

Aerodrome Obstacle Survey Information Checks

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GENERAL

Overseas Territories Aviation Circulars are issued to provide advice, guidance and information on standards, practices and procedures necessary to support Overseas Territory Aviation Requirements. They are not in themselves law but may amplify a provision of the Air Navigation (Overseas Territories) Order or provide practical guidance on meeting a requirement contained in the Overseas Territories Aviation Requirements.

PURPOSE

This Circular provides guidance regarding checks that an aerodrome may carry out to provide assurance that the 'obstacle surveyor' has provided accurate and useable survey data.

RELATED REQUIREMENTS

This Circular relates to OTAR Part 139.

CHANGE INFORMATION

Second issue.

ENQUIRIES

Enquiries regarding the content of this Circular should be addressed to Air Safety Support International at the address on the ASSI website www.airsafety.aero or to the appropriate Overseas Territory Aviation Authority.

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1. Introduction

- 1.1 After an obstacle survey has been completed it is important for an aerodrome to check the information provided to ensure that it is correct and the operating environment surrounding the aerodrome remains safe for aircraft operations.
- 1.2 This OTAC provides guidance regarding some basic checks that can be carried out to validate the survey.
- 1.3 The references in this OTAC are based on ICAO Annex 14 Volume 1.

2. Purpose

Checks of the obstacle survey need to ascertain that the Survey Company has understood the aerodrome's particular declared distance positions, Obstacle Limitation Surfaces' reference elevations and positions. This is especially important if these are restricted due to factors that the survey company may not be fully conversant with, such as Runway End Safety Area provision, blast erosion areas or runway coding criteria.

3. General

- 3.1 The presence of obstacles will determine:
 - where the safeguarding surfaces will originate (for approach and take-off surfaces); and
 - where the runway threshold and end will be located or
 - the minimum safe altitude (i.e. obstacle height + safety margin) below which aeroplanes must not descend; or
 - prohibited areas within which aeroplanes must not fly.Any or all of these limits can fundamentally affect the viability of an aerodrome operation.
- 3.2 For example, if the minimum safe altitude has to be increased because of tree growth or the construction of a building, the aeroplane will be required to maintain a higher altitude which may result in the aeroplane being in or above cloud which would prevent it making visual contact with the runway thus preventing approach and landing.
- 3.3 If the penetration is of the approach or take-off slope, the only options are to remove the penetration or move the origin of the slope to remove infringements. This will reduce one or more of the runway declared distances. Equally, the removal of an obstacle may enable the Minimum Safe Altitude (MSA) to be lowered and/or increase the declared distances.
- 3.4 Figure 1 simply illustrates the stable condition with the Obstacle Clearance Height/Altitude and approach slope based on the known environment. In this case the aeroplane can pass over the obstacle and approach the threshold of the runway.

3.5 Figure 2 shows that if the obstacle (building) increases in height it pushes the aeroplane to a higher altitude which increases the risk of conflict with cloud and, to ensure the aeroplane avoids any conflict with the building, moves the approach to approach the same runway which displaces the threshold.

