

**PROPOSED AMENDMENT TO  
INTERNATIONAL STANDARDS  
AND RECOMMENDED PRACTICES**

**AERONAUTICAL INFORMATION SERVICES**

**ANNEX 15  
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT**

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~ text to be deleted
2. **New text to be inserted is highlighted with grey shading.** new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading. new text to replace existing text

**TEXT OF A PROPOSED AMENDMENT TO THE  
INTERNATIONAL STANDARDS  
AND RECOMMENDED PRACTICES  
AERONAUTICAL INFORMATION SERVICES**

**ANNEX 15  
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

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**CHAPTER 10. ELECTRONIC TERRAIN AND OBSTACLE DATA**

**10.1 Function**

Sets of electronic terrain and obstacle data used in combination with aeronautical data, as appropriate, shall satisfy user requirements necessary to support the following air navigation applications:

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**10.2 Coverage and terrain and obstacle data numerical requirements**

10.2.1 ~~To satisfy requirements necessary to accommodate air navigation systems or functions specified in 10.1, sets of electronic~~ Electronic terrain and obstacle data shall be collected and recorded in ~~databases~~ data sets in accordance with the following coverage areas:

- Area 1: entire territory of a State;
- Area 2: terminal control area;
- Area 3: aerodrome/heliport area; and
- Area 4: Category II or III operations area.

*Note.— See Appendix 8 for graphical illustrations of the defined coverage areas.*

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10.2.3 Area 2 data shall be provided for all aerodromes regularly used by international civil aviation.

10.2.4 **Recommendation.**— *Area 3 data should be provided at those aerodromes/heliports where it is considered to be beneficial, e.g. where it is supported by the availability of aerodrome mapping data.*

~~10.2.3~~ 10.2.5 ~~At IFR aerodromes/heliports,~~ When provided, Area 3 shall cover the area that extends from the edge(s) of the runway(s) to 90 m from the runway centre line(s) and for all other parts of aerodrome/heliport movement area(s), 50 m from the edge(s) of the defined area(s).

~~10.2.4~~ 10.2.6 Area 4 shall be restricted to those runways where precision approach Category II or III operations have been established and where detailed terrain and appropriate obstacle information is

required by operators to enable them to assess, by use of radio altimeters, the effect of terrain and obstacles on decision height determination. The width of the area shall be 60 m on either side of the extended runway centre line while the length shall be 900 m from the runway threshold measured along the extended runway centre line.

*Note.— Area 4 terrain data and Area 2 obstacle data are normally sufficient to support the production of the Precision Approach Terrain Chart — ICAO. When more detailed obstacle data is required for Area 4, this may be provided in accordance with the Area 4 obstacle data requirements specified in Appendix 8, Table A8-2. Guidance on appropriate obstacles for this chart is given in the Aeronautical Chart Manual (Doc 8697).*

**10.2.7 Recommendation.**— *Where the terrain at a distance greater than 900 m (3 000 ft) from the runway threshold is mountainous or otherwise significant, Area 4 should be extended to a distance not exceeding 2 000 m from the runway threshold.*

~~10.2.5~~ **10.2.8** ~~According to the air navigation applications listed in 10.1 and areas of coverage, sets~~ Sets of electronic terrain data shall satisfy the numerical requirements specified in Appendix 8, Table A8-1 while obstacle data shall satisfy the numerical requirements specified in Appendix 8, Table A8-2.

*Note 1.— Numerical terrain and obstacle data requirements for Area 2 provided in Appendix 8, Table A8-1 and Table A8-2, respectively, are defined on the basis of the most stringent application requirement (application listed under 10.1 b)).*

*Note 2.— It is recognized that some applications listed in 10.1 could be adequately accommodated with terrain and obstacle data sets that are of lower requirements than those specified in Appendix 8, Table A8-1 and Table A8-2, respectively. Consequently, careful evaluation of available data sets by data users is necessary in order to determine if the products are fit for their intended use.*

### **10.3 Terrain database data set — content and structure**

10.3.1 A terrain database data set shall contain digital sets of data representing terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum. A terrain grid shall be angular or linear and shall be of regular or irregular shape.

...

