



ICAO MID

# Webinar on the provision of Terrain and Obstacle (TOD) and AIP Datasets

IDS AirNav  
an enav group company

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## IDS AirNav solution for AMDB/eTOD data management



- eTOD is the IDS Airnav answer for terrain and human made obstacles data management for :
- Import, validate and disseminate terrain and obstacle data coming from survey in accordance with ICAO doc 10066 (PANS-AIM)
  - Design and assess ICAO Annex 4, 14 and 10066 (PANS-AIM) surfaces
  - Obstacle Chart (Type A, B and PATC) production



## eTOD – main modules

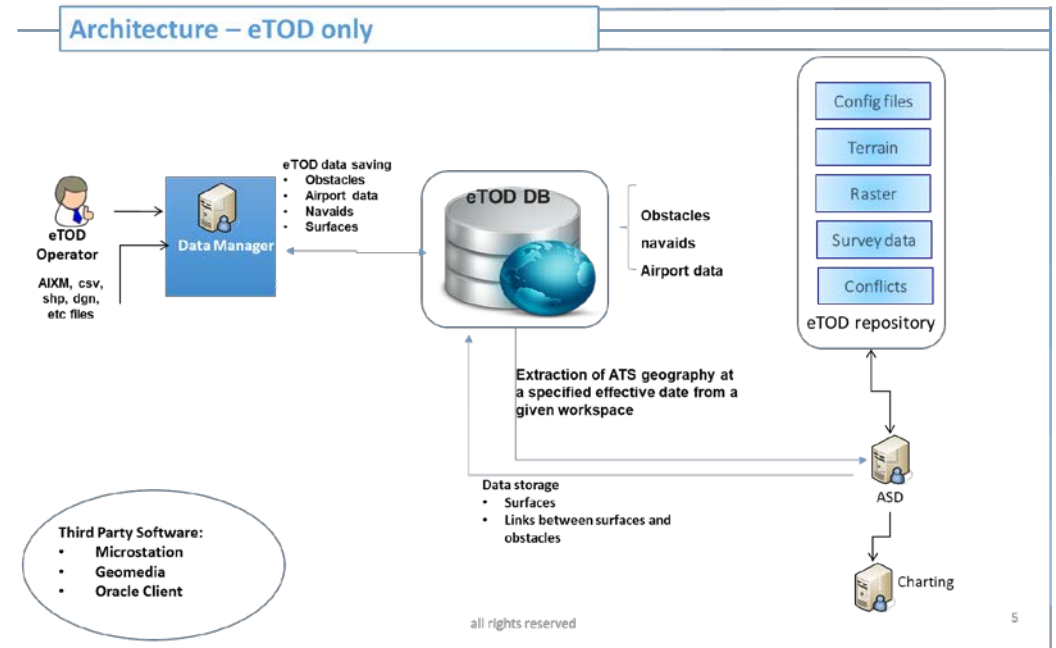
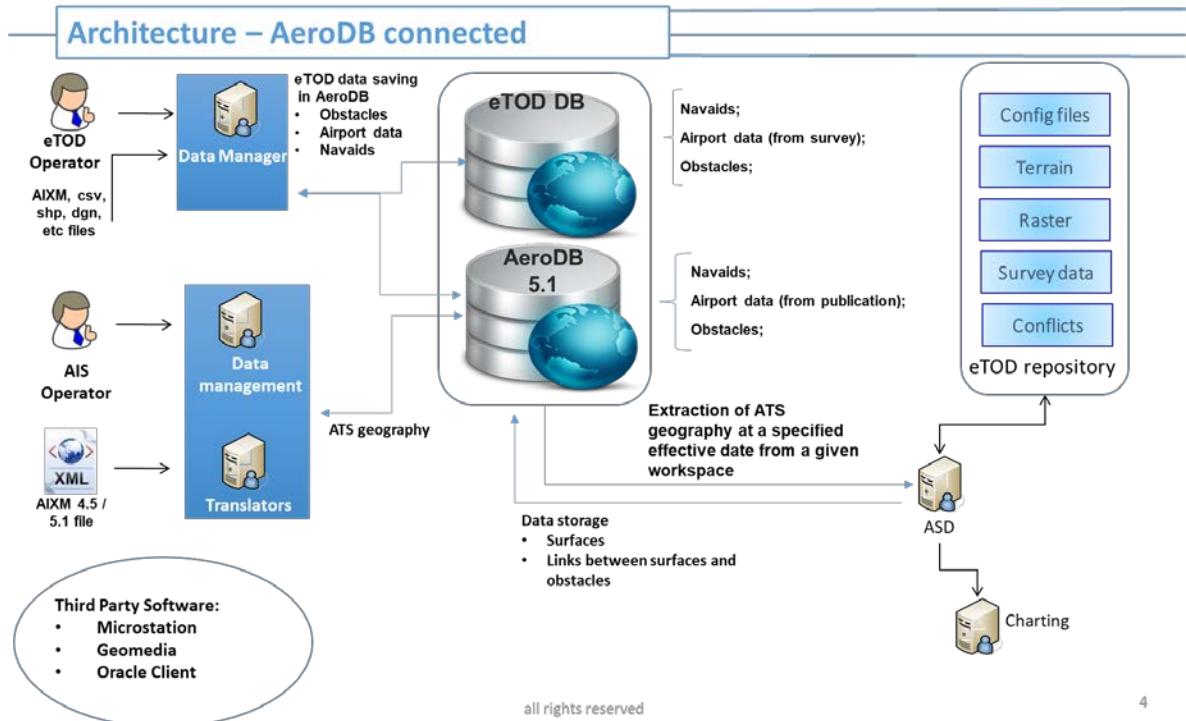
eTOD is composed of 3 modules:

