airservices australia

AERONAUTICAL CHART

USER GUIDE

Aeronautical Chart User Guide

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Version 4

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Change summary

Version	Date	Change description
1	02 December 2021	Initial issue
2	19 July 2022	Minor updates to the content
3	17 July 2023	• Section 3.2.4 – Updated heading to TAC / TAC AREA • Section 4.3 – Updated North Indicator chart • Section 4.9 – Updated Airservices Australia logo • Section 7.4.4 – Updated figure • Section 8 – Updated Definitions table
4	19 January 2024	• General editorial updates • Section 4.12 – Horizontal and vertical datum updated • Section 6.2 – Special use airspace table updated • Section 6.2.1 – Restricted, Danger and Military Operating Areas updated • Section 6.2.2 – Navigational Aids (NAVAID) table updated • Section 6.3 – Air Traffic Services (ATS) table updated • Section 6.7 – PCA symbology table update • Section 7.2.6 – Minima table and aerodrome lighting updated • Section 7.2.9 – Chart title note updated • Section 7.4.1 – General symbology chart updated • Section 7.4.2 – Procedure chart updated • Section 7.4.4 – RNP non-precision and APV approach procedures updated • Section 7.4.5 – RNP approach procedures updated • Section 8 – Definitions table updated

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1 PURPOSE

This Chart User Guide is an introduction to the Airservices range of aeronautical charts. It has been designed to be used by new pilots as a learning tool and for experienced pilots as a quick reference guide.

Airservices publishes several different charting products for use in the various stages of visual and instrument flight, including training, planning, departure, en route (for low and high altitudes), approaches and movement at an aerodrome.

2 SCOPE

This guide covers depiction and description of the topographic, cultural, and aeronautical data elements shown on the following chart types:

- En Route Chart High (ERCH)
- En Route Chart Low (ERCL)
- Planning Chart Australia (PCA)
- Terminal Area Chart (TAC)
- Visual Navigation Chart (VNC)
- Visual Terminal Chart (VTC)

Note: *When planning visual navigation outside the coverage of a VTC, pilots will need to refer to the appropriate VNC (if available), or ERCL for depiction of controlled airspace and PRD areas.*

- World Aeronautical Chart (WAC)
- Aerodrome and Procedure Charts
- Aerodrome Obstacle Charts

Charts produced by Airservices Aeronautical Information Services (AIS) that are not included in the Integrated Aeronautical Information Package (IAIP) or produced for internal operational users are not covered by this guide.

3 GENERAL INFORMATION

3.1 User responsibilities

3.1.1 Using current charts

Aeronautical information is not static, and charts are regularly updated in accordance with a published schedule, available online: www.airservicesaustralia.com/industry-info/aeronautical-information-management/document-amendment-calendar/ and the effective date of each chart is clearly depicted as well as the date when the data was captured, as shown in the example in para 4.6.

Users should also check AIP Supplements (SUP), Aeronautical Information Circulars (AIC) and NOTAM for important updates between publication cycles.

3.1.2 Operations outside the Australian Flight Information Region (FIR)

All data represented on charts that lies outside the Australian FIR is compiled from a variety of sources and is representative of the airspace and air route mosaic as it was understood at the time of compilation. Amendments will occur to non-Australian FIR data outside of the Australian AIP publication cycle. Pilots should therefore check the AIP, SUP, and NOTAM of adjoining states to ensure they are in receipt of the most up-to-date information.

3.1.3 Reporting chart errors and omissions

Errors and omissions to charts can be reported to AIS via email: docs.amend@airservicesaustralia.com.

3.1.4 Purchasing paper charts

Charts can be purchased online through CanPrint Communication: www.aipshop.canprint.com.au.

3.1.5 Definitions and abbreviations

Definitions and abbreviations for the terms used throughout this document can be found in *AIP GEN 2.2*.

3.1.6 Applicable documents/reference material

Australian charts are produced to meet the ICAO standards published in *Annex 4, Aeronautical Charts* and *Doc 8697, Aeronautical Chart Manual*.

3.1.7 Using different chart types

Users are reminded to use the most appropriate chart type for their operation and consider the scale of each chart type. The chart boundaries of larger scale charts are marked on smaller scale charts. The larger scale charts will hold more information than the smaller scales. On low charts, the TAC and VTC boundaries are marked.

3.2 Chart types

3.2.1 ERCH

Drawn to various scales to accommodate significant air traffic route areas and show controlled airspace, prohibited, restricted and danger areas, air routes, ATS and radio navigation services. Primarily for use by aircraft operating on transcontinental and inter-capital routes above FL200.

