

**COVER SHEET TO AMENDMENT 58**

**INTERNATIONAL STANDARDS  
AND RECOMMENDED PRACTICES**

# **AERONAUTICAL CHARTS**

**ANNEX 4  
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**ELEVENTH EDITION — JULY 2009**

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

## Checklist of Amendments to Annex 4

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|   | <i>Effective date</i> | <i>Date of applicability</i>          |
|---|-----------------------|---------------------------------------|
| Eleventh Edition<br>(incorporates Amendments 1 to 55)   | 20 July 2009          | 19 November 2009;<br>18 November 2010 |
| Amendment 56<br>(adopted by the Council on 24 February 2010)  | 12 July 2010          | 18 November 2010;<br>12 November 2015 |
| Amendment 57<br>(adopted by the Council on 27 February 2013)  | 15 July 2013          | 14 November 2013                      |
| Amendment 58<br>(adopted by the Council on 3 March 2014)<br>Replacement pages (xvii), 1-5, 1-6, 9-3, 11-6 and App 6-2 | 14 July 2014          | 13 November 2014                      |

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*Transmittal note*

Amendment 58

to the

International Standards  
and Recommended Practices

## AERONAUTICAL CHARTS

(Annex 4 to the Convention on International Civil Aviation)

1. Insert the following replacement pages in Annex 4 (Eleventh Edition) to incorporate Amendment 58 which becomes applicable on 13 November 2014:
    - a) Page (xvii) — Foreword
    - b) Pages 1-5 and 1-6 — Chapter 1
    - c) Page 9-3 — Chapter 9
    - d) Page 11-6 — Chapter 11
    - e) Page APP 6-2 — Appendix 6
  2. Record the entry of this amendment on page (iii).
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| <i>Amendment</i>     | <i>Source(s)</i>   | <i>Subject(s)</i>  | <i>Adopted<br/>Effective<br/>Applicable</i>                               |
|----------------------|--|--|---|
| 55<br>(11th Edition) | Secretariat with the assistance of the RNPSORSG; proposals by AP/1; and Recommendation 9/3 of IFPP/WG/WHL/1.   | Definitions and new provisions relating to performance-based navigation terminology; symbols for wind turbines; a hierarchy of symbols for significant points, and publication of bearings and tracks additionally as True values. | 4 March 2009<br>20 July 2009<br>19 November 2009;<br>18 November 2010     |
| 56                   | Secretariat with the assistance of the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG)                     | Definitions and new provisions relating to cyclic redundancy check (CRC) and an extended applicability date for the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic).  | 24 February 2010<br>12 July 2010<br>18 November 2010;<br>12 November 2015 |
| 57                   | Secretariat with assistance from the Aeronautical Information Services to Aeronautical Information Management Study Group (AIS-AIMSG)                    | Integrity of aeronautical data.  | 27 February 2013<br>15 July 2013<br>14 November 2013                      |
| 58                   | Seventh, eighth, ninth, tenth and eleventh meetings of the Instrument Flight Procedure Panel Working Group of the Whole (IFPP/WG-WHL/7, 8, 9, 10 and 11) | Amendment concerning procedure design criteria and charting requirements to support helicopter point-in-space (PinS) approach and departure operations.  | 3 March 2014<br>14 July 2014<br>13 November 2014                          |



**Gregorian calendar.** Calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108\*).

*Note.*— In the Gregorian calendar, common years have 365 days and leap years 366 days divided into twelve sequential months.

**Height.** The vertical distance of a level, a point or an object considered as a point, measured from a specified datum.

**Helicopter stand.** An aircraft stand which provides for parking a helicopter and where ground taxi operations are completed or where the helicopter touches down and lifts off for air taxi operations.

**Heliport.** An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

**Heliport reference point (HRP).** The designated location of a heliport or a landing location.

**Holding procedure.** A predetermined manoeuvre which keeps an aircraft within a specified airspace while awaiting further clearance.

**Hot spot.** A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

**Human Factors principles.** Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

**Hypsometric tints.** A succession of shades or colour gradations used to depict ranges of elevation.

**Initial approach segment.** That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

**Instrument approach procedure.** A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply.

**Integrity classification (aeronautical data).** Classification based upon the potential risk resulting from the use of corrupted data. Aeronautical data is classified as:

- a) routine data: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;
- b) essential data: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and
- c) critical data: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

**Intermediate approach segment.** That segment of an instrument approach procedure between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, racetrack or dead reckoning track procedure and the final approach fix or point, as appropriate.