1. Data Manager (DM): import, validate and disseminate obstacle and terrain data
2. Airport Surface Designer (ASD): Design and assess ICAO Annex 4, 14 and 10066 surfaces and store them all in the database with the controlling obstructions
3. Charting : Type A, B and PATC charts generation

It can be deployed with existing AeroDB instances or with a dedicated validation (AIXM 5.1 extended, temporal based) database



## eTOD – Deployment models





## eTOD - Data Manager main features

- **Import standard input file formats** : AIXM 5.1, KML, DVOF, DOF, ...
- **Import non standard input file formats** : generic ASCII, xml
- **Define non standard input file formats**: powerful tool for mapping the extended AIXM 5.1 schema with the input formats
- **Vector file formats management**: SHP, dgn, dxf file import and convert in aeronautical (AIXM 5.1 extended) format
- **Validate the imported data**: before storing the data in the validation database data can be validated in accordance to **the Annex 15 ICAO** requirements or custom rules
- **Conflicts: detection** of conflicts on existing data done by identifier, logical key or position with a dedicated tolerances



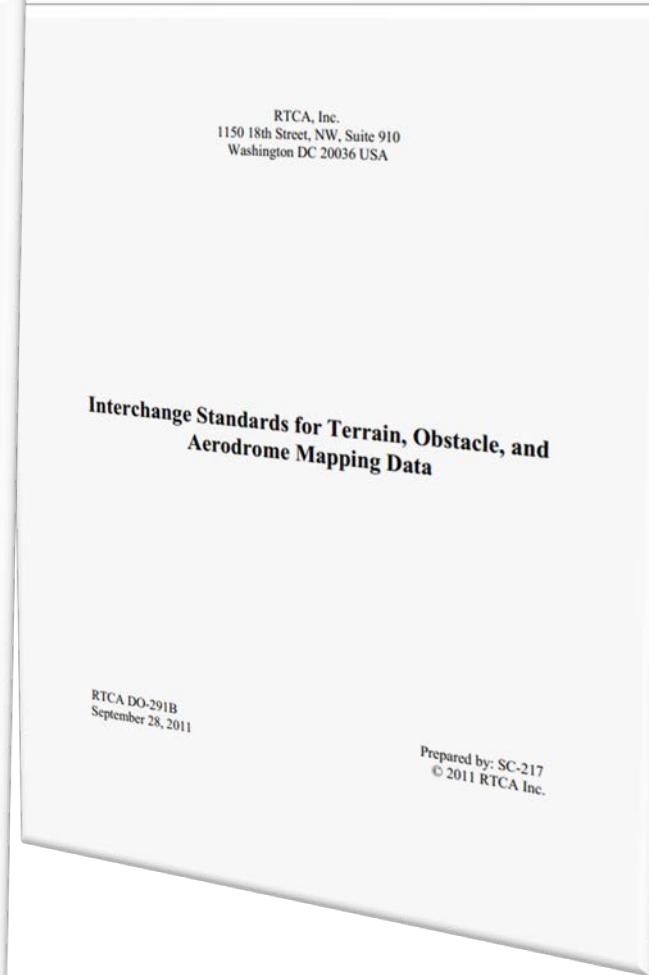
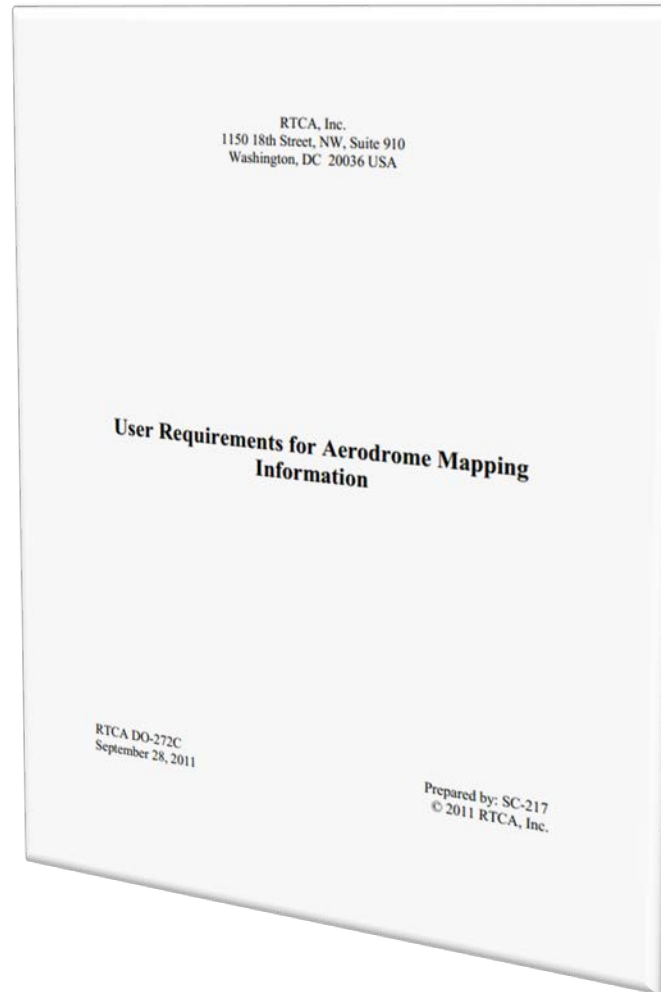
## eTOD - Data Manager main features

- **GIS 2D/3D management:** data directly imported from your raw file to GIS display
- **Data preview:** Preview in tabular and graphic views available for the data to be imported and data already stored
- **Filtering:** Powerful filtering capabilities based on any feature attribute