10.3.3 Terrain data shall be collected according to the areas specified in 10.2, terrain data collection surfaces and criteria specified in Appendix 8, Figure Figures A8-1, A8-3 and A8-4, and in accordance with the terrain data numerical requirements provided in Table A8-1 of Appendix 8. In terrain databases data sets, only one feature type, i.e. terrain, shall be recorded. Feature attributes describing terrain shall be those listed in Appendix 8, Table A8-3. The terrain feature attributes listed in Table A8-3 represent the minimum set of terrain attributes, and those annotated as mandatory shall be recorded in the terrain database data set.

### **10.4 Obstacle database data set — content and structure**

10.4.1 ~~One obstacle database~~ Obstacle data sets shall contain a digital set of obstacle data and shall include all obstacles that penetrate the collection surfaces defined in Figure A8-2 ~~those features having vertical significance in relation to adjacent and surrounding features that are considered hazardous~~

~~to air navigation.~~ Obstacle data shall comprise the digital representation of the vertical and horizontal extent of man-made objects. Obstacles shall not be included in terrain ~~databases~~ **data sets**. Obstacle data elements are features that shall be represented in the ~~database~~ **data sets** by points, lines or polygons.

10.4.2 Obstacles, which in accordance with the definition, can be fixed (permanent or temporary) or mobile shall be identified within the areas defined in 10.2, on the basis of the obstacle data collection surfaces and criteria specified in ~~Appendix 8, Figure~~ **Figures A8-2, A8-3 and A8-4**, and collected in accordance with obstacle data numerical requirements provided in Table A8-2 ~~of Appendix 8~~. In an obstacle ~~database~~ **data set**, all defined obstacle feature types shall be recorded and each of them shall be described according to the list of mandatory attributes provided in Table A8-4 ~~of Appendix 8~~.

*Note.— Specific attributes associated with mobile (feature operations) and temporary types of obstacles are annotated in ~~Appendix 8, Table A8-4~~, as optional attributes. If these types of obstacles are to be recorded in the ~~database~~ **data set**, appropriate attributes describing such obstacles are also required.*

...

## 10.6 Availability

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10.6.1.1 States shall ensure that ~~as of 20 November 2008~~, electronic terrain and obstacle data are made available in accordance with Area 1 specifications and terrain data in accordance with Area 4 specifications.

10.6.1.2 States shall ensure that as of ~~18 November 2010~~ **15 November 2012**, electronic terrain and obstacle data are made available in accordance with Area 2 and Area 3 specifications.

