



ICAO MID

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

19 May 2022



**Presented by Saudi Arabia**

**Obstacle/Terrain and AIP Dataset**





## Content

- A. Regulation framework
- B. Obstacle/Terrain Data Set Publication
- C. Terrain Data Set Publication
- D. eTod System
- E. AIP Data Set
- F. IFP Data Set



## A. Regulation framework

- **Civil Aviation law.**
- **GACAR Part 77, 137, 138, 139, and 175.**
- **E-book Volume 8.**
- **Advisory Circular AC-175-03.**

[www.gaca.gov.sa](http://www.gaca.gov.sa)

<https://gaca.gov.sa/web/ar-sa/page/new-regulations>





## A. Regulation framework

### I. Civil Aviation law.

#### المادة الرابعة: تطبيق المعاهدات والاتفاقيات الدولية

تعد أحكام معاهدة شيكاغو وملاحقها وسائر المعاهدات الدولية للطيران المدني الأخرى التي وافقت المملكة عليها جزءا مكتملا لهذا النظام.

#### الفصل الثاني: حقوق الارتفاع الجوية

##### المادة الأربعون: إنشاء حقوق الارتفاع الجوية

تتسأ حقوق ارتفاع خاصة تسمى حقوق ارتفاع جوية لتأمين سلامة الملاحة الجوية وحسن عمل الأجهزة المتعلقة بها، وتقتضي بالآتي:

- 1- إزالة أو منع أية مبان أو منشآت أو غرس أو مد أو تثبيت الأسلاك الهوائية أو أي عقبة مهما كان نوعها أو تحديد ارتفاعها وذلك في المناطق المجاورة للمطارات ومنشآت الأجهزة الملاحية .
- 2- وضع علامات الإرشاد عن العوائق التي تشكل خطرا على سلامة الملاحة الجوية .

##### المادة الحادية والأربعون: حدود حقوق الارتفاع

تحدد الهيئة نطاق ومدى حقوق الارتفاع الجوية والمناطق التي تفرض فيها وفقا لأحكام الملحق الرابع عشر لمعاهدة شيكاغو الخاص بالمطارات.

##### المادة الثانية والأربعون: المنشآت والتجهيزات التي تؤثر على سلامة الملاحة الجوية

على كل من يستعمل، أو يملك تجهيزات كهربائية، أو إلكترونية، أو تجهيزات اتصالات، أو غيرها، أو منشآت مدنية ثابتة أو متحركة من شأنها أن تحدث تداخلا يعرقل عمل الأجهزة اللاسلكية، أو الأجهزة المساعدة في الملاحة الجوية؛ التقيد بالتدابير التي تحددها السلطة المختصة، وفقا لما تحدده اللائحة.





## A. Regulation framework

### II. GACAR Part 77

#### SUBPART C – STANDARDS FOR DETERMINING OBSTRUCTIONS TO AIR NAVIGATION OR NAVIGATION AIDS OR FACILITIES

§ 77.21 Applicability. ....	8
§ 77.23 Scope. ....	8
§ 77.25 Standards for Determining Hazards. ....	8

#### SUBPART D – AERONAUTICAL STUDIES AND DETERMINATIONS

§ 77.41 Applicability. ....	10
§ 77.43 Initiation of Studies. ....	10
§ 77.45 Evaluating Aeronautical Effect. ....	10
§ 77.47 Determinations. ....	11
§ 77.49 Effective Period of Determinations. ....	12
§ 77.51 Extensions, Terminations, Revisions, and Corrections. ....	13
§ 77.53 Operating Rules for Lights Required for Denoting Obstacles to Air Navigation. ....	14

APPENDIX A TO GACAR PART 77 – OBSTACLE NOTIFICATION SURFACES ...	16
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## A. Regulation framework

### III. GACAR Part 137

CERTIFICATION, AUTHORIZATION AND OPERATION OF WATER AERODROMES

SUB PART G - OBSTACLE RESTRICTION AND REMOVAL .....	35
§137.401 Obstacle limitation surfaces .....	35
§137.403 Displaced threshold.....	39
§137.405 Objects and obstacles .....	40
§137.407 Other objects .....	41

### IV. GACAR Part 138

CERTIFICATION, AUTHORIZATION AND OPERATION OF HELIPORTS

SUBPART G – OBSTACLE ENVIROMENT .....	50
§ 138.401 Obstacle limitation Surfaces and Sectors.....	50
§ 138.403 Obstacle Limitation Requirements .....	59