- **Data storage and temporality:** Store the data on the temporal based validation database or in AeroDB at a given effective date
- **Calculation:** Calculate the declared distances
- **Repository:** a dedicated repository for DTM/DSM/DEM, Raster, survey output, etc. with full traceability functions
- **Export data:** different formats (same as per input)
- **What-if:** create what-if scenarios and check the impact



## eTOD - Data Manager

Full AMDB  
Data  
Management





## eTOD – Data Manager

**eTOD - Data Manager**

File View Settings Plugins Info

PLX

eTOD Features Explorer

Search...

Feature Types: LIMJ - LIMJ

Features

- Obstacle (1000/1057)
- Navaid (10)
- Survey Control Point (129)
- Runway Center Line Point...
- Obstacle Area (18)

eTOD Feature Details

Property Name	Value

Data Manager Repository Explorer

Families

- DOCUMENTATION
- MONOGRAPHS
- RASTER
- RAW\_DATA
- SURVEYDATA
- VECTOR\_FILES

SURVE...	Name	EF
	addattach_99_36...	05
	airport_infrastruct...	02
	aixm2806575796...	05
	aixm5190645285...	03
	obstacle.xml	02

Data Manager Repository Explorer Validation Log

**Validation Rules**

Rules

- Domain
  - Obstacle
    - VerticalstructurepartList <C
      - ObstaclepartgeomList
    - Runway Center Line Point
    - Runway declared distance
    - Survey Control Point
    - Navaid
    - Runway
    - Runway Direction
    - Airport
    - Survey Campaign
    - Taxiway
    - Apron
    - Runway Element
    - Section
    - Marking
    - Marking element
    - Arresting Gear
    - Runway Blastpad