Figure 1 Stable condition

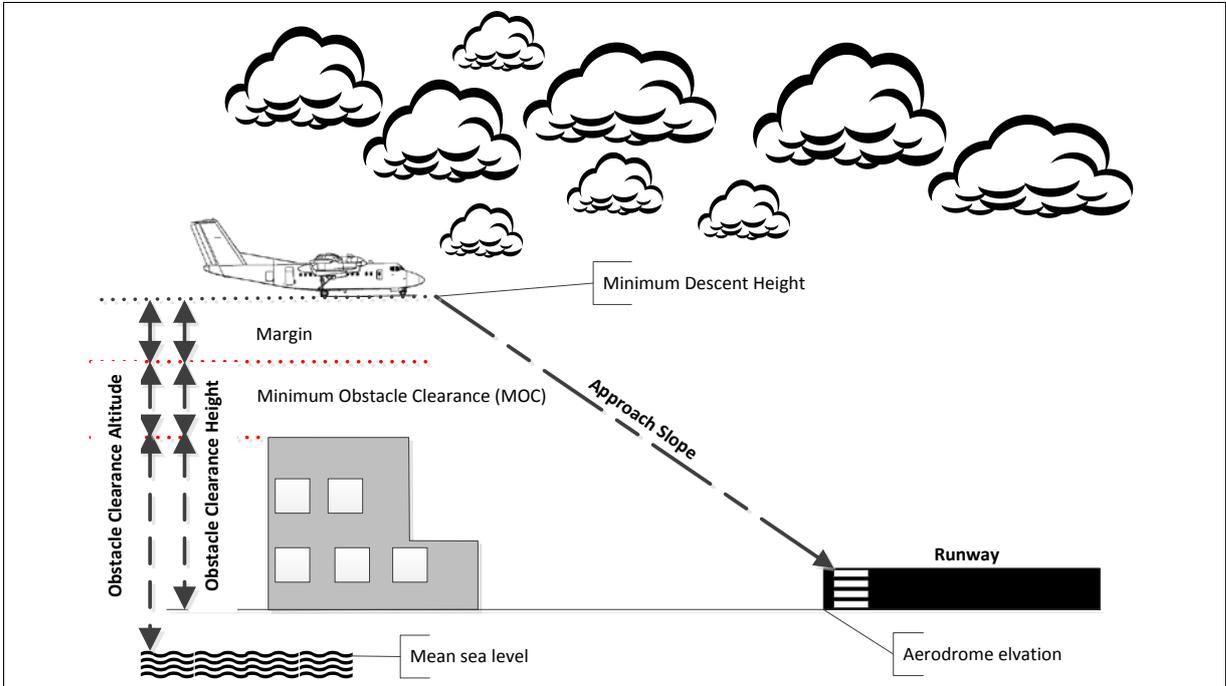
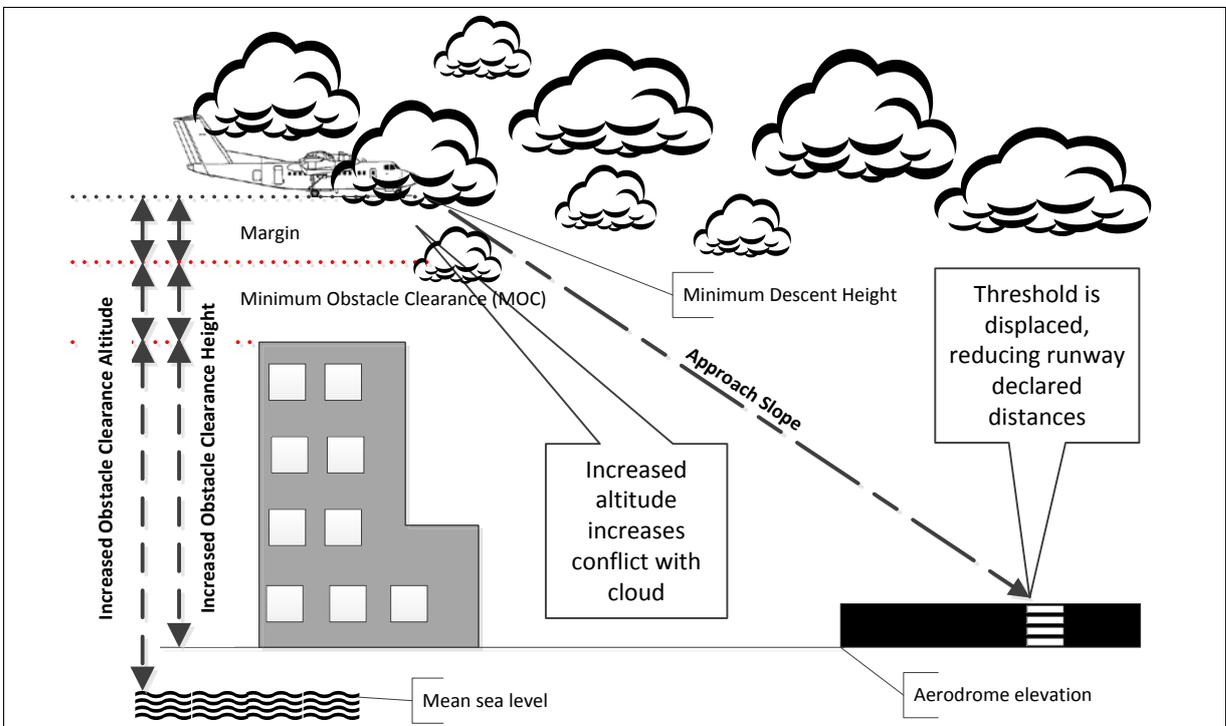


Figure 2 – Taller building increases altitude and displaces approach slope



3.6 Therefore, the accuracy and integrity of the survey is vital to ensure the airspace around the aerodrome is safe, free from hazardous obstacles or, where obstacles exist, they are appropriately promulgated, marked/lit and flight procedures take account of them.

- 3.7 It should be borne in mind that, at an aerodrome with instrument flight procedures (IFPs), an accurate obstacle survey is the foundation on which the minimum limits of those procedures will be based; remembering that the IFP surfaces are generally more demanding than the safeguarding surfaces. However, this OTAC concentrates only on the safeguarding surfaces.
- 3.8 As well as checking the survey information/data aerodromes should establish consultation and co-ordination procedures with the local/municipal authorities that enable control to be exercised over construction that may adversely affect the safeguarding surfaces and consequently the viability of the aerodrome operation.
- 3.9 Any objects that penetrate the safeguarded surfaces have the potential to either raise minimum obstacle clearance heights or shorten runway declared distances or both.
- 3.10 In accordance with OTAR 139 the description, height and location of obstacles which infringe standard obstacle limitation surfaces and whether they are lit should be included in the Aerodrome manual and AIP.

