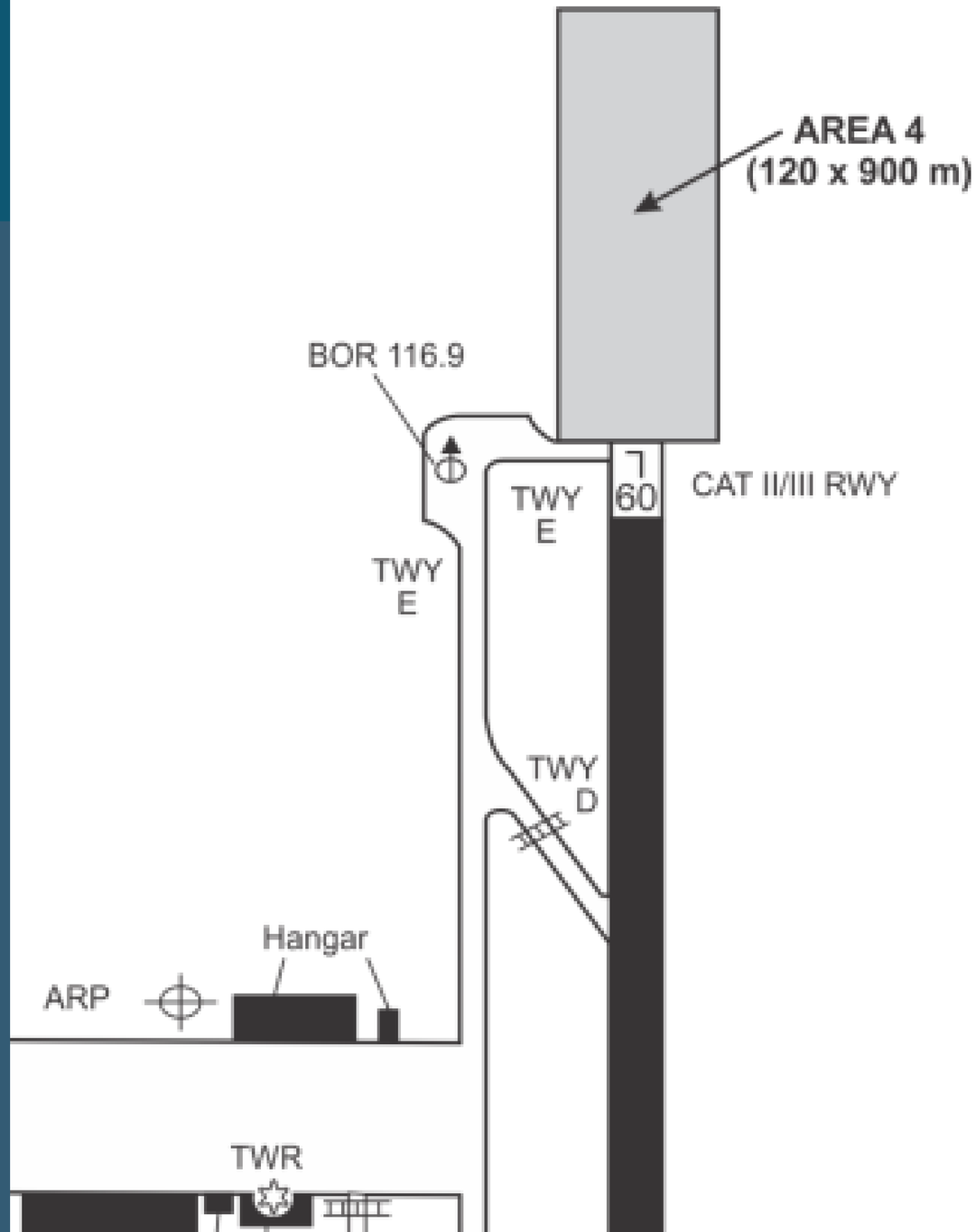


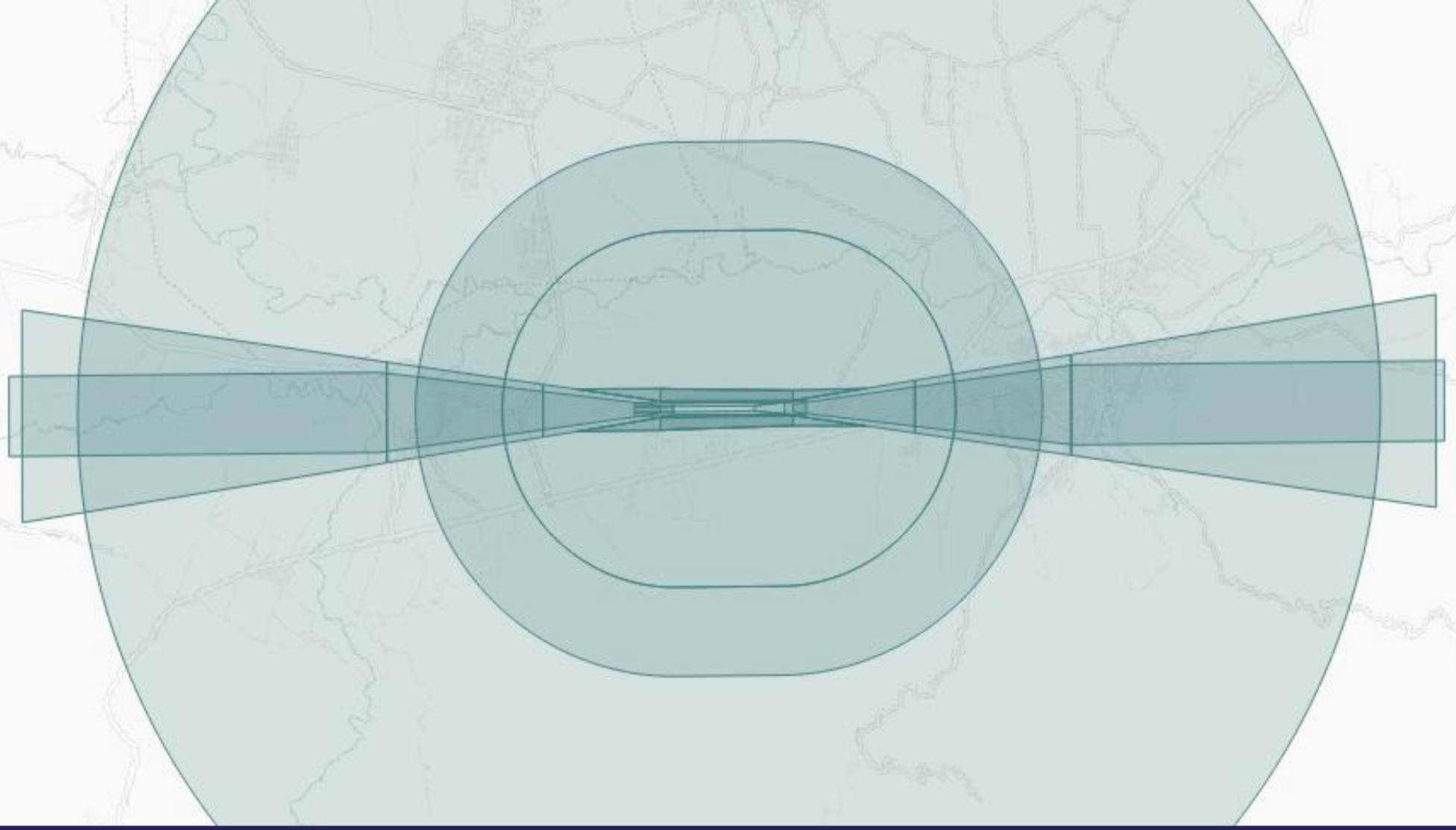

# Area 3

Area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway center line and 50 m from the edge of all other parts of the aerodrome movement area

# Area 4

Area extending 900 m prior to the runway threshold and 60 m each side of the extended runway centre line in the direction of the approach on a precision approach runway, Category II or III.





# Obstacle Limitation Surfaces (OLS)

# Outer horizontal surface

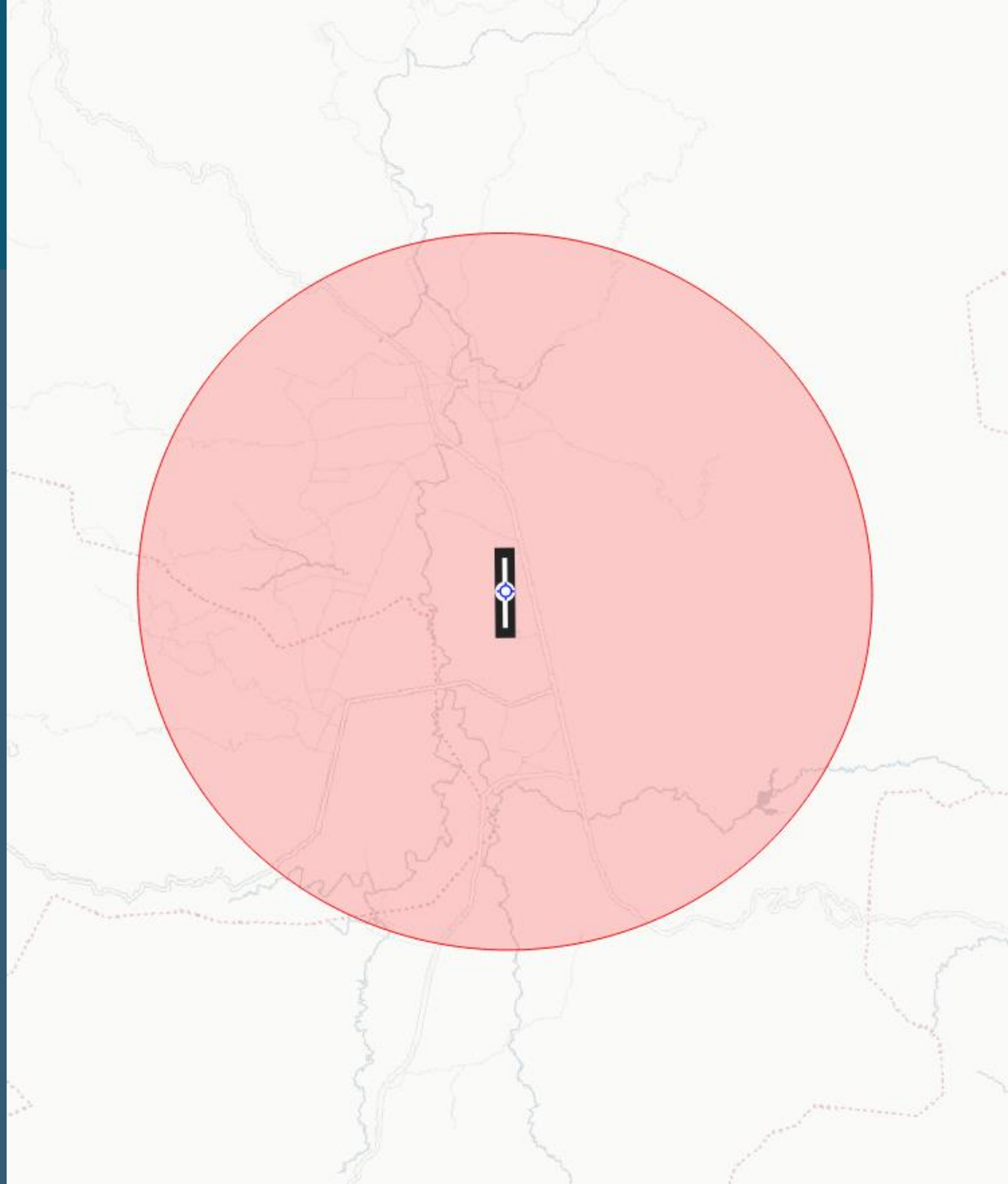
## Purpose

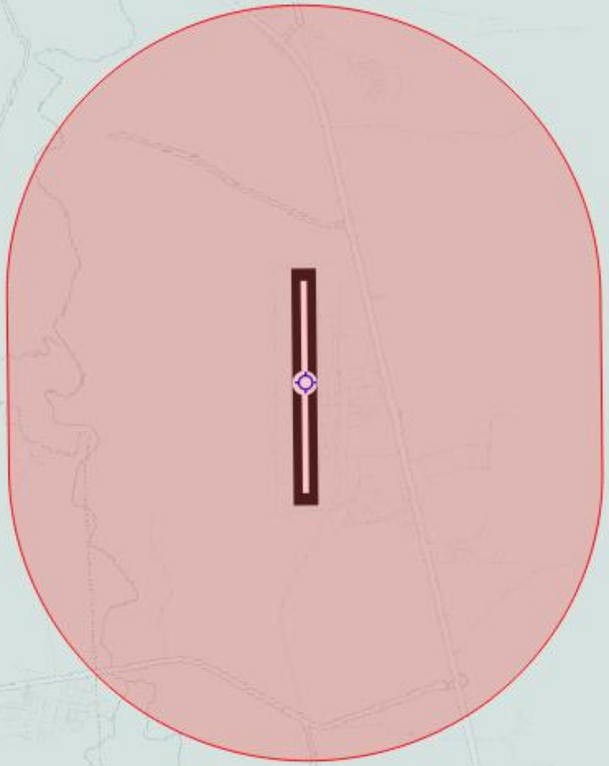
Protection of airspace from tall structures in or near the airports that may limit the desired flexibility for instrument approaches and radar vectoring

## Surface definition

15 km from ARP but may be extended even further

150 m above AD elevation





# Inner horizontal surface

## Purpose

Protects the airspace for visual circling before landing.