## A. Regulation framework

### V. GACAR Part 139

CERTIFICATION, AUTHORIZATION AND OPERATION OF AERODROMES

<b>SUBPART G – OBSTACLE RESTRICTION AND REMOVAL</b> .....	71
§ 139.401 Obstacle Limitation Surfaces .....	71
§ 139.403 Obstacle limitation requirements .....	80
§ 139.405 Objects outside the obstacle limitation surfaces .....	85
§ 139.407 Other objects .....	85
§ 139.409 Overlapping of OLS surfaces.....	86
§ 139.411 Restriction and removal of obstacles .....	86
§ 139.413 Procedures for aerodrome operators to deal with obstacles in the OLS .....	87
§ 139.415 Objects or structures that could become obstacles in the OLS .....	87
§ 139.417 Notes of construction or alteration.....	88
§ 139.419 Monitoring of obstacles associated with instrument runways .....	88
§ 139.421 Training.....	88
§ 139.423 Aerodrome obstacle and terrain charts .....	89
§ 139.425 Obstacle Survey .....	89





## A. Regulation framework

### VI. GACAR Part 175

- §175.001 Scope.
- b)The requirements of this regulation are aligned with ICAO Annexes.
- §175.135 Surveyors and providers of electronic terrain and obstacle data for Areas 1, 2, 3 and 4 must be accepted by the President.



#### GACAR PART 175 – AERONAUTICAL INFORMATION SERVICES

#### TABLE OF CONTENTS

##### Part 175 - Aeronautical Information Services

##### SUBPART A – GENERAL

§175.001 Scope .....	4
§175.003 Service provider restrictions .....	5
§175.005 Means of compliance .....	5
§175.007 Demonstration of compliance .....	5
§175.009 Responsibilities of AIS providers .....	5
§175.011 Facilitation and cooperation .....	7
§175.013 Findings and corrective actions .....	7
§175.015 Immediate reaction to a safety problem .....	7
§175.017 Occurrence reporting .....	7
§175.019 Contingency plans .....	8







## A. Regulation framework

### VII. E-book Volume 8

#### Section 3. Terrain and Obstacle Data Management

- (a) Acceptance of surveyors.
- (b) Information and survey areas.
- (c) Survey procedures and requirements.
- (d) Quality Assurance and deliverable presentation.
- (e) Specifications for terrain & obstacle data surveys.
- (f) Aerodrome/heliport obstacle charts and plan.

#### 8.3.3.1 Purpose

This section describes the aerodrome/heliport and obstacle survey requirements and provides guidance and information for Aerodrome/Heliport Operators and Aeronautical Surveyors.

#### Inspector Guidance:

*There are two purposes of this section. The first is to allow the inspector to ensure that Aeronautical surveyors and providers of eTOD and surveyed aeronautical data meets all requirements to be accepted by the GACA President. The second is to provide guidance describing the aerodrome/heliport and obstacle survey requirements.*

#### 8.3.3.2 Scope

Aeronautical surveyors as an integral part of Aeronautical Information Management (AIM) are involved in the aeronautical data chain; therefore, the integrity of aeronautical data must be maintained throughout the data chain. It's essential that data provided by the aeronautical surveyors must be at the required level of quality. This section covers guidance for:

- (a) Acceptance of surveyors



## A. Regulation framework

### VIII. Advisory Circular AC-175-03

Guidance and information required for Aerodrome/Heliport Operators and Aeronautical Surveyors regarding aerodrome/heliport and obstacle survey requirements based on the following conditions of GACAR Part 175 and Part 139:

- (a) GACAR Part 175 §175.135: Surveyors and providers of electronic terrain and obstacle data for Areas 1, 2, 3, and 4 must be accepted by the President.
- (b) GACAR Part 139 § 139.425: The aerodrome operator will apply the aerodrome survey requirements as per AC 175-03.



### ADVISORY CIRCULAR

<b>Subject:</b> AERONAUTICAL SURVEY REQUIREMENTS	<b>Date:</b> 11/11/2021	<b>Date:</b> 173-03	<b>Version:</b> 1.0
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NOTE: THIS ADVISORY CIRCULAR IS PUBLISHED TO DESCRIBE ACCEPTABLE MEANS OF COMPLIANCE WITH THE GENERAL AUTHORITY OF CIVIL AVIATION REGULATIONS (GACAR).