Code

Ortometric elev at top not null  
Ellipsoidic elev shall be not null

Survey Code: HEAD20      Type: HEAD

Airport: LIEA  
Town: Alghero

Longitude (WGS84)	Latitude (WGS84)	East (UTM32WGS84)	North (UTM32WGS84)	Ellipsoidic elevation: 73.532	Orthometric elevation: 26.530
E 8 ° 17 ' 53.3567 ''	N 40 ° 38 ' 39.9003 ''	440657.425	4499521.919		

Vertical Accuracy: 5.600  
Horizontal Accuracy: 5.657

Monography description: HEAD 20 coincidente con THR

Longitude(ED50)	Latitude(ED50)	Longitude(MM40)	Latitude(MM40)	North(G-Boaga)	East(G-Boaga)	X (THR.02)	Y (THR.02)	Z (THR.02)
8 ° 17 ' 56.8130 ''	40 ° 38 ' 43.4796 ''	8 ° 17 ' 54.7280 ''	40 ° 38 ' 37.6305 ''	4499529.635	1440686.382	-2999.417	0.000	5.707

RTI - Gepin IDS \ 14/02/2008      Dimensions and altitudes in meters

Apply    OK    Cancel





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## eTOD - Airport Data Analyzer

Full AMDB  
"What if"  
Design &  
Analysis

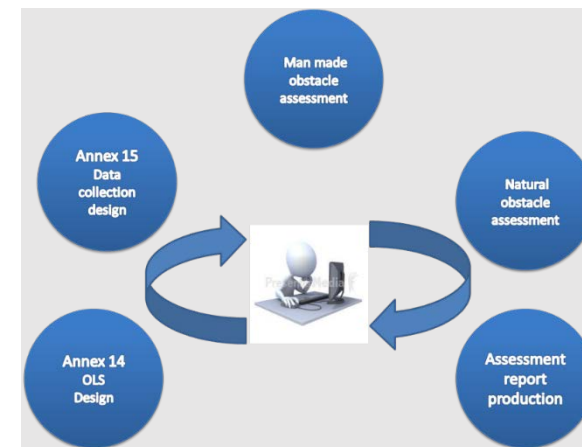


**Aixm** AIXM 5.1  
Aeronautical Information Exchange Model



## eTOD – Airport Data Analyzer

- **Airport Annex 4** (Take Off Flight Path Area) , **Annex 14** (OLS), **PAPI** surface design and assessment
- **ICAO 10066** (former Annex 15) areas definition and design for data collection
- Configurable surfaces parameters
- Airport data display and analysis
- Obstacle and terrain assessment and reports
- Different criteria storage and tailored parameters management
- What-if analysis with configurable parameters
- DSM/DTM/DEM terrain files assessment
- Raster data display
- Assessment results and surface geometry stored in the DB





## eTOD – Airport Data Analyzer



**Assessment Report**

Label: Terrain and Obstacle data

Target:

Obstacles (7) Nav aids Terrain (1)

Results: 7

Result	Surface	Target	Obstacle	Type	Min Clearance	Extra data
Penetrating	Transitional	01	LIPB_583	POINT	-0.564	
Penetrating	Transitional	01	LIPB_108	POINT	-8.351	
Penetrating	Transitional	19	LIPB_583	POINT	-0.564	
Penetrating	Transitional	19	LIPB_108	POINT	-8.351	
Not Penetrating	Balked Landing	01	LIPB_108	POINT	21.679	
Not Penetrating	Inner transitional	01	LIPB_583	POINT	15.281	
Not Penetrating	Transitional	01	LIPB_110	POINT	14.945	
Not Penetrating	Transitional	01	LIPB_114	POINT	10.598	
Not Penetrating	Inner transitional	19	LIPB_108	POINT	21.784	
Not Penetrating	Transitional	19	LIPB_110	POINT	14.945	
Not Penetrating	Transitional	19	LIPB_114	POINT	10.598	
Not Penetrating	Inner Horizontal	LIPB	LIPB_583	POINT	42.297	
Not Penetrating	Inner Horizontal	LIPB	LIPB_110	POINT	21.529	
Not Penetrating	Inner Horizontal	LIPB	LIPB_108	POINT	22.268	
Not Penetrating	Inner Horizontal	LIPB	LIPB_114	POINT	35.615	
Outside	Approach	01	LIPB_584	POINT	N/A	
Outside	Approach	01	LIPB_583	POINT	N/A	
Outside	Approach	01	LIPB_110	POINT	N/A	
Outside	Approach	01	LIPB_108	POINT	N/A	
Outside	Approach	01	LIPB_114	POINT	N/A	