Some sectors may not be required if aircraft do not use them

## Surface definition

Horizontal plane above an aerodrome, can be a circle or racetrack (depends on speed)

45 m above AD elevation

# Conical Surface

## Purpose

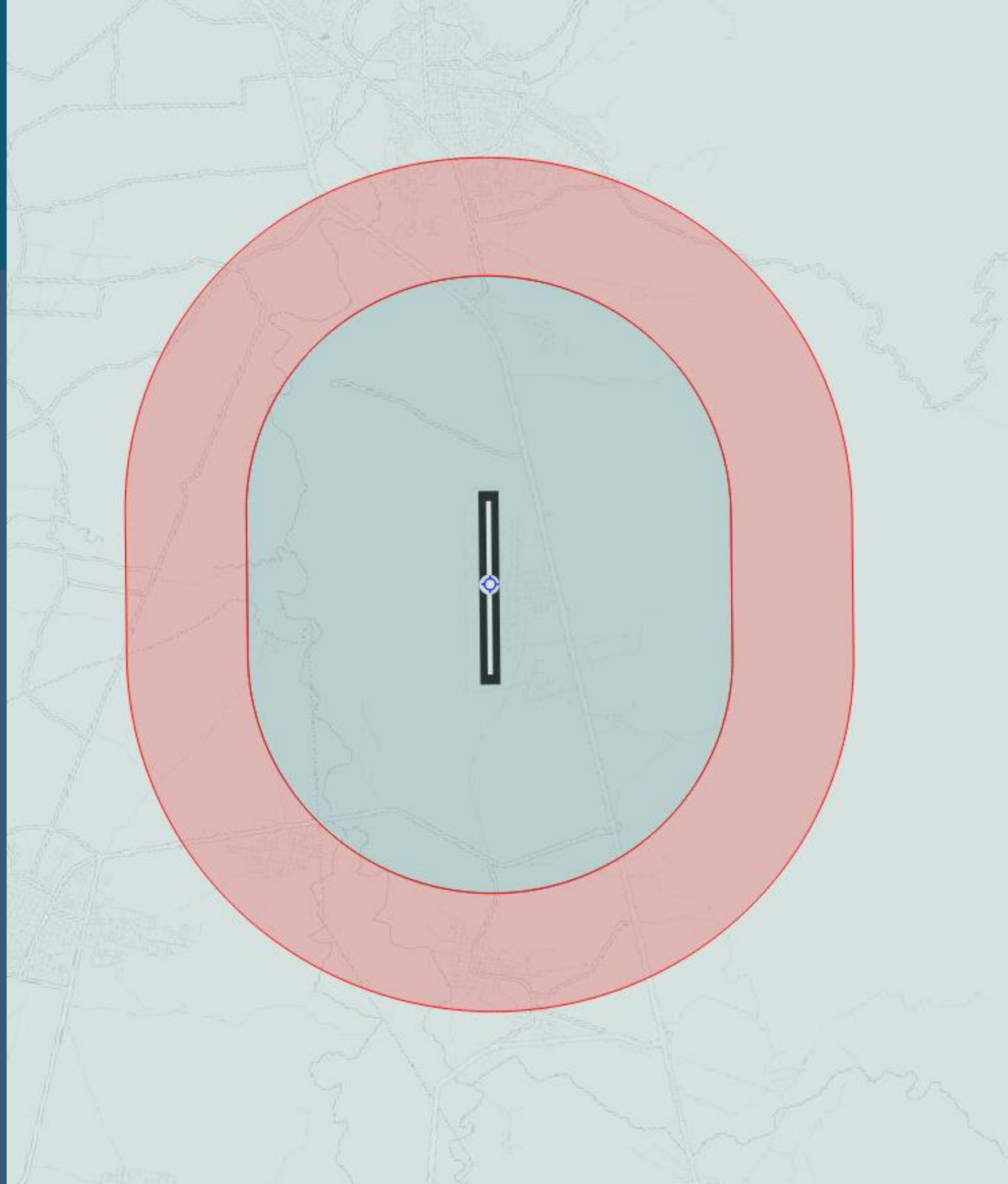
Protects the airspace for visual circling before landing.

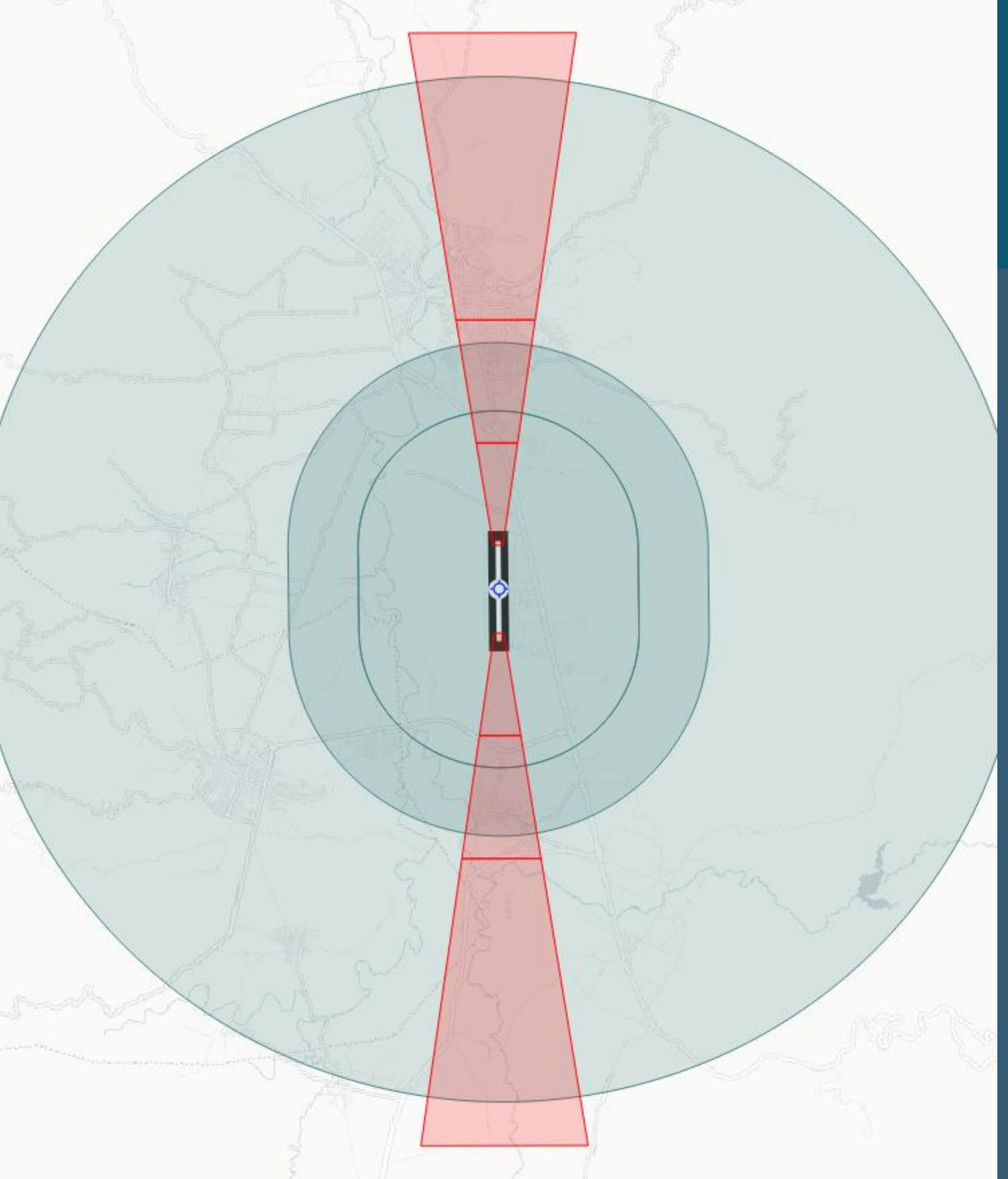
Some sectors may not be required if aircraft do not use them

## Surface definition

A surface sloping upwards & outwards from the edge the inner horizontal surface

150 m above inner horizontal





# Approach Surface

## Purpose

Protection of the airspace for aircraft in an approach that should be kept free of obstacles

## Surface definition

Inclined plane/planes that precedes the threshold.

Slopes & dimensions vary depending on the aerodrome reference code and type of runway