#### 1. Purpose

This Advisory Circular (AC) is the reference for guidance and information needed for Aerodrome/Heliport Operators, Aeronautical Surveyors and Aeronautical Information Management (AIM) regarding aerodrome/heliport and obstacle survey requirements.

Aeronautical Surveyors are engaged in the aeronautical data chain as an integral part of Aeronautical Information Management (AIM); therefore, the integrity of aeronautical data must be maintained throughout all the process from the point at which the need for a survey is identified to the point when it is available in accordance with the GACA Regulations (GACAR) and ICAO requirements.

It is essential that data provided by the Aeronautical Surveyors be at the required level of quality.

#### 2. Scope



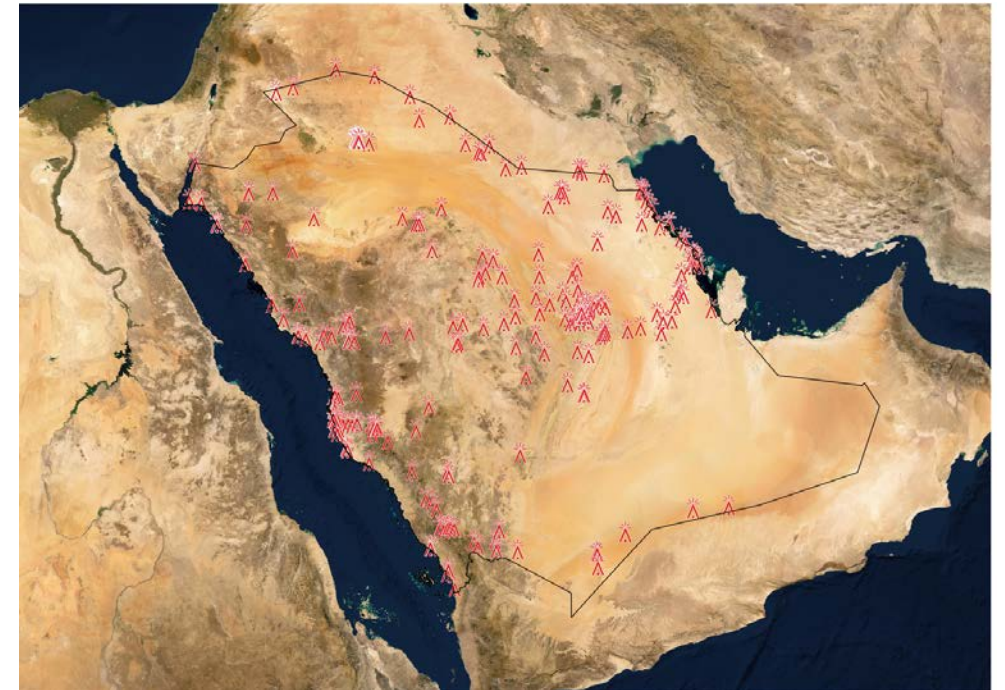


## B. Obstacle Data Set Publication

### I. KSA Obstacles Area 1

- GEN 3.1.6  
<https://sans.com.sa/English/AIMs/AIMsLibrary/eTOD/area1>.
- Transition period: AIP ENR 5.4 remains as it is.
- After transition period: AIP ENR 5.4 to be emptied.
- data formats:
  - Excel

Designation	OBST type	OBST position	ELEV/HGT (FT)	OBST LGT Type/ Colour	Remarks
1	2	3	4	5	6
ORY OE006 RY	Building	244549N 0463830E	3 400/1 320 FT	-/-	
OB-36-10	Mast	272618N 0353544E	498/406 FT	-/-	
OB-36-11A	Mast	272625N 0353554E	557/549 FT	-/-	
OB-36-11B	Mast	272629N 0353554E	558/546 FT	-/-	
OB-36-11C	Mast	272633N 0353556E	561/546 FT	-/-	
OB-36-12	Mast	272603N 0353553E	613/511 FT	-/-	
OB-36-13A	Mast	272647N 0353607E	583/554 FT	-/-	
OB-36-13B	Mast	272651N 0353607E	581/546 FT	-/-	
OB-36-13C	Mast	272654N 0353609E	590/545 FT	-/-	





## B. Obstacle Data Set Publication

### II. KSA Obstacles Area 2

- OEDF, OERK and OEMA

[https://sans.com.sa/ layouts/15/SANS.Portal.eServices.AIPMs/eAIPs.aspx](https://sans.com.sa/layouts/15/SANS.Portal.eServices.AIPMs/eAIPs.aspx)