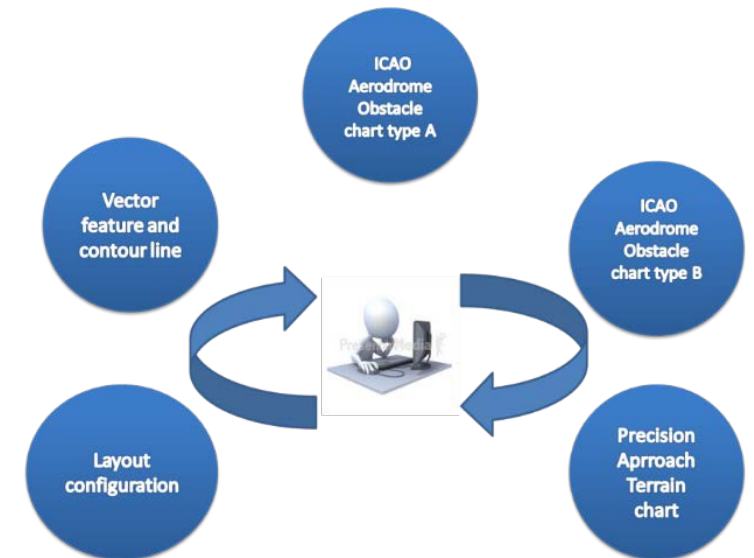
Assessment analysis saved

Generate report Save project Save interference Close



## eTOD – Obstacle Chart Builder

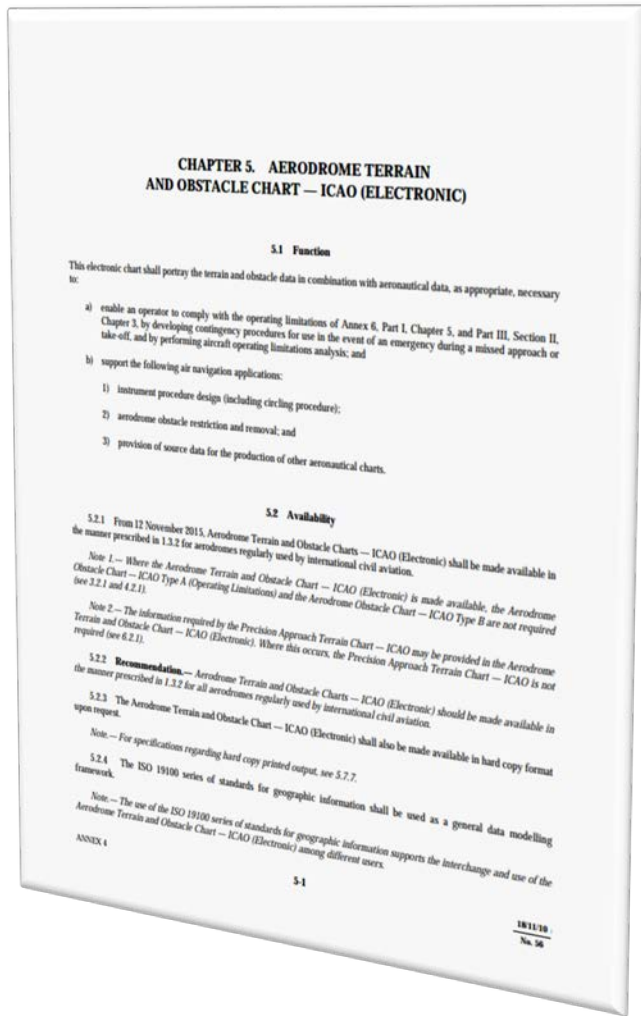
- Collects user inputs regarding the parameters to be applied to the charts
- Penetrating obstacles loaded from the DB
- Surface parameters imported from the DB
- Incorporate vector features
- Automatic terrain contour lines generation
- Cartographic background loading





## eTOD - Obstacle Chart Builder

IDS is ready to implement requirements for electronic Terrain and Obstacle chart!