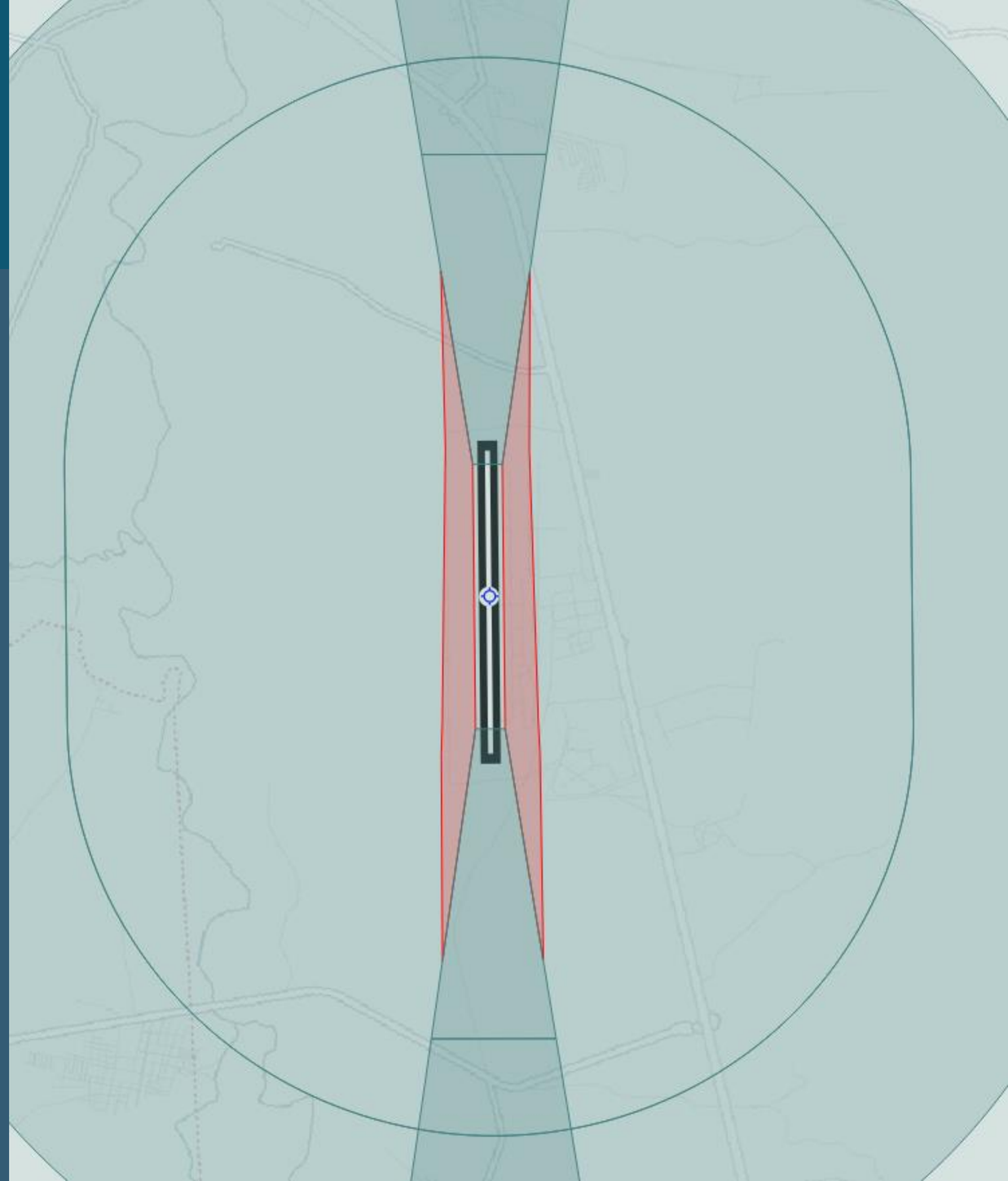
# Transitional Surface

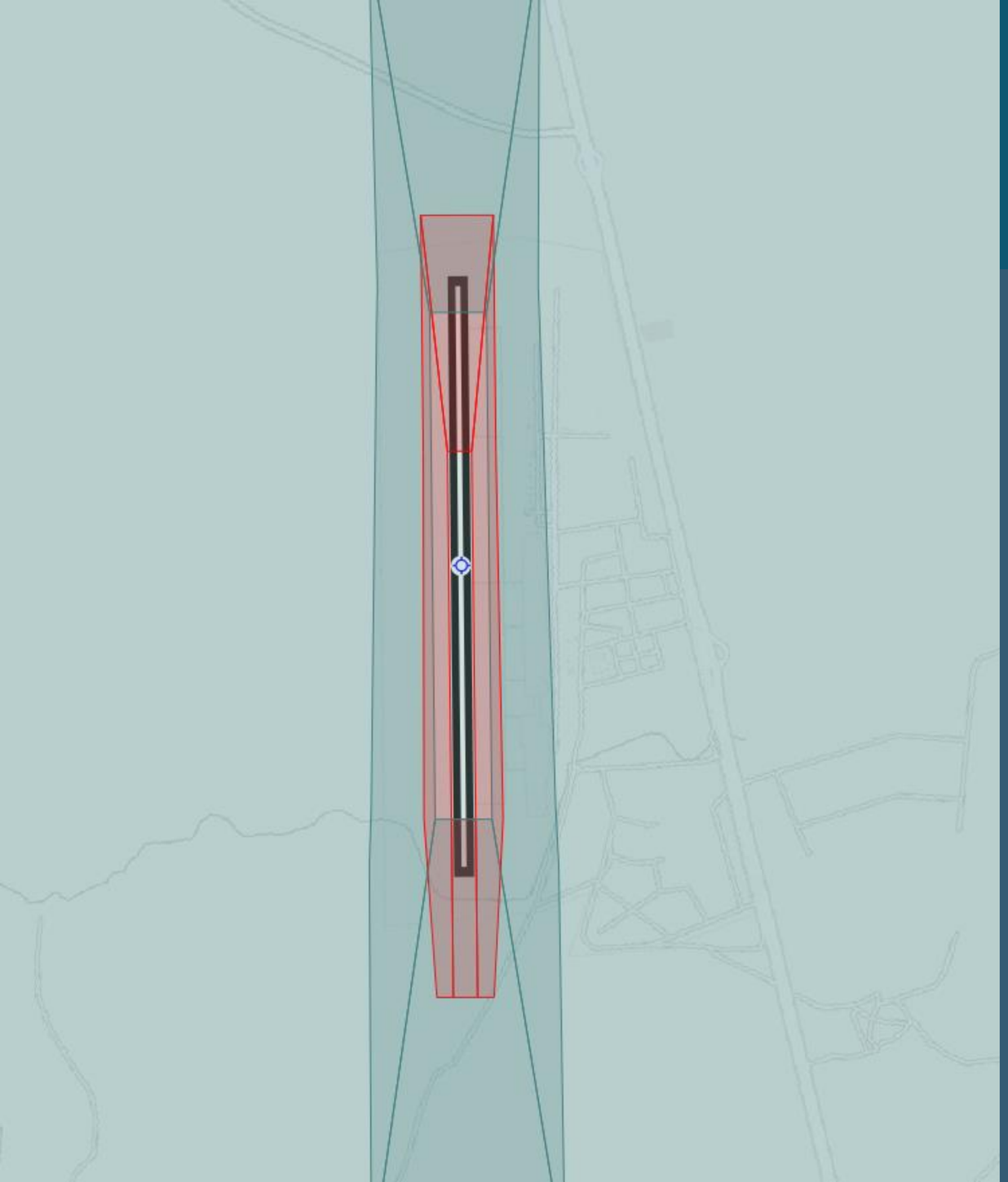
## Purpose

intended to remain as the controlling obstacle limitation surface for buildings, etc.

## Surface definition

A complex surface along the side of the strip and part of the side of the approach surface, that slopes upwards and outwards to the inner horizontal surface.





# Obstacle Free Zone

**Purpose:**

Define a volume of airspace for precision runways that needs to be kept from fixes objects except frangible aids for navigations

**Composed of:**

Inner approach

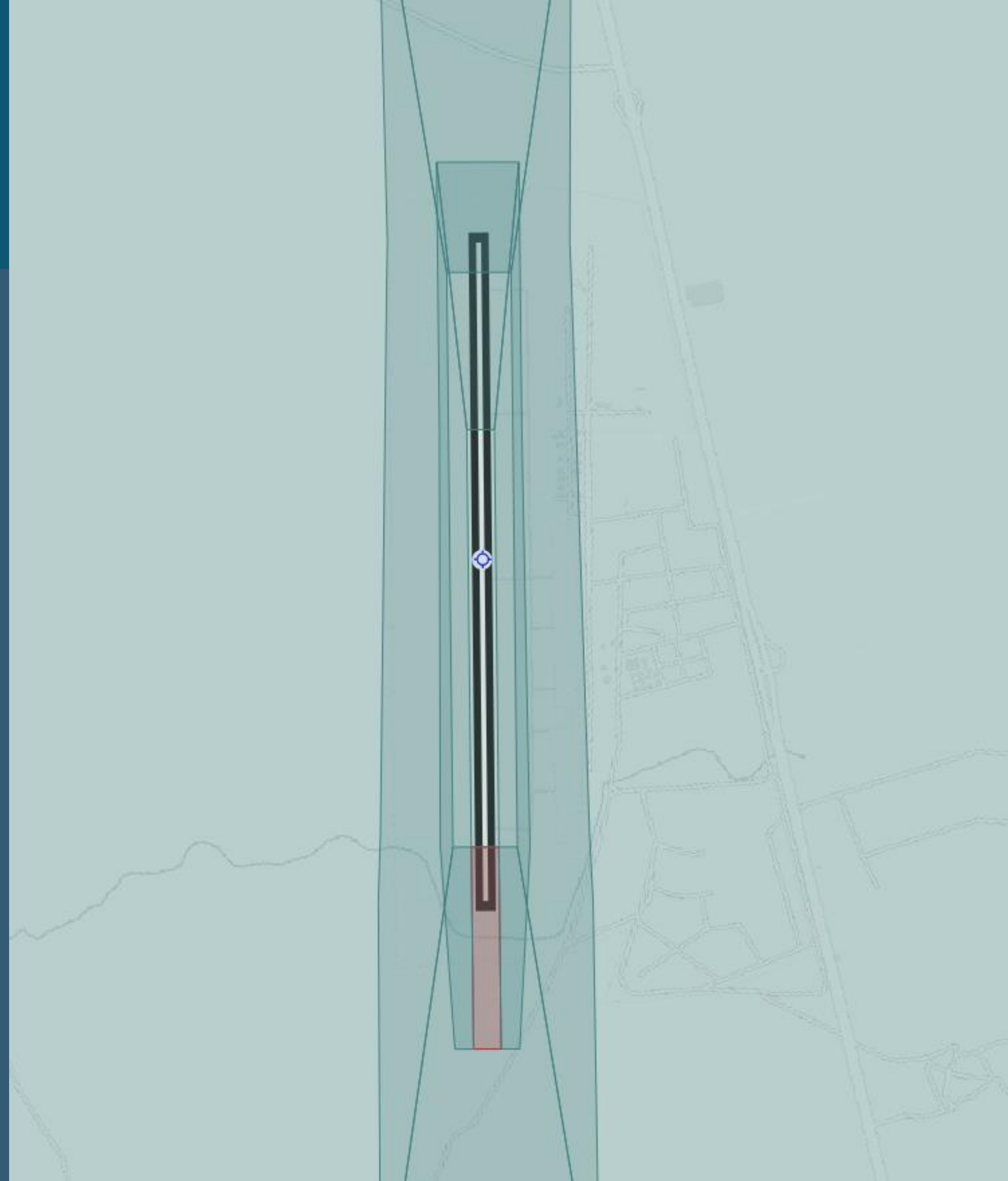
Inner transitional

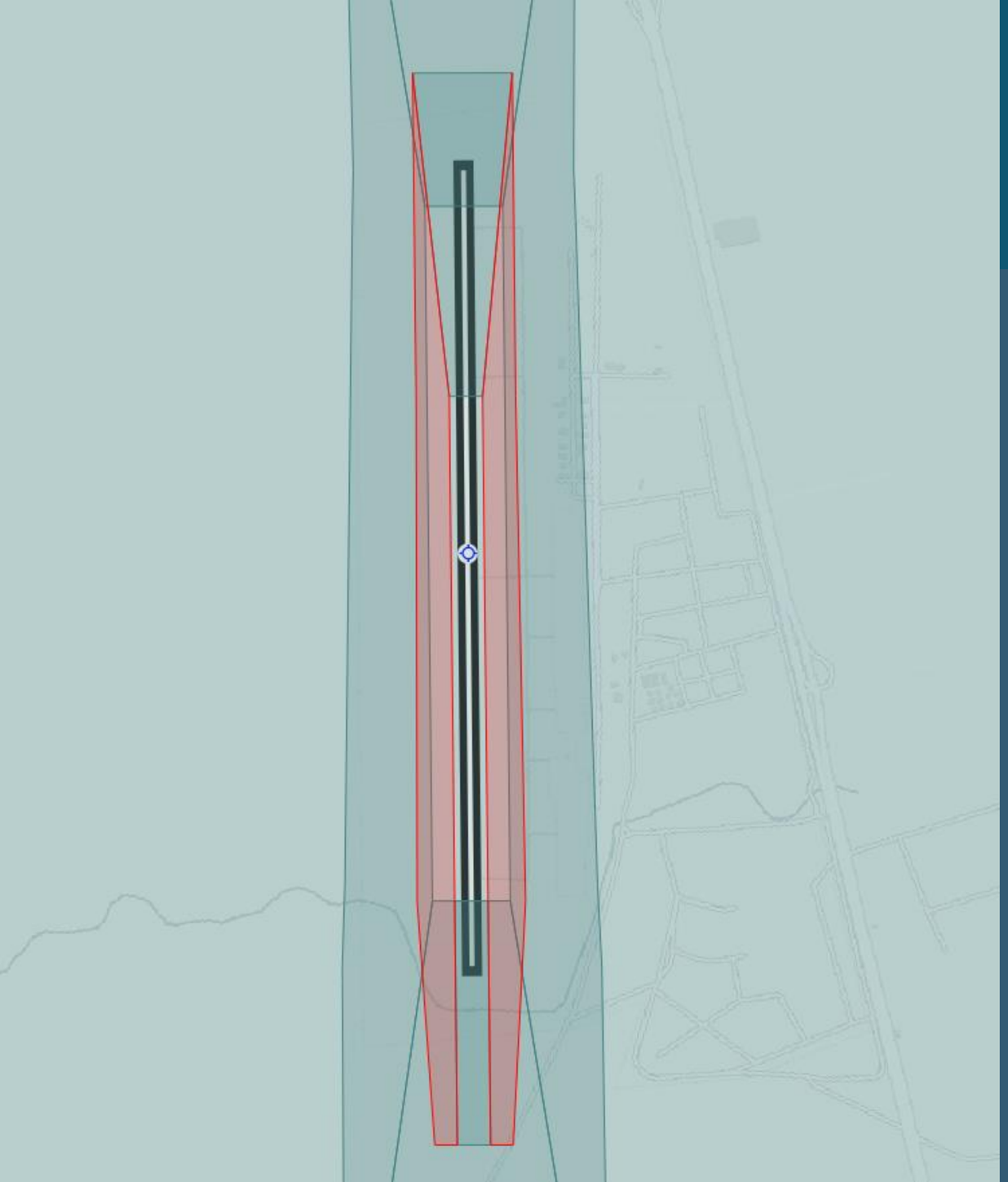
Balked landing surfaces

# Inner Approach Surface

## Surface definition

A rectangular portion of the approach surface immediately preceding the threshold.