- Area 2a
- Take-off path area
- Obstacle that penetrates the obstacle limitation surface
- Area 2b, 2C, 2d
- Area 3
- formats:
  - Excel

AREA 2a					
OBST ID/ Designation	OBST type	OBST position	ELEV/HGT	Markings/ Type, colour	Remarks
a	b	c	d	e	f
OEDF_0330_Bld	Antenna	26 29 10.56N 49 46 50.92E	69/22 FT	MARKED/LGTD	
OEDF_0331_Bld	Antenna	26 29 08.20N 49 46 51.59E	100/53 FT	MARKED/LGTD	
OEDF_0332_Bld	Building	26 29 08.00N 49 46 51.54E	63/15 FT	MARKED/LGTD	
OEDF_0333_Bld	Non-comm tower	26 29 11.86N 49 46 59.26E	92/45 FT	MARKED/LGTD	
OEDF_0336_Bld	Building	26 27 22.87N 49 47 24.05E	69/15 FT	MARKED/LGTD	
OEDF_0337_Bld	Antenna	26 27 22.73N 49 47 24.17E	107/53 FT	MARKED/LGTD	
OEDF_0338_Bld	Antenna	26 27 20.02N 49 47 25.12E	75/22 FT	MARKED/LGTD	
OEDF_0339_Bld	Non-comm tower	26 27 22.92N 49 47 32.92E	90/36 FT	MARKED/LGTD	
OEDF_0340_Bld	Non-comm tower	26 27 20.89N 49 48 45.69E	115/45 FT	MARKED/LGTD	

OBSTACLE THAT PENETRATE THE TAKE-OFF PATH AREA					
OBST ID/ Designation	OBST type	OBST position	ELEV/HGT	Markings/ Type, colour	Remarks
a	b	c	d	e	f
OEDF_0326	Approach light	26 29 19.91N 49 48 13.13E	65/3 FT	LGTD	
OEDF_0327	Approach light	26 29 20.00N 49 48 13.48E	65/3 FT	LGTD	
OEDF_0328	Approach light	26 29 19.81N 49 48 12.71E	65/3 FT	LGTD	
OEDF_0328_Bld	Antenna	26 29 51.08N 49 46 43.02E	97/50 FT	MARKED/LGTD	
OEDF_0329	Approach light	26 29 20.96N 49 48 13.20E	65/3 FT	LGTD	

OBSTACLE THAT PENETRATE THE OBSTACLE LIMITATION SURFACE					
OBST ID/ Designation	OBST type	OBST position	ELEV/HGT	Markings/ Type, colour	Remarks
a	b	c	d	e	f
OEDF_0001	CONTROL TOWER	26 27 52.45N 49 48 00.70E	359/300 FT	MARKED	Inner Horizontal
OEDF_0004	Minaret	26 28 08.97N 49 47 57.01E	229/140 FT	NIL	Inner Horizontal
OEDF_0060	Comm Tower	26 29 24.81N 49 49 08.80E	202/144 FT	MARKED/LGTD	Inner Horizontal
OEDF_0058	Water Tank	26 29 22.04N 49 50 39.64E	227/147 FT	MARKED	Inner Horizontal
OEDF_0066	Comm Tower	26 28 43.46N 49 50 11.70E	219/124 FT	MARKED	Inner Horizontal

AREA 2b, 2C, 2d					
OBST ID/ Designation	OBST type	OBST position	ELEV/HGT	Markings/ Type, colour	Remarks
a	b	c	d	e	f
OEDF_0001	CONTROL TOWER	26 27 52.45N 49 48 00.70E	359/300 FT	LGTD	Area 2c
OEDF_0002	HOTEL U/C	26 28 00.03N 49 47 58.36E	210/126 FT	NIL	Area 2c
OEDF_0003	MOSQUE	26 28 07.47N 49 47 56.07E	213/124 FT	NIL	Area 2c
OEDF_0004	Minaret	26 28 08.97N 49 47 57.01E	229/140 FT	NIL	Area 2c

AREA 3					
OBST ID/ Designation	OBST type	OBST position	ELEV/HGT	Markings/ Type, colour	Remarks
a	b	c	d	e	f
OEDF_0015	LIGHT MAST	26 27 43.77N 49 47 47.24E	169/104 FT	LGTD	
OEDF_0016	LIGHT MAST	26 27 45.00N 49 47 46.67E	172/106 FT	LGTD	
OEDF_0017	LIGHT MAST	26 27 47.30N 49 47 46.67E	169/103 FT	LGTD	
OEDF_0018	LIGHT MAST	26 27 49.26N 49 47 46.73E	169/104 FT	LGTD	
OEDF_0019	LIGHT MAST	26 27 51.64N 49 47 46.53E	169/104 FT	LGTD	