### CHAPTER 5. AERODROME TERRAIN AND OBSTACLE CHART — ICAO (ELECTRONIC)

#### 5.1 Function

This electronic chart shall portray the terrain and obstacle data in combination with aeronautical data, as appropriate, necessary to:

- a) enable an operator to comply with the operating limitations of Annex 6, Part I, Chapter 5, and Part III, Section II, Chapter 3, by developing contingency procedures for use in the event of an emergency during a missed approach or take-off, and by performing aircraft operating limitations analysis; and
- b) support the following air navigation applications:
  - 1) instrument procedure design (including circling procedure);
  - 2) aerodrome obstacle restriction and removal; and
  - 3) provision of source data for the production of other aeronautical charts.

#### 5.2 Availability

5.2.1 From 12 November 2015, Aerodrome Terrain and Obstacle Charts — ICAO (Electronic) shall be made available in the manner prescribed in 1.3.2 for aerodromes regularly used by international civil aviation.

*Note 1.* — Where the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is made available, the Aerodrome Obstacle Chart — ICAO Type A (Operating Limitations) and the Aerodrome Obstacle Chart — ICAO Type B are not required (see 3.2.1 and 4.2.1).

*Note 2.* — The information required by the Precision Approach Terrain Chart — ICAO may be provided in the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic). Where this occurs, the Precision Approach Terrain Chart — ICAO is not required (see 6.2.1).

5.2.2 **Recommendation.** — Aerodrome Terrain and Obstacle Charts — ICAO (Electronic) should be made available in the manner prescribed in 1.3.2 for all aerodromes regularly used by international civil aviation.

5.2.3 The Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) shall also be made available in hard copy format upon request.

5.2.4 The ISO 19100 series of standards for geographic information shall be used as a general data modelling framework.

*Note.* — The use of the ISO 19100 series of standards for geographic information supports the interchange and use of the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) among different users.

ANNEX 4



## Obstacle Chart Builder

**Chart Manager**

**ChartDetails**

Date of issue: 29/10/2010  
 Survey date: 29/10/2010  
 Partial survey date: 29/10/2010  
 Designed by:  
 Published by:

**Magnetic Variation**

- uses the value of the aerodrome
- set the value manually
- recalculates the value

**ObstacleList**

Obstacle Code	Surface	Interference Result	Shadowed	Visibility
LIPB_150	tolpa 19	Outside	N/A	<input checked="" type="checkbox"/>
LIPB_151	tolpa 19	Outside	N/A	<input checked="" type="checkbox"/>
LIPB_152	strip 01-19	Outside	N/A	<input checked="" type="checkbox"/>
LIPB_1501	strip 01-19	Outside	N/A	<input checked="" type="checkbox"/>
LIPB_1502	tolpa 01	Outside	N/A	<input checked="" type="checkbox"/>
LIPB_1503	tolpa 19	Outside	N/A	<input checked="" type="checkbox"/>
LIPB_1507	tolpa 19	Outside	N/A	<input checked="" type="checkbox"/>

**ObstacleList** | **DTEList**

**View 1**

CARTA DEGLI OSTACOLI DI AERODROMO TIPO A OACI - Limitazioni Operative  
 AERODROME OBSTACLE CHART ICAO TYPE A - Operating Limitations

ITALY - BOLZANO RWY 01/19

Scala Verticale  
 1:2000  
 0 250 500 750 1000 1250 1500 1750 2000 2250 2500 2750 3000 3250 3500 3750 4000 4250 4500 4750 5000 5250 5500 5750 6000 6250 6500 6750 7000 7250 7500 7750 8000 8250 8500 8750 9000 9250 9500 9750 10000 10250 10500 10750 11000

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# Electronic Terrain and Obstacle chart

## IDS AIRNAV :

- Portray in a 3D or 2D environment aeronautical features in accordance to their geometry:
  - Aerodrome mapping data
  - Obstacle data
  - ICAO Annex 14 (OLS) surfaces
  - ICAO Annex 15 areas
  - ICAO Annex 4 (Take off flight path Area)
  - Terrain data (BT, DTED, GEOTIFF, Shapefile)
  - Terrain Contour lines encoding as polygonal vertical structure
  - Orthophoto
  - Topography
- Display the features in different layers
- Symbolize the features according to one or a combination of attributes
- Query the features according to one or a combination of attributes
- Display the feature attributes on user request
- Print in PDF format the visualized scenario
- Download in AIXM format obstacle data (if the user is authorized to)
- Download in AIXM format airport data (if the user is authorized to).



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**THANK YOU**