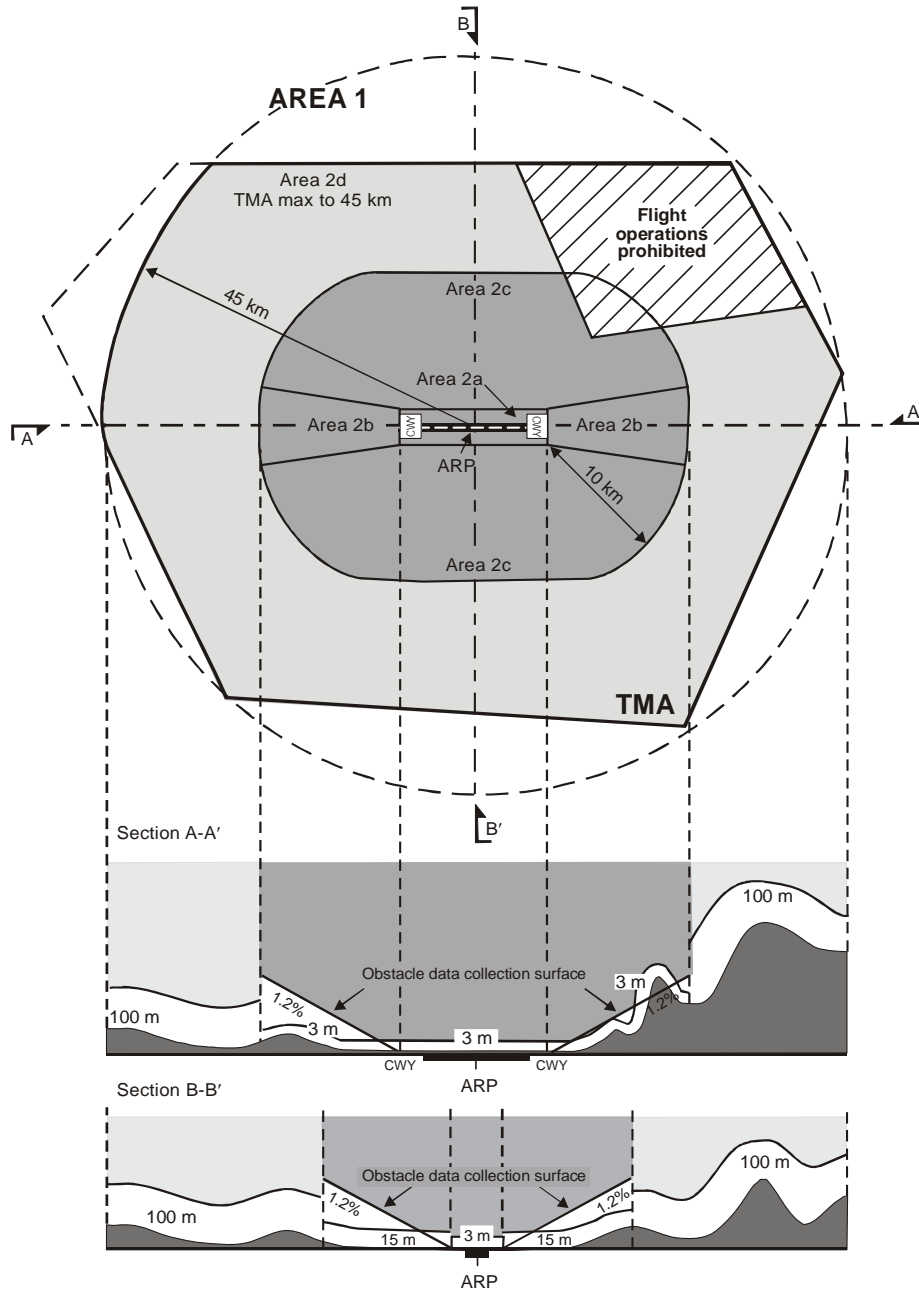
10.6.1.3 **Recommendation.**— *States should ensure that electronic terrain and obstacle data are made available in accordance with ~~Area 1~~, Area 2, and Area 3 specifications ~~and terrain data in accordance with Area 4 specifications~~.*

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## APPENDIX 8. TERRAIN AND OBSTACLE DATA REQUIREMENTS (see Chapter 10)

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*Editorial Note.— Replace Figure A8-2 with the following figure.*



**Figure A8-2. Obstacle data collection surfaces — Area 1 and Area 2**

1. Obstacle data shall be collected and recorded in accordance with the Area 2 numerical requirements specified in Table A8-2:

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*Editorial Note.— Delete the following existing text.*

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- a) any obstacle that penetrates the conical surface whose origin is at the edges of the 180-m wide rectangular area and at the nearest runway elevation measured along the runway centre line, extending at 1.2 per cent slope until it reaches 120 m above the lowest runway elevation of all operational runways at the aerodrome (1.2 per cent slope reaches 120 m at 10 km); in the remainder of Area 2 (between 10 km and the TMA boundary or 45-km radius, whichever is smaller), the horizontal surface 120 m above the lowest runway elevation; and

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*Editorial Note.— Insert the following new text.*