## B. Obstacle Data Set Publication

### Area 1 Obstacle Metadata

Obstacle attribute	Mandatory/Optional	Value
Area of coverage	Mandatory	The entire KSA
Data originator identifier	Mandatory	Ref report
Data source identifier	Mandatory	Ref report
Horizontal accuracy	Mandatory	5m
Horizontal confidence level	Mandatory	95%
Horizontal resolution	Mandatory	1m
Horizontal extent	Mandatory	150m
Horizontal reference system	Mandatory	WGS-84
Vertical accuracy	Mandatory	3 m
Vertical confidence level	Mandatory	95%
Vertical resolution	Mandatory	1m
Vertical reference system	Mandatory	WGS-84
Integrity	Mandatory	Essential

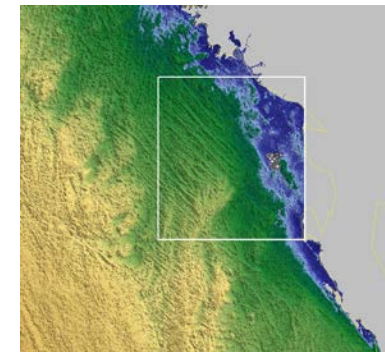
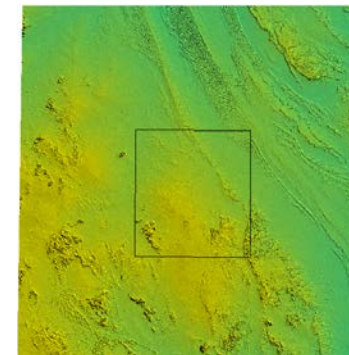
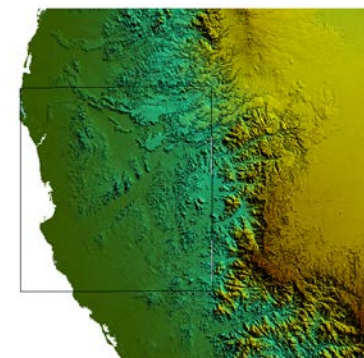
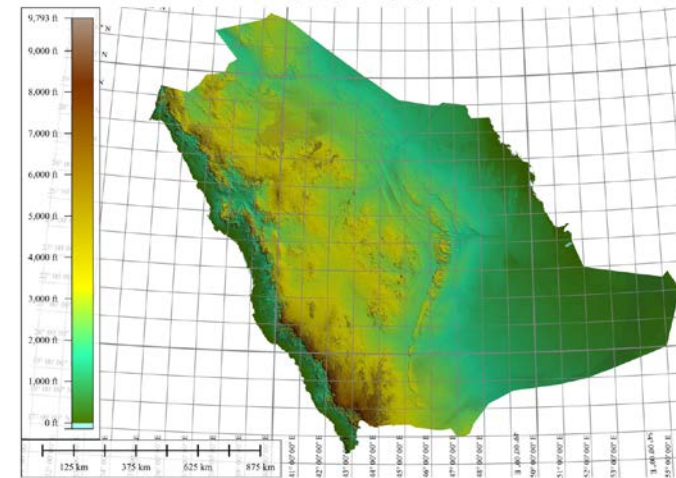




## C. Terrain Data Set Publication

### III. KSA Terrain Area 1

- GEN 3.1.6  
<https://sans.com.sa/English/AIMs/AIMsLibrary/eTOD/area1>.
- 206 files (file for Each Quadrilateral: whole degree of latitude and longitude)
- Dataset metadata
  - GeoTiff





## C. Terrain Data Set Publication

Terrain attribute	Mandatory/Optional	Value
Area of coverage	Mandatory	Entire KSA
Data originator identifier	Mandatory	Certified ANSPs (Ref Report)
Data source identifier	Mandatory	SRTM
Acquisition method	Mandatory	Synthetic Aperture radar
Post spacing	Mandatory	90 m
Horizontal reference system	Mandatory	WGS-84
Horizontal resolution	Mandatory	30m
Horizontal accuracy	Mandatory	50m
Horizontal confidence level	Mandatory	90%
Vertical reference system	Mandatory	EGM-2008
Vertical resolution	Mandatory	1m
Vertical accuracy	Mandatory	30m
Vertical confidence level	Mandatory	90%
Surface type	Optional	mixed
Recorded surface	Mandatory	First Reflective surface
Integrity	Mandatory	Routine $1 \times 10^{-3}$