# Inner Transitional Surface

**Purpose:**

Controlling OLS for navigation aids, aircraft & other vehicles that must be near the runway and which is not to be penetrated except for frangible objects

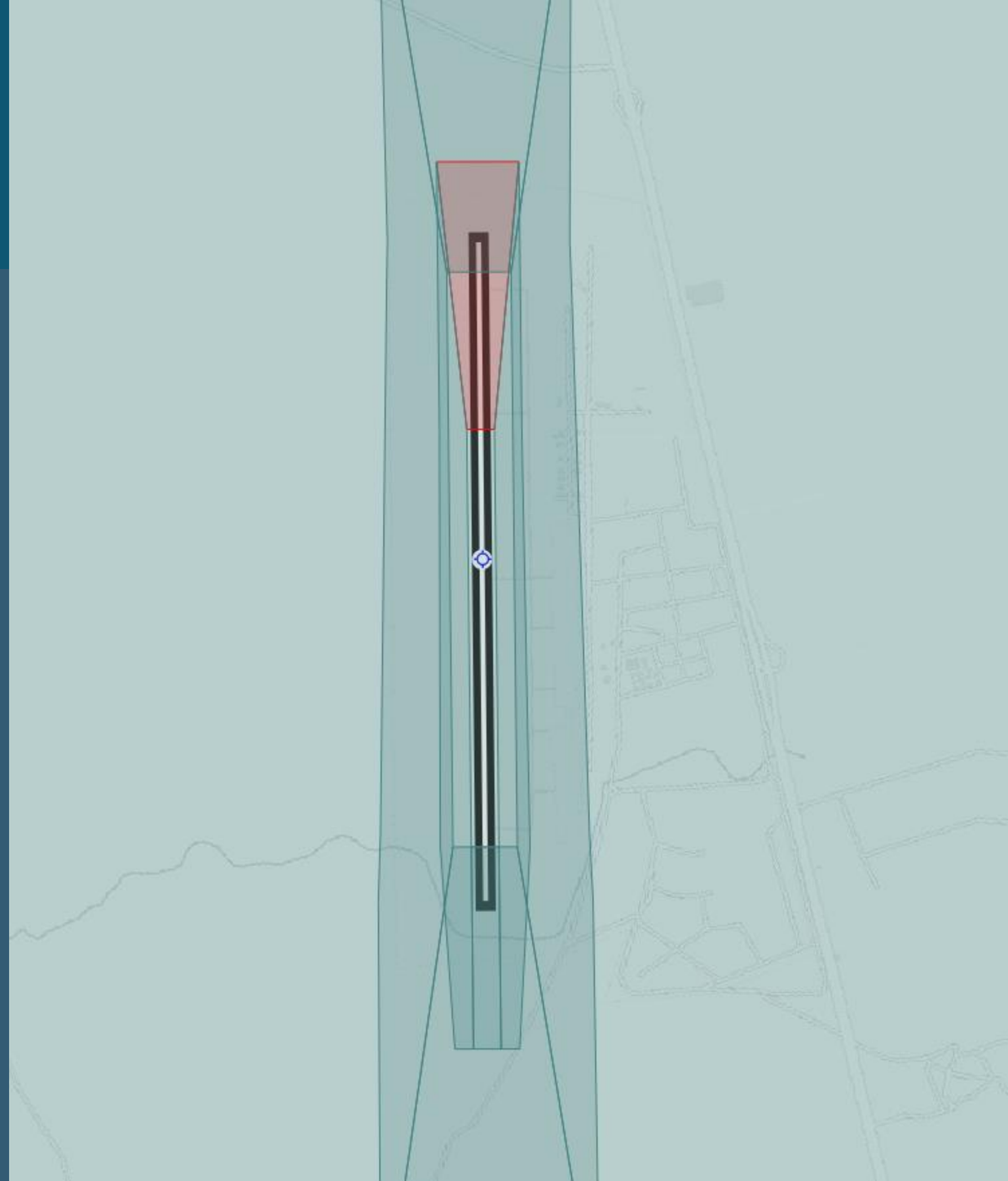
Surface definition

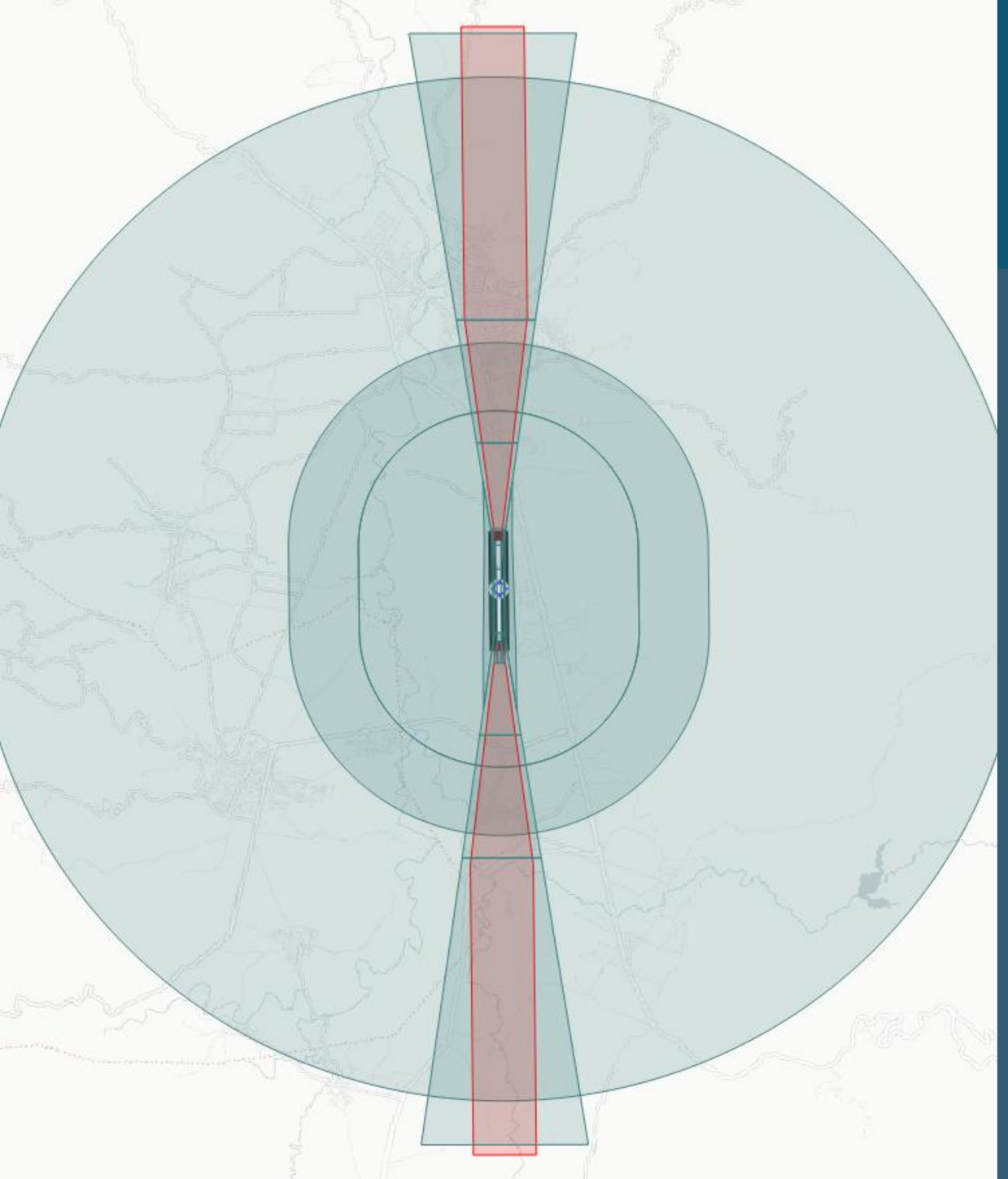
A surface similar to the transitional surface but closer to the runway

# Balked Landing Surface

## Surface definition

An inclined plane located at a specified distance after the threshold, extending between the inner transitional surface.





# Take-off climb surface

## Purpose

Protection for an aircraft on take-off

Obstacles need to be removed and marked/lighted if removal not possible

May impact MTOW for aircraft

## Surface definition

An inclined plane or other specified surface beyond the end of a runway or clearway.

Dimensions and slopes vary according to the aerodrome

APPROACH RUNWAYS

| Surface and dimensions[a] (1) | RUNWAY CLASSIFICATION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Non-instrument Code number | | | | Non-precision approach Code number | | | Precision approach category I Code number | | II or III Code number |
| | 1 (2) | 2 (3) | 3 (4) | 4 (5) | 1,2 (6) | 3 (7) | 4 (8) | 1,2 (9) | 3,4 (10) | 3,4 (11) |
| CONICAL | | | | | | | | | | |
| Slope | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| Height | 35 m | 55 m | 75 m | 100 m | 60 m | 75 m | 100 m | 60 m | 100 m | 100 m |
| INNER HORIZONTAL | | | | | | | | | | |
| Height | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m |
| Radius | 2 000 m | 2 500 m | 4 000 m | 4 000 m | 3 500 m | 4 000 m | 4 000 m | 3 500 m | 4 000 m | 4 000 m |
| INNER APPROACH | | | | | | | | | | |
| Width | — | — | — | — | — | — | — | 90 m | 120 m[e] | 120 m[e] |
| Distance from threshold | — | — | — | — | — | — | — | 60 m | 60 m | 60 m |
| Length | — | — | — | — | — | — | — | 900 m | 900 m | 900 m |
| Slope | | | | | | | | 2.5% | 2% | 2% |

# Table 4-1 Dimensions and slopes of obstacle limitation surfaces – Approach runways

| APPROACH | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Length of inner edge | 60 m | 80 m | 150 m | 150 m | 140 m | 280 m | 280 m | 140 m | 280 m | 280 m |
| Distance from threshold | 30 m | 60 m | 60 m | 60 m | 60 m | 60 m | 60 m | 60 m | 60 m | 60 m |
| Divergence (each side) | 10% | 10% | 10% | 10% | 15% | 15% | 15% | 15% | 15% | 15% |
| First section | | | | | | | | | | |
| Length | 1 600 m | 2 500 m | 3 000 m | 3 000 m | 2 500 m | 3 000 m | 3 000 m | 3 000 m | 3 000 m | 3 000 m |
| Slope | 5% | 4% | 3.33% | 2.5% | 3.33% | 2% | 2% | 2.5% | 2% | 2% |
| Second section | | | | | | | | | | |
| Length | — | — | — | — | — | 3 600 m[b] | 3 600 m[b] | 12 000 m | 3 600 m[b] | 3 600 m[b] |
| Slope | — | — | — | — | — | 2.5% | 2.5% | 3% | 2.5% | 2.5% |
| Horizontal section | | | | | | | | | | |
| Length | — | — | — | — | — | 8 400 m[b] | 8 400 m[b] | — | 8 400 m[b] | 8 400 m[b] |
| Total length | — | — | — | — | — | 15 000 m | 15 000 m | 15 000 m | 15 000 m | 15 000 m |

# Table 4-1 Dimensions and slopes of obstacle limitation surfaces – Approach runways

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| INNER TRANSITIONAL | | | | | | | | | | |
| Slope | — | — | — | — | — | — | — | 40% | 33.3% | 33.3% |
| BALKED LANDING SURFACE | | | | | | | | | | |
| Length of inner edge | — | — | — | — | — | — | — | 90 m | 120 m[e] | 120 m[e] |
| Distance from threshold | — | — | — | — | — | — | — | c | 1 800 m[d] | 1 800 m[d] |
| Divergence (each side) | — | — | — | — | — | — | — | 10% | 10% | 10% |
| Slope | — | — | — | — | — | — | — | 4% | 3.33% | 3.33% |

a. All dimensions are measured horizontally unless specified otherwise.
b. Variable length (see 4.2.9 or 4.2.17).
c. Distance to the end of strip.
d. Or end of runway whichever is less.
e. Where the code letter is F (Table 1-1), the width is increased to 140 m except for those aerodromes that accommodate a code letter F aeroplane equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

