Civil Aviation Safety Authority
of Papua New Guinea

Advisory Circular

AC175-10

DIGITAL Data sets

Initial Issue

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GENERAL

Civil Aviation Authority Advisory Circulars (AC) contain information about standards, practices and procedures that the Director has found to be an Acceptable Means of Compliance (AMC) with the associated rule.

An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices or procedures are found to be acceptable, they will be added to the appropriate Advisory Circular.

PURPOSE

This Advisory Circular provides methods, acceptable to the Director, for showing compliance with the aerodrome certification exposition requirements of Part 175 and explanatory material to assist in showing compliance.

RELATED CAR

This AC relates specifically to CAR 175.401 Subpart I – Digital data sets.

CHANGE NOTICE

There was no previous issue of this AC, consequently no change is in effect.

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CHAPTER 1 – DIGITAL DATA SETS

1.1 General

(a) To facilitate and support the use of exchange of digital data sets between data providers and data users, the ISO 19100 series of standards for geographic information shall be used as a reference framework.

(b) A description of available digital data sets shall be provided in the form of data product specifications on which basis of air navigation users will be able to evaluate the products and determine whether they fulfil the requirements for their intended use (application).

(c) The content and structure of digital data sets shall be defined in terms of an application schema and a feature catalogue.

(d) The aeronautical information model used shall encompass the aeronautical data and aeronautical information to be exchanged.

1.2 Data Sets

a) Digital data shall be in the form of the following data sets:

AIP data set;

terrain data sets;

obstacle data sets;

aerodrome mapping data sets; and

instrument flight procedure data sets.

(b) **The AIP data set** shall contain the digital representation of aeronautical information of lasting character (permanent information and long duration temporary changes) essential to air navigation.

(c) **In terrain data sets**, only one feature type, i.e. terrain, shall be provided. Feature attributes describing terrain shall be those listed in AC175-6. The terrain feature attributes listed in AC175-6 Terrain and obstacle attributes provision requirements, represent the minimum set of terrain attributes, and those annotated as mandatory shall be recorded in the terrain data set.

(d) **In an obstacle data set**, all defined obstacle feature types shall be provided and each of them shall be described according to the list of mandatory attributes provided in AC175-6 Terrain and obstacle attributes provision requirements.

(e) **Aerodrome mapping data sets** shall contain the digital representation of aerodrome features.

(f) **Instrument flight procedure data sets** shall contain the digital representation of instrument flight procedures.

(g) Each data set shall be provided to the next intended user together with at least the minimum set of metadata that ensures traceability.

(h) A checklist of valid data sets shall be regularly provided.

(i) Each data set shall include the following minimum set of metadata:

(1) the names of the organization or entities providing the data set;

(2) the date and time when the data set was provided;

(3) period of validity of the data set; and

(4) any limitations with regard to the use of the data set.

(j) Data sets shall be amended or reissued at such regular intervals as may be necessary to keep them up to date.

(k) Permanent changes and temporary changes of long duration (three months or longer) made available as digital data shall be issued in the form of a complete data set or a subset that includes only the differences from the previously issued complete data set.

(l) The update interval for the digital data sets shall be specified in the data product specification.

(m) Data sets that have been made available in advance (according to the AIRAC cycle) shall be updated with the non-AIRAC changes that occur between the publication and the effective date.

(n) Updates to AIP and digital data sets shall be synchronized.

1.3 Terrain and Obstacle data set areas

(a) The coverage areas for terrain and obstacle data sets shall be specified as:

(1) Area 1: the entire territory of the State;

(2) Area 2: within the vicinity of an aerodrome, subdivided as follows:

(i) Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists;

(ii) 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;

(iii) 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; and

(iv) 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 terminal control area (TMA) boundary, whichever is nearest;

(3) Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway centre line and 50 m from the edge of all other parts of the aerodrome movement area; and

(4) Area 4: the 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.

1.4 Terrain data sets

(a) Terrain data sets shall contain the digital representation of the terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum.

(b) A terrain grid shall be angular or linear and shall be of regular or irregular shape.

(c) Sets of terrain data shall include spatial (position and elevation), thematic and temporal aspects for the surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, and permanent ice and snow, and exclude obstacles. Depending on the acquisition method used, this shall represent the continuous surface that exists at the bare Earth, the top of the canopy or something in-between, also known as “first reflective surface”.

(d) Terrain data for each area shall conform to the applicable numerical requirements in AC175-6.

1.4.1 Provision of terrain data sets

(a) Terrain data shall be provided for Area 1.

(b) For aerodromes regularly used by international civil aviation, terrain data shall be provided for:

(1) Area 2a;

(2) the take-off flight path area; and

(3) an area bounded by the lateral extent of the aerodrome obstacle limitation surfaces.

(c) For aerodromes regularly used by international civil aviation, additional terrain data shall be provided within Area 2 as follows:

(1) in the area extending to a 10-km radius from the ARP; and

(2) 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

(d) For aerodromes regularly used by international civil aviation, terrain data shall be provided for Area 3.

(e) For aerodromes regularly used by international civil aviation, terrain data shall be provided for Area 4 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.

1.5 Obstacle data sets

(a) Obstacle data sets shall contain the digital representation of the vertical and horizontal extent of obstacles.

(b) Obstacle data elements are features that shall be represented in the data sets by points, lines or polygons.

(c) Obstacle data shall not be included in terrain data sets.

(d) In an obstacle data set, all defined obstacle feature types shall be provided and each of them shall be described according to the list of mandatory attributes provided in AC175-6.

(e) Obstacle data for each area shall conform to the applicable numerical requirements contained in AC175-6.

(f) The obstacle data product specification, supported by geographical coordinates for each aerodrome included within the data set, shall describe the following areas:

(1) Areas 2a, 2b, 2c, 2d;

(2) the take-off flight path area; and

(3) the obstacle limitation surfaces.

1.5.1 Provision of obstacle data sets

(a) Obstacle data shall be provided for obstacles in Area 1 whose height is 100 m or higher above ground.

(b) For aerodromes regularly used by international civil aviation, obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.

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

(1) 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;

(2) 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; and

(3) penetrations of the aerodrome obstacle limitation surfaces.

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

(1) 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;

(2) 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 10km 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; and

(3) 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; except that data need not be collected for obstacles less than a height of 3 m above ground in Area 2b and less than a height of 15 m above ground in Area 2c.

(e) For aerodromes regularly used by international civil aviation, obstacle data should be provided for Area 3 for obstacles that penetrate the relevant obstacle data collection surface extending a half- metre (0.5 m) above the horizontal plane passing through the nearest point on the aerodrome movement area.

(f) For aerodromes regularly used by international civil aviation, obstacle data shall be provided for Area 4 for all runways where precision approach Category II or III operations have been established

1.6 Aerodrome mapping data sets

(a) Aerodrome mapping data sets shall contain the digital representation of aerodrome features.

(b) Aerodrome mapping data sets shall be made available for aerodromes regularly used by international civil aviation.

1.7 Instrument flight procedure data sets

(a) Instrument flight procedure data sets shall contain the digital representation of instrument flight procedures.

(b) Instrument flight procedure data sets shall be made available for aerodromes regularly used by international civil aviation