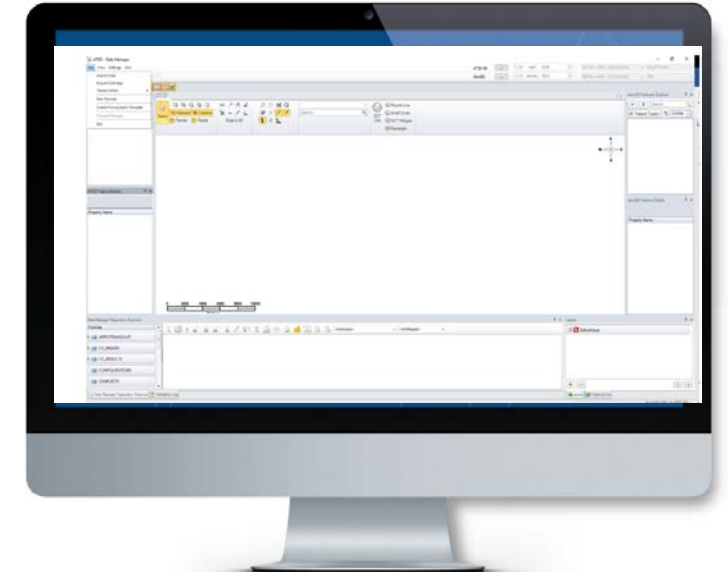
## Terrain Metadata





## D. E-Tod System

- ❑ Use of eTOD suite tools to manage, terrain and obstacle data accordance with ICAO Doc 10066 and Annex 15.
- ❑ The e-TOD system assist the user in managing the lifecycle of data, validating and detecting ambiguous and conflicting data as well as supporting data export and reporting.
- ❑ e-TOD System able to import and validate several different types of data:
  - ❖ Digital terrain models (DTM, DSM, DEM);
  - ❖ Orthophotos and raster files (tiff, Geotiff,, etc);
  - ❖ Three-dimensional vector maps (dgn, shp, dxf, dwg, etc);
  - ❖ Generic ASCII, csv;
  - ❖ AIXM;
  - ❖ Google Map export results

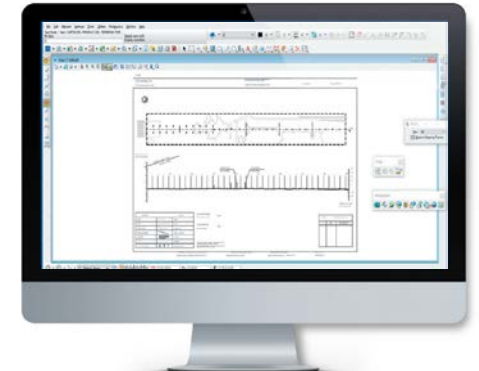






## D. E-Tod System

- ❑ The eTOD system supports the design of Obstacle Limitation Surface (OLS) in accordance with Annex 4.
- ❑ The eTOD system ensures the design of obstacle and terrain charts (ICAO type A,B and Precision Approach Terrain Chart).





## E. AIP Data Set

- Use of the new AIM system to generate the AIP data sets in accordance with ICAO Docs, 10066 and Annex 15. the publication of the AIP datasets will be performed in a coordinated manner within the MID region.
- The new AIM system ensures the management of following AIP data Sets :
  - ❖ Air traffic services (ATS) airspace
  - ❖ Special activity airspace
  - ❖ ATS route and other Route
  - ❖ Route segment
  - ❖ Waypoint – En-route
  - ❖ Aerodrome/heliport
  - ❖ Runway
  - ❖ Runway direction
  - ❖ Final approach and take-off (FATO)
  - ❖ Fouchdown and lift off area (TLOF)
  - ❖ Radio navigation aids
- Format: AIXM 5.1





## E. IFP Data Set

- In addition, the new AIM system ensures the management of the Instrument flight procedure data sets which will include as a minimum:
  - a) Procedure (all properties),
  - b) Procedure segment (all properties),
  - c) Final approach segment (all properties),
  - d) Procedure fix (all properties),
  - e) Procedure holding (all properties);
- Format:
  - ❖ AIXM 5.1





ICAO MID

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



# THANK YOU

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