*Note.— See Circulars 301 and 345, and Chapter 4 of the PANS-Aerodromes, Part I (Doc 9981) for further information.*

# Table 4-1 Dimensions and slopes of obstacle limitation surfaces – Approach runways

**Table 4-2. Dimensions and slopes of obstacle limitation surfaces**

RUNWAYS MEANT FOR TAKE-OFF

| Surface and dimensions[a] (1) | Code number 1 (2) | 2 (3) | 3 or 4 (4) |
|---|---|---|---|
| TAKE-OFF CLIMB | | | |
| Length of inner edge | 60 m | 80 m | 180 m |
| Distance from runway end[b] | 30 m | 60 m | 60 m |
| Divergence (each side) | 10% | 10% | 12.5% |
| Final width | 380 m | 580 m | 1 200 m<br>1 800 m[c] |
| Length | 1 600 m | 2 500 m | 15 000 m |
| Slope | 5% | 4% | 2%[d] |

# Table 4-2 Dimensions and slopes of OLS (Runways meant for take-off)

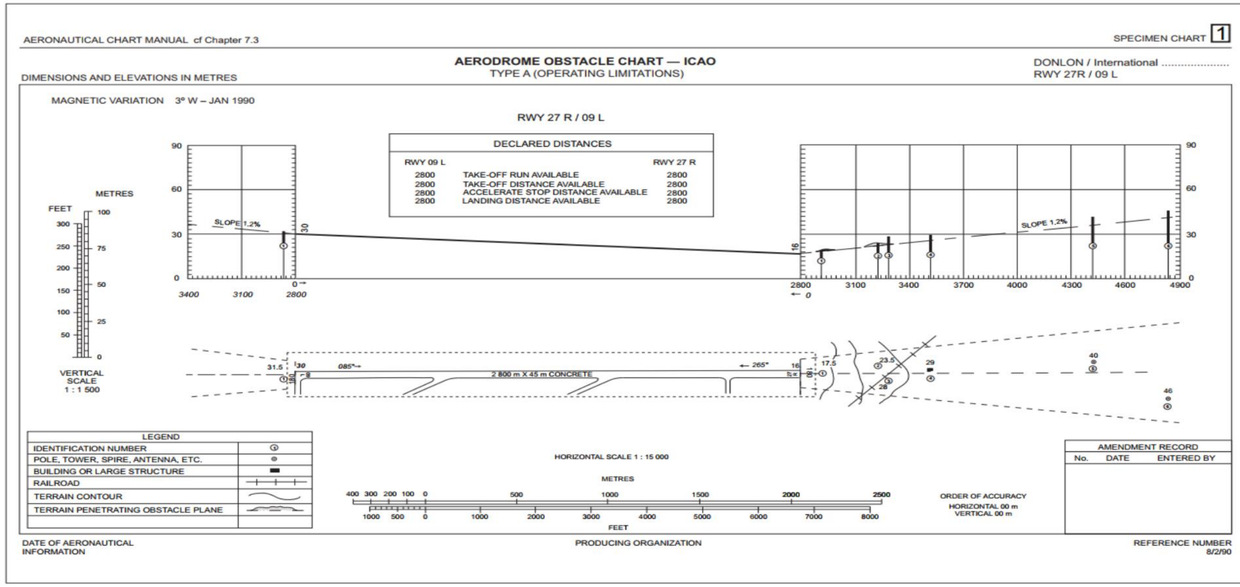
## EADD AD 2.10 AERODROME OBSTACLES

| In Area 2 | | | | | |
|---|---|---|---|---|---|
| *OBST ID/ Designation* | *OBST type* | *OBST position* | *ELEV/HGT* | *Markings/ Type, colour* | *Remarks* |
| a | b | c | d | e | f |
| EADDOB001 | Antenna | 522142.17N 0320215.24W | 93/60 M | MARKED/FLS W | Obstacle data sets are available (see GEN 3.1.6) |
| EADDOB002 | Power line | 522151.82N 0315845.12W | 65/15 M | MARKED | |
| EADDOB003 | Tower | 522203.36N 0315457.22W | 40/12 M | LGTD | |
| EADDOB004 | Mobile OBST | 522243.85N 0315455.58W | 28/3 M | NIL | |

| In Area 3 | | | | | |
|---|---|---|---|---|---|
| *OBST ID/ Designation* | *OBST type* | *OBST position* | *ELEV/HGT* | *Markings/ Type, colour* | *Remarks* |
| a | b | c | d | e | f |
| EADDOB005 | Terminal building | 522124.86N 0315452.18W | 31.5/15 M | MARKED/HI R | Obstacle data sets are available (see GEN 3.1.6) |
| EADDOB006 | Hangar | 522115.34N 0315532.17W | 55/20 M | LGTD | |
| EADDOB007 | Antenna | 522138.15N 0315425.48W | 37/4 M | LGTD | |

## ENR 5.4 AIR NAVIGATION OBSTACLES — AREA 1
(Height 100 m AGL or higher)

| *OBST ID or designation* | *OBST type* | *OBST position* | *ELEV/HGT (M)* | *OBST LGT Type/Colour* | *Remarks* |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Justine | Mast | 510136N 0311932W | 277/163 | OBST/R | Obstacle data sets are available (see GEN 3.1.6) |
| 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) | |




# Aeronautical Information Management Publication requirements

# ENR 5.4 Obstacles

Air navigation obstacles

#OBS-DS# A list of obstacles affecting air navigation in Area 1 (the entire State territory), including:

1) obstacle identification or designation;

2) type of obstacle;

3) obstacle position, represented by geographical coordinates in degrees, minutes and seconds;

4) obstacle elevation and height to the nearest metre or foot; and

5) type and colour of obstacle lighting (if any).

Note 1.— An obstacle whose height above the ground is 100 m and higher is considered an obstacle for Area 1.

Note 2.— Specifications concerning the determination and reporting (accuracy of field work and data integrity) of positions (latitude and longitude) and elevations/heights for obstacles in Area 1 are given in Appendix 1.

# AD 2.10 Obstacles

#OBS-DS# Detailed description of obstacles, including:

1) obstacles in Area 2:

a) obstacle identification or designation;

b) type of obstacle;

c) obstacle position, represented by geographical coordinates in degrees, minutes, seconds and tenths of seconds;

d) obstacle elevation and height to the nearest metre or foot;

e) obstacle marking, and type and colour of obstacle lighting (if any); and

f) NIL indication, if appropriate.

# AD 2.10 Obstacles

2) the absence of an Area 2 data set for the aerodrome is to be clearly stated and obstacle data are to be provided for:

a) obstacles that penetrate the obstacle limitation surfaces;

b) obstacles that penetrate the take-off flight path area obstacle identification surface; and

c) other obstacles assessed as being hazardous to air navigation.

# AD 2.10 Obstacles

3) indication that information on obstacles in Area 3 is not provided, or if provided:

a) obstacle identification or designation;

b) type of obstacle;

c) obstacle position, represented by geographical coordinates in degrees, minutes, seconds and tenths of seconds;

d) obstacle elevation and height to the nearest tenth of a metre or tenth of a foot;

# AD 2.10 Obstacles

e) obstacle marking, and type and colour of obstacle lighting (if any);

f) if appropriate, an indication that the list of obstacles is available as a digital data set, and a reference to GEN 3.1.6; and

g) NIL indication, if appropriate.

# Terrain and Obstacle Dataset

## 5.3 Digital data sets

### 5.3.1 General

5.3.1.1 Digital data shall be in the form of the following data sets:

a) AIP data set;

**b) terrain data sets;**

**c) obstacle data sets;**

d) aerodrome mapping data sets; and

e) instrument flight procedure data sets.

Note.— Detailed specifications concerning the content of the digital data sets are contained in the PANS-AIM (Doc 10066).

# Terrain Datasets

Digital representation of the terrain surface in the form of continuous elevation values (grid)

**Requirements:**

Area 1 is mandatory

*For international airports:*

Area 2a

Take-off flight path area

Area bounded by the OLS

Recommended:

In the area extending to a 10-km radius from the ARP

within the area between 10 km and the TMA boundary or a 45-km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation

terrain data should be provided for Area 3.

for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters.

# Obstacle Datasets

Shall contain the digital representation of the vertical and horizontal extent of obstacles and not be included in terrain datasets

**Requirements:**

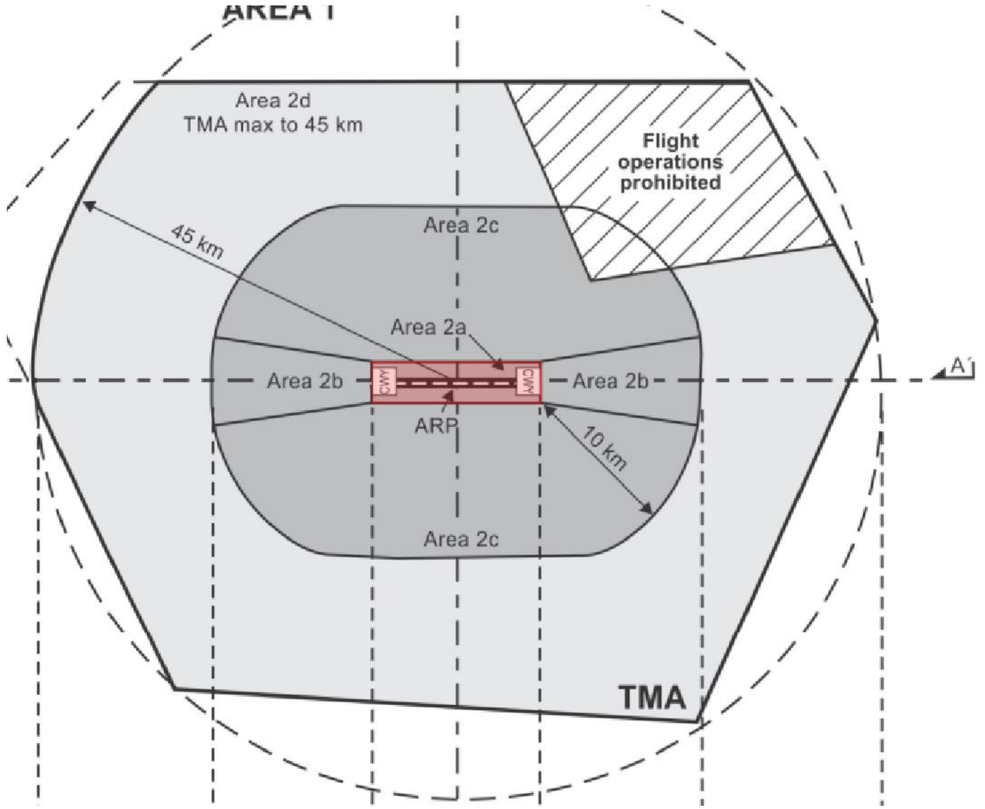
Area 1 is mandatory for 100m AGL or above

*For international airports:*

Area 2 obstacles considered a hazard

For aerodromes regularly used by international civil aviation, obstacle data shall be provided for:

a) Area 2a for those obstacles that penetrate an obstacle data collection surface outlined by a rectangular area around a runway that comprises the runway strip plus any clearway that exists.