3.2.2 ERCL

Depict similar information to that shown on ERCH up to and including FL200. Aeronautical information within terminal areas may not be complete and pilots should use a TAC or VTC.

3.2.3 PCA

Contains meteorological area forecast boundaries and locations, communication coverage outside controlled airspace and WAC coverage.

3.2.4 TAC/TAC AREA

For use in terminal areas, these charts provide airspace, air routes, prohibited, restricted and danger areas, navigation aids and radio frequencies. They are designed to display aeronautical information at a larger scale for easier use in congested areas. Scale varies for each chart.

3.2.5 VNC

Assists in planning flights in relation to controlled airspace, navigation when nearing controlled airspace or restricted and danger areas. Scale is 1:500,000.

3.2.6 VTC

Provides both aeronautical and topographical information for VFR operations in the vicinity of major aerodromes. In some cases, these charts show the details of tracks to be flown and significant landmarks which are used by pilots of VFR aircraft to avoid inadvertent penetration of controlled airspace. Scale is 1:250,000.

3.2.7 WAC

These Australian charts are part of the ICAO 1:1,000,000 international series. Designed for pre-flight planning as well as pilotage, these charts are constructed using Lambert’s conformal conic projection and conform to ICAO specifications.

3.2.8 Aerodrome and approach charts

Includes aerodrome, ground movement and apron charts, noise abatement procedures, Standard Instrument Departure (SID) and Standard Arrival Route (STAR) charts, Distance Measuring Equipment (DME) and Global Positioning System (GPS) arrival charts and Instrument Approach and Landing (IAL) charts.

3.2.9 Aerodrome obstruction charts

Aerodrome obstruction charts, as detailed in *ERSA FAC*, are available to aircraft operators by contacting the appropriate aerodrome operator. Details are available online: www.airservicesaustralia.com/aip/aip.asp.

4 COMMON CHARTING ELEMENTS

Information common across several chart types is listed in this section with examples for clarification.

4.1 Chart title

Identifies the type of chart and the chart name and/or number.

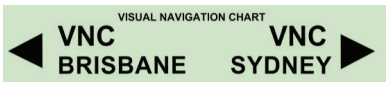		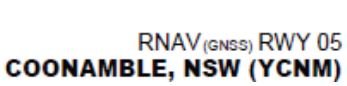

Table 1 – Chart title

4.2 Scale bar

Scale is depicted in two ways:

1. Statement of scale – the ratio between the chart and the earth that it is describing, e.g., 1:100,000 states that every unit on the face of the map is the equivalent to 100,000 units on the face of the earth, 1CM on the chart = 1KM on the earth.
2. Scale bar – this can be used to measure real world distances on the map.

Where applicable the scale of the chart is shown in the scale bar; where the scale is standard across an entire chart series this is also shown in the title block.

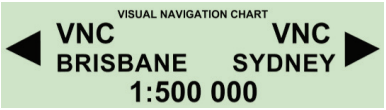		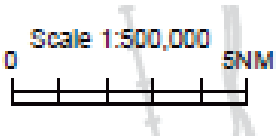

Table 2 – Scale bar

4.3 North indicator

When a grid is not shown on a chart, a north arrow is published with the magnetic variation.

Table 3 – North indicator

4.4 Projection information

A map projection is a method used to depict the earth's surface, which is spherical onto paper, which is flat. There are different types of map projection, all of which cause some type of distortion. The most common form of projection used by Airservices is Lambert's Conformal Conic projection with two standard parallels. This information is published on the individual charts, where no projection is published (on IAL charts) UTM projection is used, see para 4.5.

Lambert Conformal Conic Projection Standard Parallels 8°40′S and 11°20′S	LAMBERT CONFORMAL PROJECTION WITH TWO STANDARD PARALLELS 38°15'S & 42°30'S

Table 4 – Projection information

4.5 Universal Transverse Mercator (UTM)

UTM is a plane coordinate grid system named for the map projection on which it is based (Transverse Mercator). The UTM system consists of 60 zones, each 6-degrees of longitude in width. The zones are numbered 1-60, beginning at 180-degrees longitude, and increasing to the east. The UTM zone is not published on charts, however a diagram showing those used in the Australian FIR is at Figure 1.

