Title: Guidance Material on Specification for Obstruction Survey's

1 INTRODUCTION

This document sets out certain minimum requirements for the surveying of obstructions to obtain positional data for use in aeronautical planning and operations. Only obstructions outside aerodrome boundaries are considered. (Special training is required for survey work with aerodrome boundaries.)

Any obstruction might have the potential to endanger or interfere with the safety of aircraft or the safe and efficient navigation thereof. The significance of any obstruction in this regard will be dependent on, inter alia, its location relative to aerodrome(s) or flight paths and its maximum elevation.

Details of obstructions which may have significance for the safety of aircraft or air navigation are held in databases by the Irish Aviation Authority or/and published on aeronautical charts.

The accuracy requirements specified in this standard are in accordance with the current standards of the International Civil Aviation Organisation (ICAO).

Readers should forward advice of errors, inconsistencies, requests for further information or suggestions for improvement to this guidance material to ansdinfo@iaa.ie

2 DEFINITIONS

Positional Data: Positional data for obstructions includes latitude, longitude, elevation, height, distance and dimension

Obstructions: For the purpose of this specification an obstruction is considered to be any antennae, building, fence, pole, transmission line, tree, terrain, tower, shrub, spire or an other object in respect of which positional data may be required

3 POLICY

Purpose

The purpose of this document is to provide a standard of surveying obstructions, which have the potential to interfere with the safety of aircraft or air navigation, for the guidance of surveyors.

Applicability

The standard for surveying applies to obstructions which are:

- (a) Within 15km of State or Regional Airports;

- (b) Within 4 km of other licensed Airports; and
- (c) All areas other than those included in (a) and (b) above.

For the purposes of this document obstructions located within either area (a) or area (b) above are referred to as obstructions in the vicinity of airports. Obstructions located within area (c) above are referred to an en-route obstructions.

3.1 Specification

Geodetic Datum

The geodetic datum to which all obstructions shall be referred is the World Geodetic System of 1984 (WSG-84).

This shall be achieved by surveying with respect to an appropriate global reference frame, such as the European Terrestrial Reference System (ETRS89), as realised in Ireland by the IRENET 95 Network.

The competent organisations for the provision of geodetic information in Ireland are the Ordnance Survey of Ireland (Phoenix Park, Dublin) or the Ordnance Survey of Northern Ireland (Corby House, Stranmillis Court, Belfast BT9 5BJ).

Where the positional data required cannot be directly observed by differential GPS satellite surveying then control points can be established from which angular and distance measurements can be made to derive the required positional data.

Positional Data

General

Positional data given shall represent the geometric centre, where appropriate and the maximum elevation of the obstruction. The height (average height where appropriate) of obstruction above ground level shall also be included.

Accuracy and Probability

All positional data accuracy shall relate to a 95% (2 x sigma) probability.

Survey Accuracy Requirements

Positional data survey accuracy shall be established and shall at minimum meet the requirements specified at attachment 1.

Format

The format for depicting geographic co-ordinates is to be degrees, minutes, seconds and decimals of seconds as appropriate.

The format for depicting elevation/height shall be feet.

The format for depicting length/distance/dimension shall be nautical miles and decimals of nautical miles as appropriate or meters and decimals of meters as appropriate.

Resolution

The resolution required shall be such as to reflect the accuracy requirements

Traceability

All positional data must be traceable to source by an unbroken trail.

Data Delivery

Positional data shall be delivered in electronic medium.

3.2 Quality Control

Quality Assurance

All positional data produced in accordance with the requirements of this specification shall be such that their quality can be assured.

Evidence shall be present which confirms that the required accuracies have been met.

Data submitted shall have been checked and be free from all known viruses.

Calibration of Survey Equipment

All survey equipment used for the taking of measurements in relation to surveys covered by this document shall be shown to be calibrated and to perform to accuracies appropriate to the task and for the time of use.

Details of calibration shall be included in the survey report.

Survey Work

All survey work shall be carried out by appropriately qualified surveyors.

Quality Records

A survey report shall be submitted giving details specified in attachment 2.

Use of Software

Where software is used for any of the survey processing, other than software approved by the survey equipment manufacturer for use in association with the equipment, it must be demonstrated that it functions correctly. This demonstration must be included in the written report.

Auditing

Survey work shall be recorded and reported in such a way that the quality of the positional data produced can be audited.

Non-compliance

Where the audit shows that surveys have not produced positional data which meet the standard of accuracy and traceability laid down in this document then corrective action will be requested.

Attachment 1

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 ~~(1σ)~~	90%	90%	90%	90%
Data classification Integrity level	routine 1×10^{-3}	essential 1×10^{-5}	essential 1×10^{-5}	Essential 1×10^{-5}
Maintenance period	as required	as required	as required	as required

Notes:

1. Heights are orthometric, above MSL as defined by the Ordnance Survey vertical datum in Malin Head.
2. Where ellipsoidal heights are observed as an integral part of the survey process these shall be recorded and included in the survey report. The ellipsoid to which such heights should be stated.

Obstacle attributes

Obstacle attribute	Mandatory/Optional
Area of coverage	Mandatory
Data originator identifier	Mandatory
Obstacle identifier	Mandatory
Horizontal accuracy	Mandatory
Horizontal confidence level	Mandatory
Horizontal position	Mandatory
Horizontal resolution	Mandatory
Horizontal extent	Mandatory
Horizontal reference system	Mandatory
Elevation/Height	Mandatory/Optional

Vertical accuracy	Mandatory
Vertical confidence level	Mandatory
Elevation reference	Mandatory
Vertical resolution	Mandatory
Vertical reference system	Mandatory
Obstacle type	Mandatory
Geometry type	Mandatory
Integrity	Mandatory
Date and time stamp	Mandatory
Unit of measurement used	Mandatory
Operations	Optional
Effectivity	Optional
Lighting	Mandatory
Marking	Mandatory

Attachment 2

Survey Report Requirement

A Survey report should contain the following general information:

1. A receipt note signed on behalf of the authority indicating the date of receipt.
2. Statement of conformance
3. Contents Page
4. Project summary
5. Historical data including;
    a. dates;
    b. purpose of survey;
    c. name(s) of surveyor(s);
    d. survey organisation;
    e. planning reference (if any); and
    f. Other relevant details.
6. Statement of survey.
7. Survey diagram showing the point surveyed with description, photographic records and site location map.
8. Positional data obtained and date of survey.
9. Quality control report indicating equipment used, calibration details, method of checking survey and other relevant matters.
10. Annexes:
    a. Booking sheets and observations
    b. Baseline log
    c. Minimum constrained adjustment
    d. Constrained adjustment
    e. Error ellipse and histogram
    f. Loop closures on baseline
11. A CD of the survey data