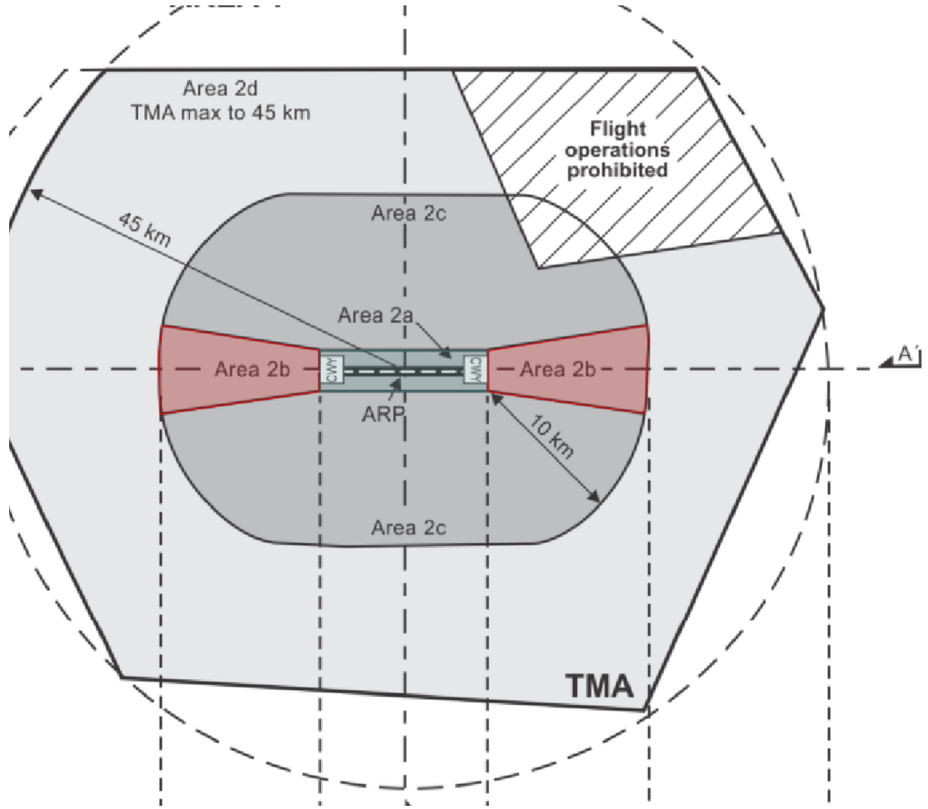
The Area 2a obstacle collection surface shall have a height of 3 m above the nearest runway elevation measured along the runway centre line, and for those portions related to a clearway, if one exists, at the elevation of the nearest runway end

b) objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area

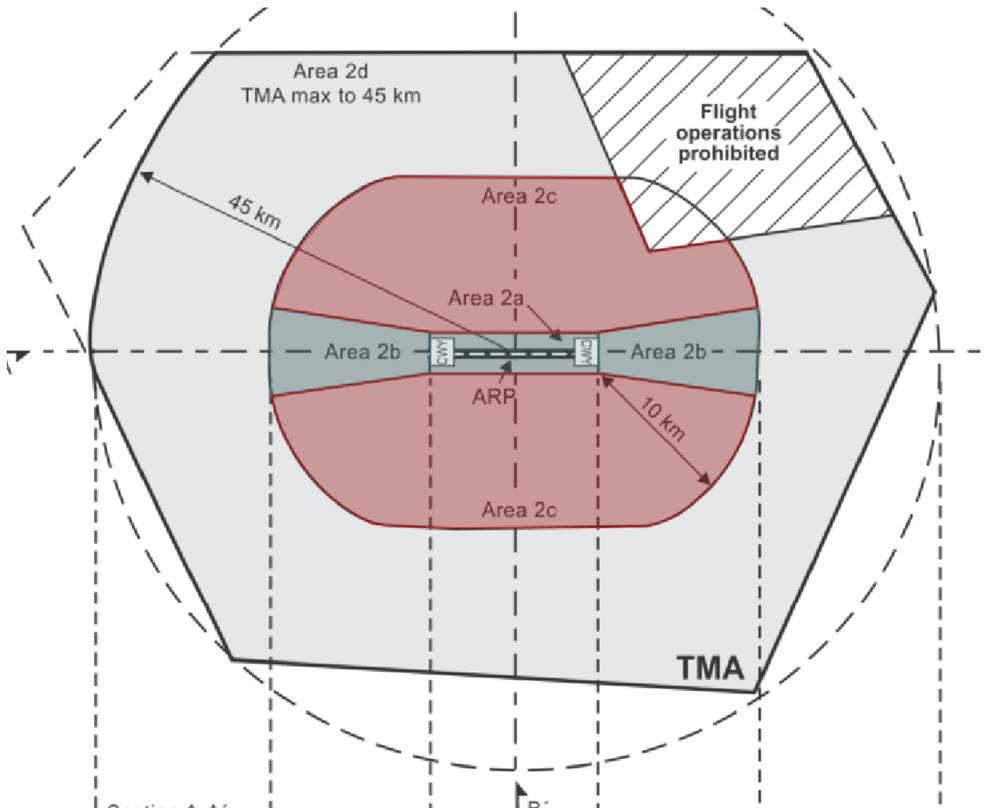
c) penetrations of the aerodrome obstacle limitation surfaces

For aerodromes regularly used by international civil aviation, obstacle data should be provided for Areas 2b, 2c and 2d for obstacles that penetrate the relevant obstacle data collection surface specified as follows:

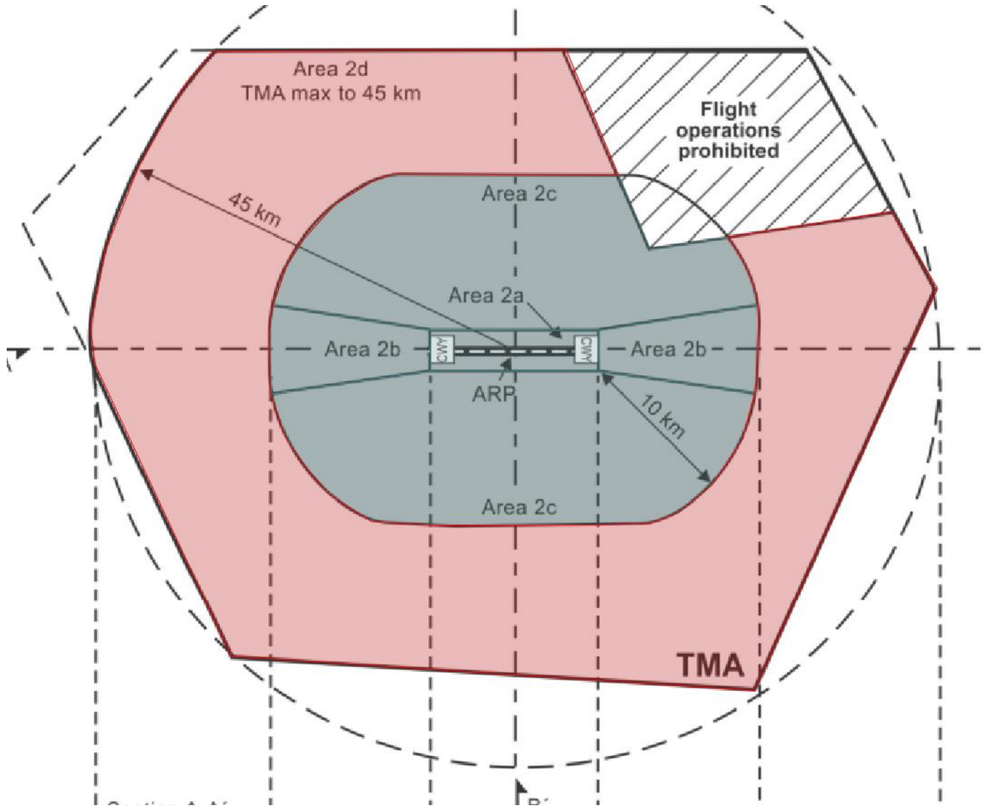
a) Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side. The Area 2b obstacle collection surface has a 1.2 per cent slope extending from the ends of Area 2a at the elevation of the runway end in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side



b) Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The Area 2c obstacle collection surface has a 1.2 per cent slope extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The initial elevation of Area 2c has the elevation of the point of Area 2a at which it commences



c) Area 2d: an area outside Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest. The Area 2d obstacle collection surface has a height of 100 m above ground;



## Table A1-6 Obstacle data

| Subject | Property | Sub-Property | Type | Description | Note | Accuracy | Integrity | Orig Type | Pub. Res. | Chart Res. |
|---|---|---|---|---|---|---|---|---|---|---|
| Obstacle | | | | All fixed (whether temporary or permanent) and mobile obstacles or parts thereof. | | | | | | |
| | Obstacle identifier | | Text | Unique identifier of obstacle | | | | | | |
| | Operator / Owner | | Text | Name and Contact information of obstacle operator or owner | | | | | | |
| | Geometry type | | Code list | An indication whether the obstacle is a point, line or polygon. | | | | | | |
| | Horizontal position | | Point<br>Line<br>Polygon | Horizontal position of obstacle | | See Note 1) | | | | |
| | Horizontal extent | | Distance | Hoizontal extent of the obstacle | | | | | | |
| | Elevation | | Elevation | Elevation of the highest point of the obstacle. | | See Note 2) | | | | |
| | Height | | Height | Height of the obstacle above ground | | | | | | |
| | Type | | Text | Type of obstacle | | | | | | |
| | Date and time stamp | | Date | Date and time the obstacle was created | | | | | | |
| | Operations | | Text | Feature operations of mobile obstacles | | | | | | |
| | Effectivity | | Text | Effectivity of temporary types of obstacles | | | | | | |
| | Lighting | | | | | | | | | |
| | | Type | Text | Type of lighting | | | | | | |
| | | Colour | Text | Colour of the obstacle lighting | | | | | | |
| | Marking | | Text | Type of marking of obstacle | | | | | | |
| | Material | | Text | Predominant surface material of the obstacle | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Note 1) | Obstacles in Area 1 | 50 m | routine | surveyed | 1 sec | as plotted |
| | Obstacles in Area 2 (including 2a, 2b, 2c, 2d, take-off flight path area and obstacle limitation surfaces) | 5 m | essential | surveyed | 1/10 sec | 1/10 sec |
| | Obstacles in Area 3 | 0.5 m | essential | surveyed | 1/10 sec | 1/10 sec |
| | Obstacles in Area 4 | 2.5 m | essential | surveyed | | |
| Note 2) | Obstacles in Area 1 | 30 m | routine | surveyed | 1 m or 1 ft | 3 m (10 ft) |
| | Obstacles in Area 2 (including 2a, 2b, 2c, 2d, take-off flight path area and obstacle limitation surfaces) | 3 m | essential | surveyed | 1 m or 1 ft | 1 m or 1 ft |
| | Obstacles in Area 3 | 0.5 m | essential | surveyed | 0.1 m or 0.1 ft0.01 | 1m or 1 ft |
| | Obstacles in Area 4 | 1 m | essential | surveyed | 0.1 m | |

## Table A1-6 Obstacle data

| Subject | Property | Sub-Property | Type | Description | Note | Accuracy | Integrity | Orig Type | Pub. Res. | Chart Res. |
|---|---|---|---|---|---|---|---|---|---|---|
| Obstacle | | | | All fixed (whether temporary or permanent) and mobile obstacles or parts thereof. | | | | | | |
| | Obstacle identifier | | Text | Unique identifier of obstacle | | | | | | |
| | Operator / Owner | | Text | Name and Contact information of obstacle operator or owner | | | | | | |
| | Geometry type | | Code list | An indication whether the obstacle is a point, line or polygon. | | | | | | |
| | Horizontal position | | Point<br>Line<br>Polygon | Horizontal position of obstacle | | See Note 1) | | | | |
| | Horizontal extent | | Distance | Hoizontal extent of the obstacle | | | | | | |
| | Elevation | | Elevation | Elevation of the highest point of the obstacle. | | See Note 2) | | | | |
| | Height | | Height | Height of the obstacle above ground | | | | | | |
| | Type | | Text | Type of obstacle | | | | | | |
| | Date and time stamp | | Date | Date and time the obstacle was created | | | | | | |
| | Operations | | Text | Feature operations of mobile obstacles | | | | | | |
| | Effectivity | | Text | Effectivity of temporary types of obstacles | | | | | | |
| | Lighting | | | | | | | | | |
| | | Type | Text | Type of lighting | | | | | | |
| | | Colour | Text | Colour of the obstacle lighting | | | | | | |
| | Marking | | Text | Type of marking of obstacle | | | | | | |
| | Material | | Text | Predominant surface material of the obstacle | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Note 1) | Obstacles in Area 1 | 50 m | routine | surveyed | 1 sec | as plotted |
| | Obstacles in Area 2 (including 2a, 2b, 2c, 2d, take-off flight path area and obstacle limitation surfaces) | 5 m | essential | surveyed | 1/10 sec | 1/10 sec |
| | Obstacles in Area 3 | 0.5 m | essential | surveyed | 1/10 sec | 1/10 sec |
| | Obstacles in Area 4 | 2.5 m | essential | surveyed | | |
| Note 2) | Obstacles in Area 1 | 30 m | routine | surveyed | 1 m or 1 ft | 3 m (10 ft) |
| | Obstacles in Area 2 (including 2a, 2b, 2c, 2d, take-off flight path area and obstacle limitation surfaces) | 3 m | essential | surveyed | 1 m or 1 ft | 1 m or 1 ft |
| | Obstacles in Area 3 | 0.5 m | essential | surveyed | 0.1 m or 0.1 ft | 0.01m or 1 ft |
| | Obstacles in Area 4 | 1 m | essential | surveyed | 0.1 m | |