**Intermediate holding position.** A designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower.

**Isogonal.** A line on a map or chart on which all points have the same magnetic variation for a specified epoch.

**Isogriv.** A line on a map or chart which joins points of equal angular difference between the North of the navigation grid and Magnetic North.

**Landing area.** That part of a movement area intended for the landing or take-off of aircraft.

**Landing direction indicator.** A device to indicate visually the direction currently designated for landing and for take-off.

**Level.** A generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level.

**Logon address.** A specified code used for data link logon to an ATS unit.

**Magnetic variation.** The angular difference between True North and Magnetic North.

*Note.*— The value given indicates whether the angular difference is East or West of True North.

**Manoeuvring area.** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

**Marking.** A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.

**Metadata.** Data about data (ISO 19115\*).

*Note.*— Data that describes and documents data.

**Minimum en-route altitude (MEA).** The altitude for an en-route segment that provides adequate reception of relevant navigation facilities and ATS communications, complies with the airspace structure and provides the required obstacle clearance.

**Minimum obstacle clearance altitude (MOCA).** The minimum altitude for a defined segment of flight that provides the required obstacle clearance.

**Minimum sector altitude (MSA).** The lowest altitude which may be used which will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius centred on a significant point, the aerodrome reference point (ARP) or the heliport reference point (HRP).

**Missed approach point (MAPt).** That point in an instrument approach procedure at or before which the prescribed missed approach procedure must be initiated in order to ensure that the minimum obstacle clearance is not infringed.

**Missed approach procedure.** The procedure to be followed if the approach cannot be continued.

**Movement area.** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

**Navigation specification.** A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

*Required navigation performance (RNP) specification.* A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.



## 9.9 Aeronautical data

### 9.9.1 Aerodromes

9.9.1.1 The aerodrome of departure shall be shown by the runway pattern.

9.9.1.2 All aerodromes which affect the designated standard departure route — instrument shall be shown and identified. Where appropriate, the aerodrome runway patterns shall be shown.

### 9.9.2 Prohibited, restricted and danger areas

Prohibited, restricted and danger areas which may affect the execution of the procedures shall be shown with their identification and vertical limits.

### 9.9.3 Minimum sector altitude

9.9.3.1 The established minimum sector altitude shall be shown with a clear indication of the sector to which it applies.

9.9.3.2 Where the minimum sector altitude has not been established, the chart shall be drawn to scale and area minimum altitudes shall be shown within quadrilaterals formed by the parallels and meridians. Area minimum altitudes shall also be shown in those parts of the chart not covered by the minimum sector altitude.

*Note.— Depending on the selected chart scale, quadrilaterals formed by the parallels and meridians normally correspond to the half-degree of latitude and longitude.*

### 9.9.4 Air traffic services system

9.9.4.1 The components of the established relevant air traffic services system shall be shown.

9.9.4.1.1 The components shall comprise the following:

- a) a graphic portrayal of each standard departure route — instrument, including:
  - 1) route designator;
  - 2) significant points defining the route;
  - 3) track or radial to the nearest degree along each segment of the route;
  - 4) distances to the nearest kilometre or nautical mile between significant points;
  - 5) minimum obstacle clearance altitudes, along the route or route segments and altitudes required by the procedure to the nearest higher 50 m or 100 ft and flight level restrictions where established;
  - 6) where the chart is drawn to scale and vectoring on departure is provided, established minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

*Note 1.— Where ATS surveillance systems are used to vector aircraft to or from significant points on a published standard departure route, the relevant procedures may be shown on the Standard Departure Chart — Instrument (SID) — ICAO unless excessive chart clutter will result.*

*Note 2.— Where excessive chart clutter will result, an ATC Surveillance Minimum Altitude Chart — ICAO may be provided (see Chapter 21), in which case the elements indicated by 9.9.4.1.1, a) 6), need not be duplicated on the Standard Departure Chart — Instrument (SID) — ICAO.*

- b) the radio navigation aid(s) associated with the route(s) including:
  - 1) plain language name;
  - 2) identification;
  - 3) frequency;
  - 4) geographical coordinates in degrees, minutes and seconds;
  - 5) for DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);
- c) the name-codes of the significant points not marked by the position of a radio navigation aid, their geographical coordinates in degrees, minutes and seconds and the bearing to the nearest tenth of a degree and distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference radio navigation aid;
- d) applicable holding patterns;
- e) transition altitude/height to the nearest higher 300 m or 1 000 ft;
- f) the position and height of close-in obstacles which penetrate the obstacle identification surface (OIS). A note shall be included whenever close-in obstacles penetrating the OIS exist but which were not considered for the published procedure design gradient;

*Note.— In accordance with PANS-OPS, Volume II, information on close-in obstacles is provided by the procedures specialist.*

- g) area speed restrictions, where established;
- h) the designation of the navigation specification(s) including any limitations, where established;
- i) all compulsory and “on-request” reporting points;
- j) radio communication procedures, including:
  - 1) call sign(s) of ATS unit(s);
  - 2) frequency;
  - 3) transponder setting, where appropriate;
- k) an indication of “flyover” significant points.