4. Method

- 4.1 Using charts, position information and elevation data provided by a Survey Company an aerodrome should conduct, and document a review to ascertain with some confidence that the survey has been conducted using the correct reference and elevation positions. A procedure should be developed to outline how this is to be achieved with evidence of this work recorded, detailing what was checked. Such evidence may then be used to cross-check subsequent surveys and may provide a useful tool to assist with future safeguarding.
- 4.2 Some survey charts do provide sufficient detail to adequately assess the positions of the protected surfaces and combining this with a review of the survey report can highlight many potential errors that may occur.
- 4.3 The following is an example (Appendix A). It is not exhaustive, but a suggested list of questions that an aerodrome may consider using to check its survey. Clearly, each aerodrome should identify its key, critical features that could adversely affect flight operations, and it will need to undertake the assessment for each runway direction.
- 4.4 The example is presented in a table format that may enable ease of assessment and recording, but the aerodrome should develop its own system that best satisfies its needs.
- 4.5 Aeronautical data quality requirements are contained in Annex 14 Volume 1, Appendix 5.

5. References

ICAO Annex 4 – Aeronautical Charts, provides the requirement for the compilation of charts derived from surveys.

Annex 14 Volume 1 – Aerodromes, Chapter 4 discusses obstacle restriction and removal; Appendix 5 sets aeronautical data quality requirements; Attachment B illustrates the obstacle limitation surfaces.

Annex 15 Aeronautical Information Services - Appendix 1 sets out the contents of Aeronautical Information Publication (AIP).

ICAO Doc.8168 Volume 1 - Aircraft Operation provides information on the general criteria for the various things affecting aeroplane and obstacles.

ICAO Doc 9674 – World Geodetic System — 1984 (WGS-84) Manual.

Appendix A – Aerodrome Survey Evaluation Checklist

1. Evaluating Surveyed Aerodrome and Runway Data *(repeat for all runways)*

	Item	Additional information	Yes	No	Comment/Note
1.1	Is the Aerodrome Reference Point in the correct position and are the coordinates correct?	Annex 14 Aerodrome and runway elevations 2.2			
1.2	Are the runway thresholds in the correct positions?	Annex 14 Aerodrome reference point 2.3			
1.2.1	Do the surveyed points for the runway lights and markings match those of the runway?	Annex 14 Aerodrome dimensions and related information 2.5			
1.3	Using the survey runway true heading, what is the magnetic deviation and is the runway designation still correct?	Annex 14 Aerodrome dimensions and related information 2.5			

2. Declared Distances

	Item	Additional information	Yes	No	Comment/Note
2.1	Are the positions of the start of the landing and take-off declared distances correct?	-			
2.2	Do the above match the:				
2.2.1	Aeronautical Information Publication (AIP)	-			
2.2.2	aerodrome manual	-			
2.3	Do the coordinates cross-check to corroborate the declared distances?				
2.3.1	TORA	-			
2.3.2	TODA	-			
2.3.3	ASDA	-			

	Item	Additional information	Yes	No	Comment/Note
2.3.4	LDA	-			
2.5	Does the clearway equal TODA minus TORA?	Annex 14 3.6, and Attachment A.			
2.6	Does the stopway equal ASDA minus TORA?	Annex 14 3.7, and Attachment A.			

3. Protected Surfaces

	Item	Additional information	Yes	No	Comment/Note
3.1	Are the approach surfaces commencing in the correct positions?	Annex 14 4.1, and Attachment A. At the strip edge (30m non-instrument Code 1, 60m for all others).			
3.2	Do the two previous points match descriptions elsewhere?	For example, aerodrome manual.			
3.3	Is the inner horizontal, based on the runway midpoint or strip ends in the correct position?	Annex 14 4.1, ICAO Doc9157 Part 1.			
3.4	Does the transitional surface appear to commence from the edge of the correct strip in the landing case?	Annex 14 4.1. Is the runway non-instrument or instrument?			
3.5	Are the take-off climb surfaces commencing in the correct positions?	Annex 14 Runway strip 3.4, 3.6, and Attachment A. At the end of the take-off runway strip +, if provided, clearway.			

4. Obstacle Data Sampling

	Item	Additional information	Yes	No	Comment/Note
4.1	Using a sample of obstacles for the following for each runway , check:				
4.1.1	Inner horizontal surface	Annex 14 4.1.4, ICAO Doc.9137 Part 6 1.2.3 Determination of elevation reference.			
4.1.2	Approach surface	Annex 14 4.1.7 Elevation reference is based on midpoint of the threshold, inner edge if marked.			
4.1.3	Transitional surface	Annex 14 4.1.13 Elevation reference based on the adjacent runway centreline or approach surface.			
4.1.4	Take-off Climb Surface	Annex 14 4.1.27.			
4.2	Have any known new obstacles been accounted for?	May affect information in the AIP.			
4.3	Have any known obstacles known to have been removed correctly represented?	May affect information in the AIP.			

5. Vegetation Management

	Item	Additional information	Yes	No	Comment/Note
5.1	The survey can provide information to assist and review any needs for this?	For example, compare to last survey what are the rates of growth of certain trees?			
5.2	Are there any areas that show mature trees?	-			
5.3	Are these areas which may require tree management now or in the near future?	-			
5.4	Is a tree management system in place?	Is it sufficient in frequency and reductions made to maintain the surfaces?			