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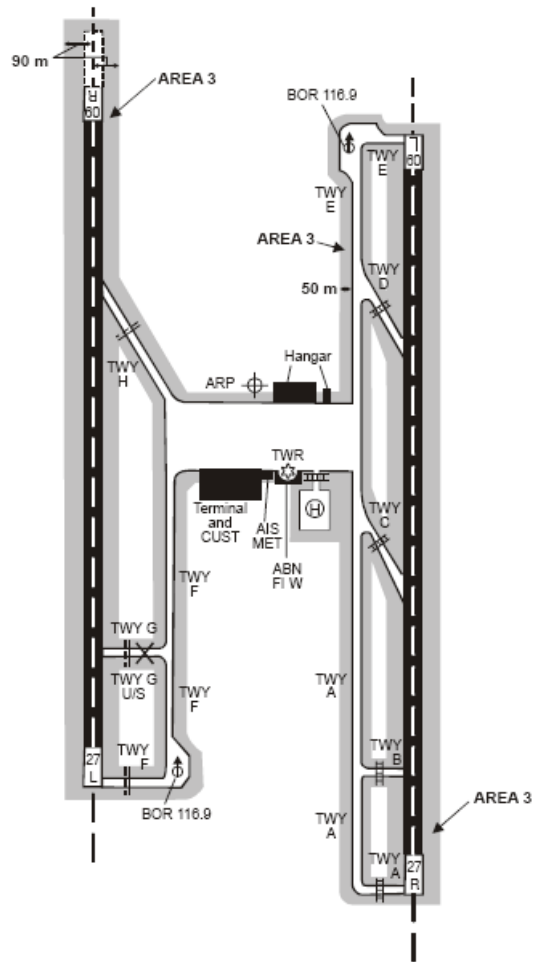
- a) Area 2 shall be divided into four sub-areas as follows:
  - Area 2a is described as a rectangular area around the runway extending to 255 m each side of the runway centre line with the length of the runway strip plus any clearway(s) that exist;
  - Area 2b is described as a surface with a 1.2% slope extending from the ends of Area 2a with a length of 10 km and a splay of 15% to each side;
  - Area 2c is described as an Area with a 1.2% slope extending outside Area 2a and Area 2b at a distance of not more than 10 km to the boundary of Area 2a; and
  - Area 2d is described as the remainder of Area 2 outside the Areas 2a, 2b and 2c up to a distance of 45 km from the ARP, or the TMA boundary, whichever is smaller;
- b) obstacles shall be collected if they:
  - are located within Area 2a and their height exceeds 3 m above ground level;
  - penetrate the surface in Area 2b and their height exceeds 3 m above ground level; and
  - penetrate the surface in Area 2c and their height exceeds 15 m above ground level;
- c) in Area 2d, obstacles whose height exceeds 100 m above ground level shall be collected and recorded in the dataset.

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End of new text.

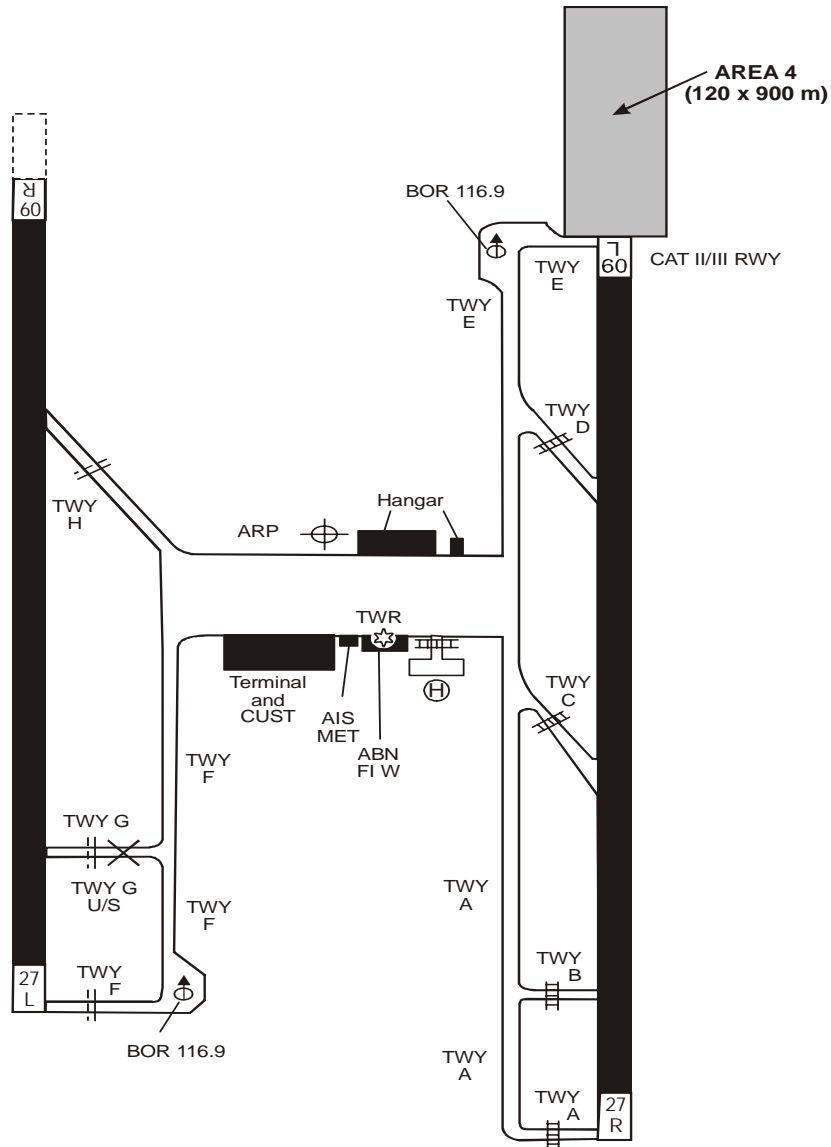
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- ~~b)~~ 2. In those portions of Area 2 where flight operations are prohibited due to very high terrain or other local restrictions and/or regulations, terrain data shall only be collected and recorded in accordance with the Area 1 numerical requirements.
- ~~2.~~ 3. Data on every obstacle within Area 1 whose height above the ground is 100 m or higher shall be collected and recorded in the data set in accordance with the Area 1 numerical requirements specified in Table A8-2.