**9.9.4.2 Recommendation.**— *A textual description of standard departure route(s) — instrument (SID) and relevant communication failure procedures should be provided and should, whenever feasible, be shown on the chart or on the same page which contains the chart.*

11.10.4.5 Radio communication frequencies, including call signs, that are required for the execution of the procedures shall be shown.

11.10.4.6 When required by the procedures, the distance to the aerodrome from each radio navigation aid concerned with the final approach shall be shown to the nearest kilometre or nautical mile. When no track-defining aid indicates the bearing of the aerodrome, the bearing shall also be shown to the nearest degree.

#### 11.10.5 Minimum sector altitude or terminal arrival altitude

The minimum sector altitude or terminal arrival altitude established by the competent authority shall be shown, with a clear indication of the sector to which it applies.

#### 11.10.6 Portrayal of procedure tracks

11.10.6.1 The plan view shall show the following information in the manner indicated:

- a) the approach procedure track by an arrowed continuous line indicating the direction of flight;
- b) the missed approach procedure track by an arrowed broken line;
- c) any additional procedure track, other than those specified in a) and b), by an arrowed dotted line;
- d) bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometre or tenth of a nautical mile or times required for the procedure;
- e) where no track-defining aid is available, the magnetic bearing to the nearest degree to the aerodrome from the radio navigation aids concerned with the final approach;
- f) the boundaries of any sector in which visual manoeuvring (circling) is prohibited;
- g) where specified, the holding pattern and minimum holding altitude/height associated with the approach and missed approach;
- h) caution notes where required, prominently displayed on the face of the chart;
- i) an indication of “flyover” significant points.

11.10.6.2 **Recommendation.**— *The plan view should show the distance to the aerodrome from each radio navigation aid concerned with the final approach.*

11.10.6.3 A profile shall be provided normally below the plan view showing the following data:

- a) the aerodrome by a solid block at aerodrome elevation;
- b) the profile of the approach procedure segments by an arrowed continuous line indicating the direction of flight;
- c) the profile of the missed approach procedure segment by an arrowed broken line and a description of the procedure;
- d) the profile of any additional procedure segment, other than those specified in b) and c), by an arrowed dotted line;
- e) bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometre or tenth of a nautical mile or times required for the procedure;

- f) altitudes/heights required by the procedures, including transition altitude, procedure altitudes/heights and heliport crossing height (HCH), where established;
- g) limiting distance to the nearest kilometre or nautical mile on procedure turn, when specified;
- h) the intermediate approach fix or point, on procedures where no course reversal is authorized;
- i) a line representing the aerodrome elevation or threshold elevation, as appropriate, extended across the width of the chart including a distance scale with its origin at the runway threshold.

11.10.6.4 **Recommendation.**— *Heights required by procedures should be shown in parentheses, using the height datum selected in accordance with 11.10.2.5.*

11.10.6.5 **Recommendation.**— *The profile view should include a ground profile or a minimum altitude/height portrayal as follows:*

- a) *a ground profile shown by a solid line depicting the highest elevations of the relief occurring within the primary area of the final approach segment. The highest elevations of the relief occurring in the secondary areas of the final approach segment shown by a dashed line; or*
- b) *minimum altitudes/heights in the intermediate and final approach segments indicated within bounded shaded blocks.*

*Note 1.— For the ground profile portrayal, actual templates of the primary and secondary areas of the final approach segment are provided to the cartographer by the procedures specialist.*

*Note 2.— The minimum altitude/height portrayal is intended for use on charts depicting non-precision approaches with a final approach fix.*

#### 11.10.7 Aerodrome operating minima

11.10.7.1 Aerodrome operating minima when established by the State shall be shown.

11.10.7.2 The obstacle clearance altitudes/heights for the aircraft categories for which the procedure is designed shall be shown; for precision approach procedures, additional OCA/H for Cat D<sub>L</sub> aircraft (wing span between 65 m and 80 m and/or vertical distance between the flight path of the wheels and the glide path antenna between 7 m and 8 m) shall be published, when necessary.