# AERODROME OBSTACLE CHART — ICAO
TYPE A (OPERATING LIMITATIONS)

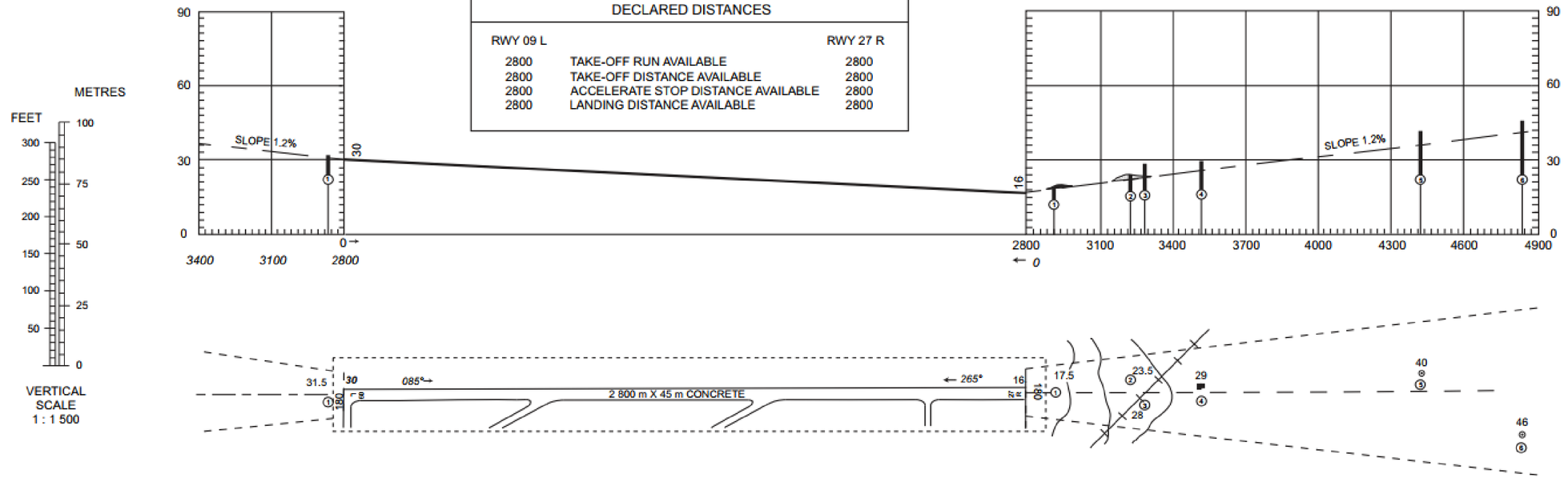
DIMENSIONS AND ELEVATIONS IN METRES

DONLON / International .....
RWY 27R / 09 L

MAGNETIC VARIATION 3° W – JAN 1990

RWY 27 R / 09 L

| DECLARED DISTANCES | | |
|---|---|---|
| RWY 09 L | | RWY 27 R |
| 2800 | TAKE-OFF RUN AVAILABLE | 2800 |
| 2800 | TAKE-OFF DISTANCE AVAILABLE | 2800 |
| 2800 | ACCELERATE STOP DISTANCE AVAILABLE | 2800 |
| 2800 | LANDING DISTANCE AVAILABLE | 2800 |




| LEGEND | |
|---|---|
| IDENTIFICATION NUMBER | ① |
| POLE, TOWER, SPIRE, ANTENNA, ETC. | ⊙ |
| BUILDING OR LARGE STRUCTURE | ■ |
| RAILROAD | |
| TERRAIN CONTOUR | |
| TERRAIN PENETRATING OBSTACLE PLANE | |
| | |

HORIZONTAL SCALE 1 : 15 000

METRES
400 300 200 100 0 500 1000 1500 2000 2500

FEET
1000 500 0 1000 2000 3000 4000 5000 6000 7000 8000

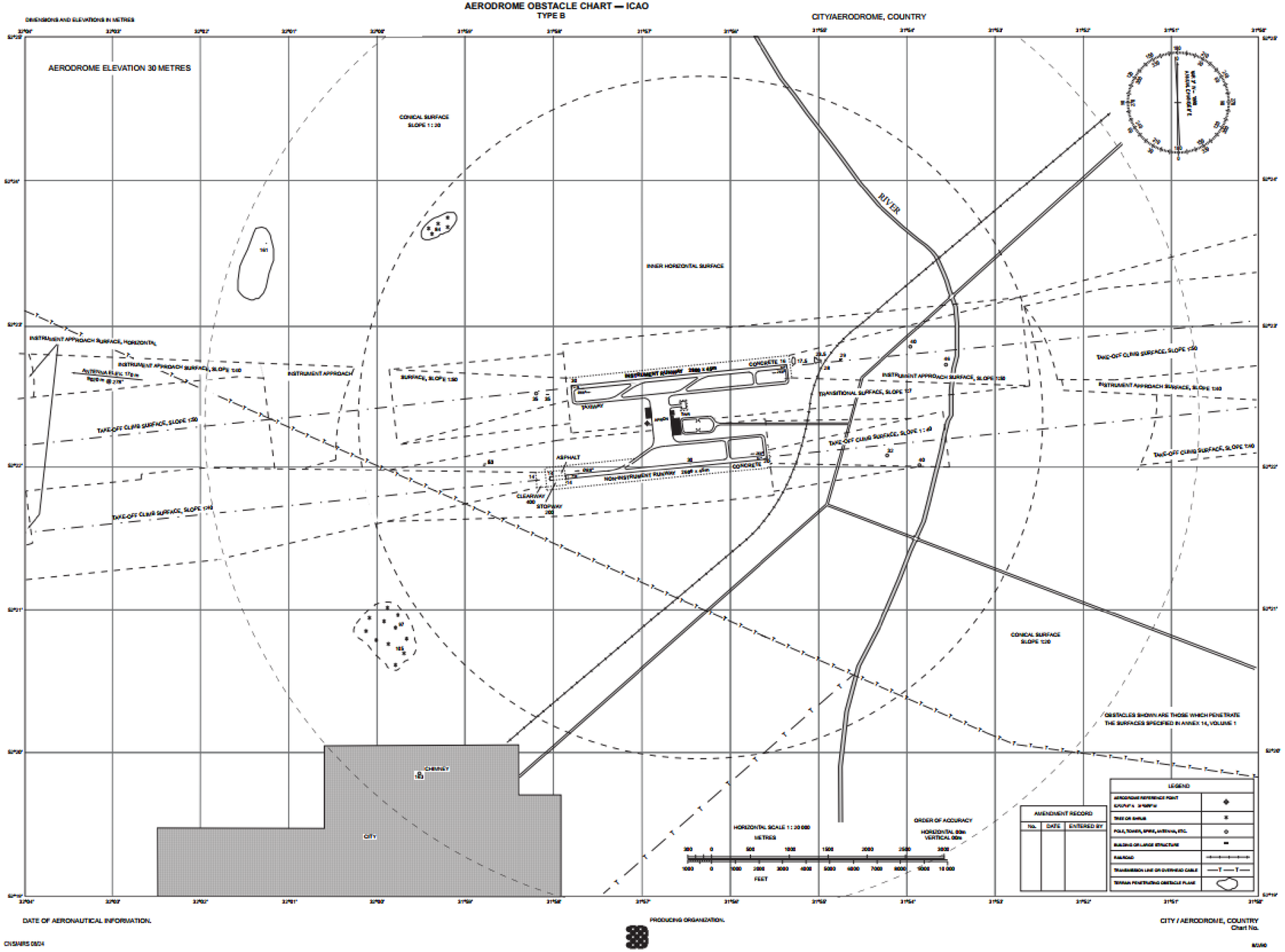
ORDER OF ACCURACY
HORIZONTAL 00 m
VERTICAL 00 m

| AMENDMENT RECORD | | |
|---|---|---|
| No. | DATE | ENTERED BY |
| | | |

DATE OF AERONAUTICAL INFORMATION

PRODUCING ORGANIZATION

REFERENCE NUMBER
8/2/90

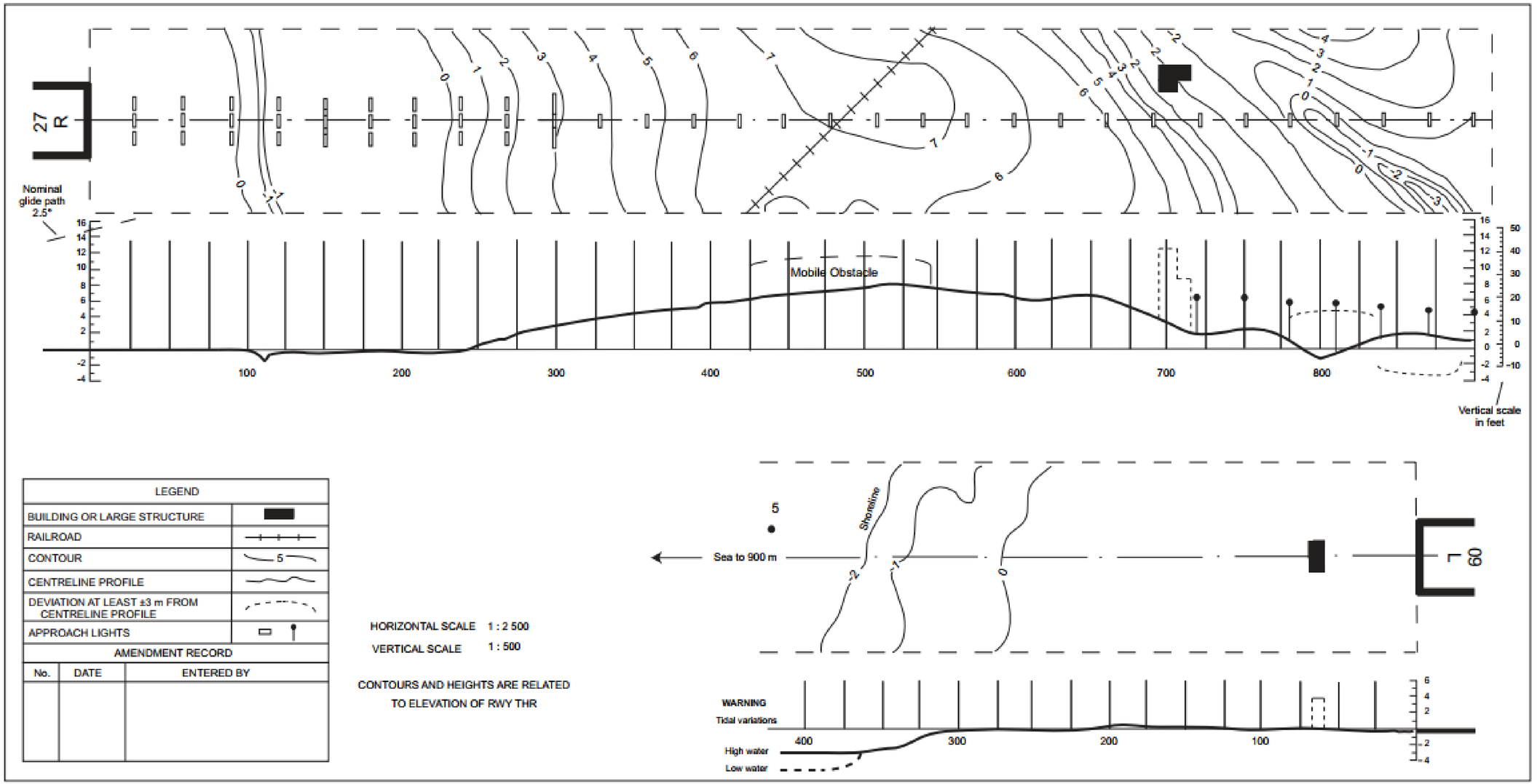

AERODROME OBSTACLE CHART — ICAO
TYPE B
CITY/AERODROME, COUNTRY
DIMENSIONS AND ELEVATIONS IN METRES
AERODROME ELEVATION 30 METRES
CONICAL SURFACE SLOPE 1:20
INNER HORIZONTAL SURFACE
RIVER
INSTRUMENT APPROACH SURFACE, HORIZONTAL
INSTRUMENT APPROACH SURFACE, SLOPE 1:50
INSTRUMENT APPROACH
SURFACE, SLOPE 1:50
TAKE-OFF CLIMB SURFACE, SLOPE 1:50
TAKE-OFF CLIMB SURFACE, SLOPE 1:40
TRANSITIONAL SURFACE, SLOPE 1:7
INSTRUMENT APPROACH SURFACE, SLOPE 1:30
TAKE-OFF CLIMB SURFACE, SLOPE 1:40
INSTRUMENT APPROACH SURFACE, SLOPE 1:50
TAKE-OFF CLIMB SURFACE, SLOPE 1:40
CONCRETE
ASPHALT
NON-INSTRUMENT RUNWAY
CLEARWAY 60
STOPWAY 60
CONICAL SURFACE SLOPE 1:20
CHIMNEY
CITY
OBSTACLES SHOWN ARE THOSE WHICH PENETRATE THE SURFACES SPECIFIED IN ANNEX 14, VOLUME 1
LEGEND
AMENDMENT RECORD
No.
DATE
ENTERED BY
HORIZONTAL SCALE 1 : 20 000
METRES
FEET
ORDER OF ACCURACY
HORIZONTAL 50m
VERTICAL 00m
DATE OF AERONAUTICAL INFORMATION
PRODUCING ORGANIZATION
CITY / AERODROME, COUNTRY
Chart No.