**Figure A8-3. Terrain and obstacle data collection surface — Area 3**

1. Data on terrain and obstacles, except frangible objects as defined by Annex 14, that extend more than a half-metre (0.5 m) above the horizontal plane passing through the nearest point on the aerodrome/heliport movement area shall be collected and recorded.
2. Terrain and obstacle data in Area 3 shall be collected and recorded in accordance with numerical requirements specified in Table A8-1 and Table A8-2, respectively.



**Figure A8-4. Terrain and obstacle data collection surface — Area 4**

~~Only terrain~~ Terrain data shall be collected and recorded in Area 4 in accordance with the numerical requirements specified in Table A8-1.

*Note 1.— The horizontal extent of Area 2 covers Area 4. More detailed obstacle data may be collected in Area 4 in accordance with Area 4 numerical requirements for obstacle data specified in Table A8-2. (See 10.2.6.)*

*Note 2.— Area 4 may be extended in accordance with 10.2.7.*



**Table A8-1. Terrain data numerical requirements**

	Area 1	Area 2	Area 3	Area 4
Post spacing	3 arc seconds (approx. 90 m)	1 arc second (approx. 30 m)	0.6 arc seconds (approx. 20 m)	0.3 arc seconds (approx. 9 m)
Vertical accuracy	30 m	3 m	0.5 m	1 m
Vertical resolution	1 m	0.1 m	0.01 m	0.1 m
Horizontal accuracy	50 m	5 m	0.5 m	2.5 m
Confidence level (1- $\sigma$ )	90%	90%	90%	90%
Data classification	routine	essential	essential	essential
Integrity level	$1 \times 10^{-3}$	$1 \times 10^{-5}$	$1 \times 10^{-5}$	$1 \times 10^{-5}$
Maintenance period	as required	as required	as required	as required

**Table A8-2. Obstacle data numerical requirements**

	Area 1	Area 2	Area 3	Area 4
Vertical accuracy	30 m	3 m	0.5 m	1 m
Vertical resolution	1 m	0.1 m	0.01m	0.1 m
Horizontal accuracy	50 m	5 m	0.5 m	2.5 m
Confidence level (1- $\sigma$ )	90%	90%	90%	90%
Data classification	routine	essential	essential	essential
Integrity level	$1 \times 10^{-3}$	$1 \times 10^{-5}$	$1 \times 10^{-5}$	$1 \times 10^{-5}$
Maintenance period	as required	as required	as required	as required

**Table A8-3. Terrain attributes**

Terrain attribute	Mandatory/Optional
...	
Vertical confidence level	Mandatory
Surface type	Mandatory Optional
Recorded surface	Mandatory
...	

**Table A8-4. Obstacle attributes**

Obstacle attribute	Mandatory/Optional
...	
Elevation	Mandatory
Height	Optional
Vertical accuracy	Mandatory
...	

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