#### 11.10.8 Supplementary information

11.10.8.1 When the missed approach point is defined by:

- a distance from the final approach fix, or
- a facility or a fix and the corresponding distance from the final approach fix,

the distance to the nearest two-tenths of a kilometre or tenth of a nautical mile and a table showing ground speeds and times from the final approach fix to the missed approach point shall be shown.

11.10.8.2 When DME is required for use in the final approach segment, a table showing altitudes/heights for each 2 km or 1 NM, as appropriate, shall be shown. The table shall not include distances which would correspond to altitudes/heights below the OCA/H.

## APPENDIX 6. AERONAUTICAL DATA QUALITY REQUIREMENTS

**Table 1. Latitude and longitude**

| Latitude and longitude   | Chart resolution | Integrity Classification |
|--|------------------|--------------------------|
| Flight information region boundary points .....  | as plotted       | routine                  |
| P, R, D area boundary points (outside CTA/CTR boundaries) .....  | as plotted       | routine                  |
| P, R, D area boundary points (inside CTA/CTR boundaries) .....   | as plotted       | essential                |
| CTA/ CTR boundary points.....  | as plotted       | essential                |
| En-route nav aids, intersections and waypoints, and holding, and STAR/SID points.....                              | 1 sec            | essential                |
| Obstacles in Area 1 (the entire State territory).....  | as plotted       | routine                  |
| Aerodrome/heliport reference point.....  | 1 sec            | routine                  |
| Nav aids located at the aerodrome/heliport.....  | as plotted       | essential                |
| Obstacles in Area 3.....   | 1/10 sec         | essential                |
| Obstacles in Area 2.....   | 1/10 sec         | essential                |
| Final approach fixes/points and other essential fixes/points<br>comprising the instrument approach procedure ..... | 1 sec            | essential                |
| Runway thresholds .....  | 1 sec            | critical                 |
| Taxiway centre line/parking guidance line points.....  | 1/100 sec        | essential                |
| Runway end.....  | 1 sec            | critical                 |
| Runway holding position.....   | 1 sec            | critical                 |
| Taxiway intersection marking line.....   | 1 sec            | essential                |
| Exit guidance line .....   | 1 sec            | essential                |
| Apron boundaries (polygon).....  | 1 sec            | routine                  |
| De-/anti-icing facility (polygon).....   | 1 sec            | routine                  |
| Aircraft standpoints/INS checkpoints .....   | 1/100 sec        | routine                  |
| Geometric centre of TLOF or FATO thresholds, heliports.....  | 1 sec            | critical                 |

*Note.— See Annex 15, Appendix 8, for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in the defined areas.*

Table 2. Elevation/altitude/height

| Elevation/altitude/height   | Chart resolution                    | Integrity Classification |
|---|-------------------------------------|--------------------------|
| Aerodrome/heliport elevation.....   | 1 m or 1 ft                         | essential                |
| WGS-84 geoid undulation at aerodrome/heliport elevation position.....                                     | 1 m or 1 ft                         | essential                |
| Runway or FATO threshold, non-precision approaches.....   | 1 m or 1 ft                         | essential                |
| WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, non-precision approaches..... | 1 m or 1 ft                         | essential                |
| Runway or FATO threshold, precision approaches.....   | 0.5 m or 1 ft                       | critical                 |
| WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, precision approaches.....     | 0.5 m or 1 ft                       | critical                 |
| Threshold crossing height (Reference datum height), precision approaches.....                             | 0.5 m or 1 ft                       | critical                 |
| Obstacle clearance altitude/height (OCA/H).....   | as specified in PANS-OPS (Doc 8168) | essential                |
| Obstacles in Area 1 (the entire State territory).....   | 3 m (10 ft)                         | routine                  |
| Obstacles in Area 2.....  | 1 m or 1 ft                         | essential                |
| Obstacles in Area 3.....  | 1 m or 1 ft                         | essential                |
| Distance measuring equipment (DME).....   | 30 m (100 ft)                       | essential                |
| Instrument approach procedures altitude.....  | as specified in PANS-OPS (Doc 8168) | essential                |
| Minimum altitudes.....  | 50 m or 100 ft                      | routine                  |
| Heliport crossing height, PinS approaches.....  | 1 m or 1 ft                         | essential                |

*Note.— See Annex 15, Appendix 8, for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in the defined areas.*