DISTANCES AND HEIGHT IN METRES

## PRECISION APPROACH TERRAIN CHART — ICAO

CITY/AERODROME

RWY 27 R/09 L




| LEGEND | |
|---|---|
| BUILDING OR LARGE STRUCTURE | |
| RAILROAD | |
| CONTOUR | 5 |
| CENTRELINE PROFILE | |
| DEVIATION AT LEAST ±3 m FROM CENTRELINE PROFILE | |
| APPROACH LIGHTS | |

| AMENDMENT RECORD | | |
|---|---|---|
| No. | DATE | ENTERED BY |
| | | |

HORIZONTAL SCALE 1 : 2 500

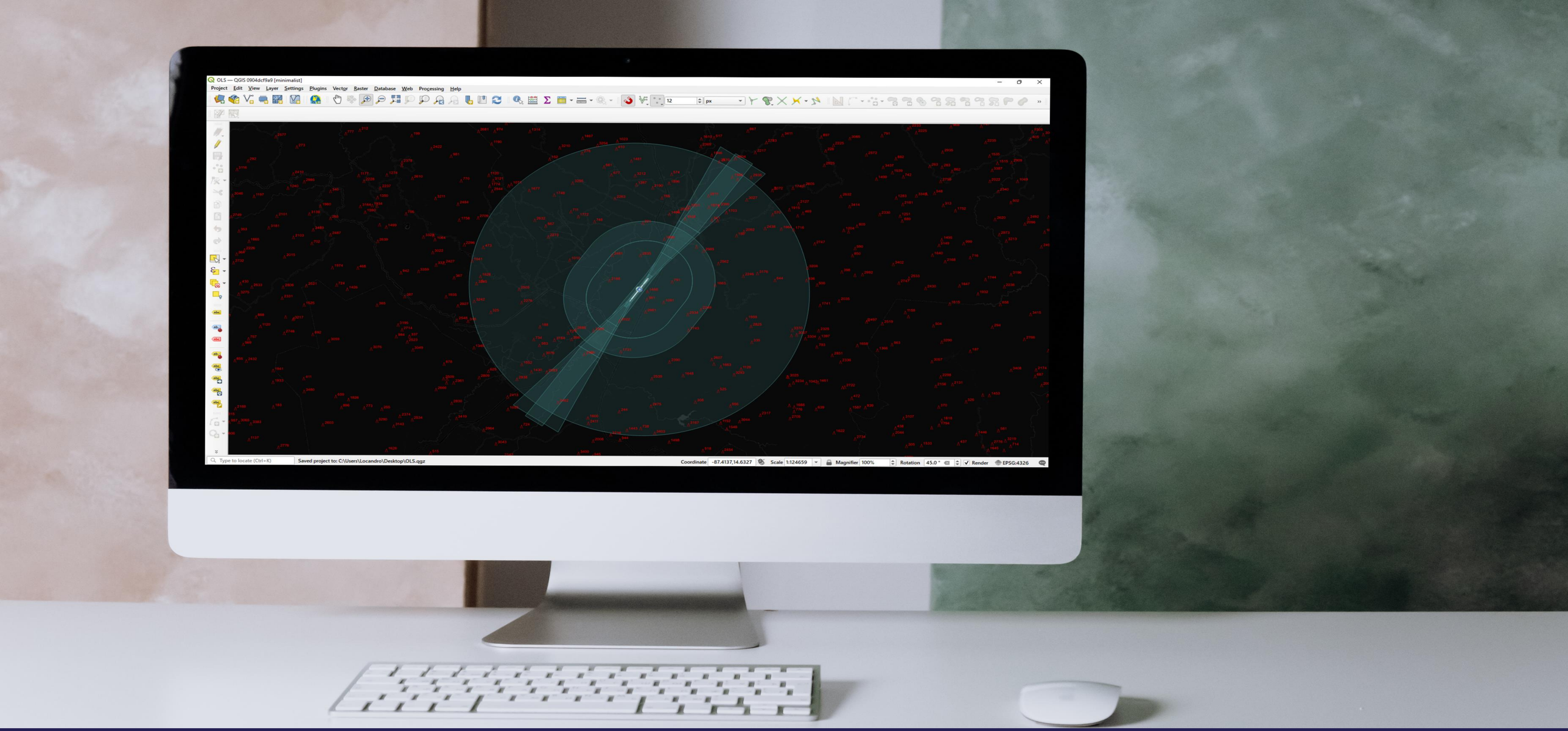
VERTICAL SCALE 1 : 500

CONTOURS AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

DATE OF AERONAUTICAL INFORMATION

PRODUCING ORGANIZATION

REFERENCE NUMBER 7/1/67




# Current practices

# AIP Spain

Aeronautical Information Service

07-OCT-21 (including AIRAC 09/21 and AMDT 346/21)

Filter sections. examples: GEN 2, Service, LEBL, Barajas, LEMD AOC, ATS routes, ...

## Digital data

Digital data provided as data sets in AIXM5 format. (+)

| | |
|---|---|
| Terrain | Terrain data set |
| Area 1 Obstacles | Area 1 obstacle data set |
| Aerodrome obstacles | For each aerodrome/heliport. Areas 2, 3 and 4 obstacle data sets |

## Aerodrome obstacles

For each aerodrome/heliport. Areas 2, 3 and 4 obstacle data sets (+)

| | |
|---|---|
| OBST AD LECO | A CORUÑA |
| OBST AD LEAL | ALICANTE-ELCHE |
| OBST AD LEAM | ALMERÍA |
| OBST AD LESU | ANDORRA-LA SEU D'URGELL |
| OBST AD LEAS | ASTURIAS |
| OBST AD LEBL | BARCELONA/Josep Tarradellas Barcelona-El Prat |
| OBST AD LEBB | BILBAO |
| OBST AD LEBG | BURGOS/Villafría |

### Web applications

Insignia | ENAIRE Drones | Insignia VFR | VFR Guide

### Digital data

Access to digital data (AIMX5) provided as data sets.

### AIS news and alerts

loading...

more

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Any query or report about the AIP? Write us at ais@enaire.es.

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| Norway Area 1 | | | |
|---|---|---|---|
| Effective date | Excel | AIXM | ZIP |
| 15.07.2021 | Download | Download | Download |

| Aerodrome | | | | |
|---|---|---|---|---|
| ENAL | Area | Effective date | Excel | AIXM |
| | Area 2 | 25.03.2021 | Download | Download |
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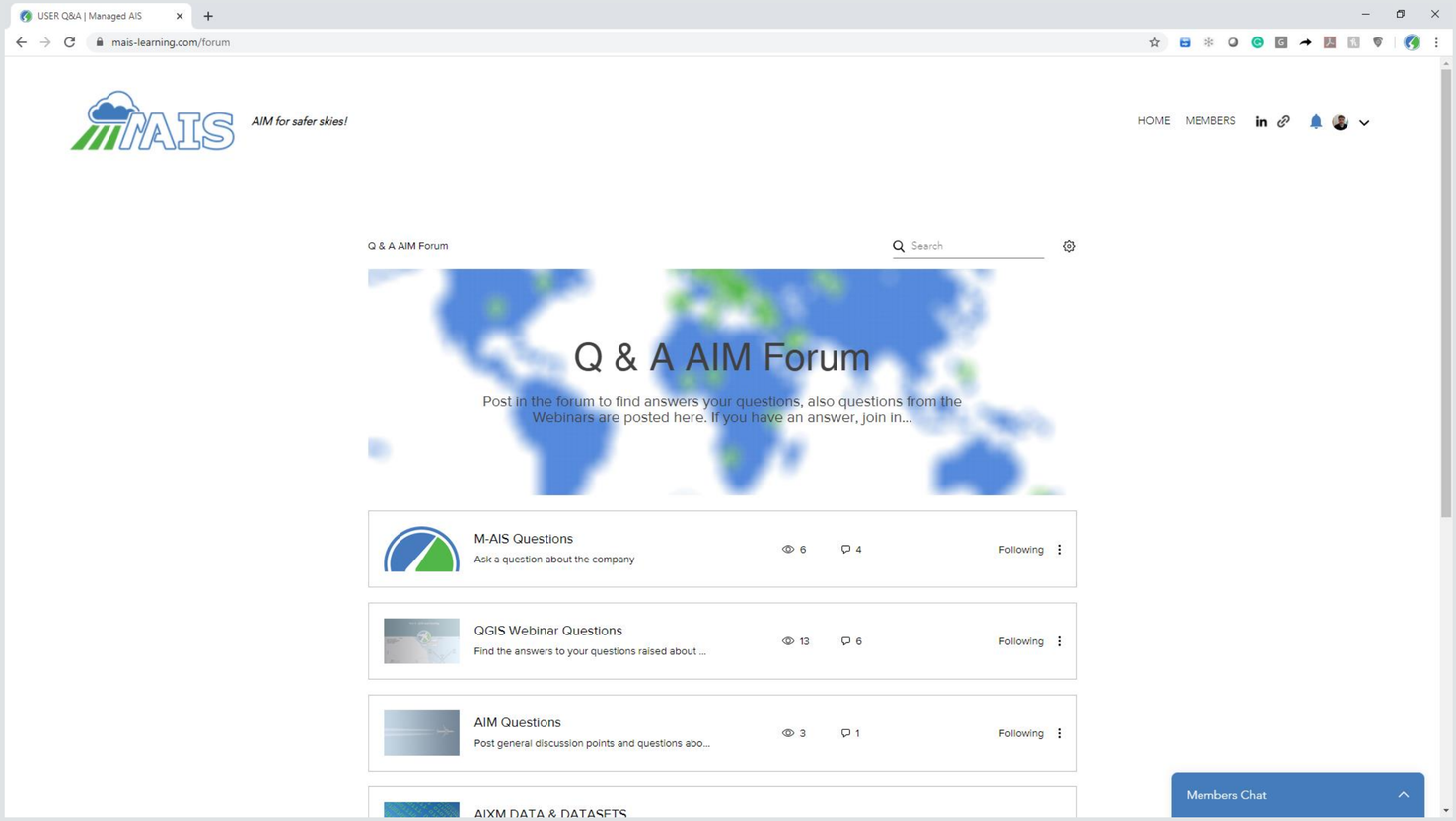
# Possible way forwards

- ↘ Update chart requirements
- ↘ Withdraw certain aeronautical charts
- ↘ Push towards digital data and geographic formats in general
- ↘ Based on the Aeronautical Data Catalogue align all future developments for data exchange and SWIM

# Additional resources and Forum

# MAIS-LEARNING.COM




https://www.mais-learning.com/aim-forum

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