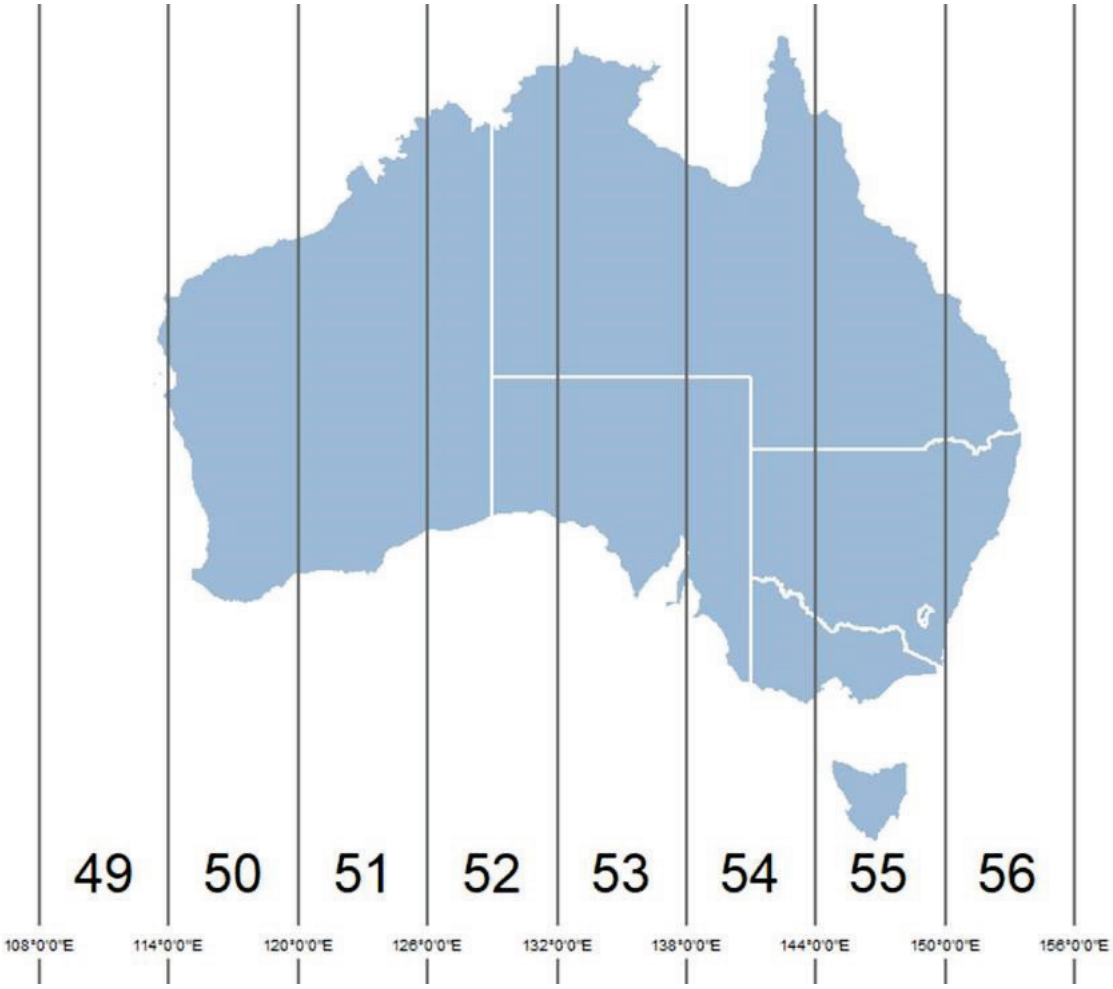

Figure 1 – Universal Transverse Mercator (UTM)

4.6 Production information

This information can include the effective date and time (in UTC), the date the data was compiled, the next edition of the chart and the chart author. Information sourced from third parties, i.e., Geoscience Australia is also noted when applicable.

Aeronautical Information: NOV 2019	EFFECTIVE 05 NOVEMBER 2020 AIRAC (202011041600UTC) NEXT AMENDMENT DUE 17 JUNE 2021 AIRAC (202106161600UTC) COMPILED FROM DATA HELD BY AIM AT 21 MAY 2020 AIP AUSTRALIA	AMENDMENT 165 COMPILED FROM DATA HELD BY AIS AT 16 JUL 2020 EFFECTIVE 5 NOV 2020 202011041600 UTC AIRAC NEXT ISSUE EXPECTED 25 MAR 2021

Table 5 – Production information

4.7 Legend

Symbology for each chart type and other general information is included in the chart legend.

4.8 Location map

Where applicable, this shows the location of the chart in reference to a map of Australia as well as the chart information for that chart type for the rest of the country.

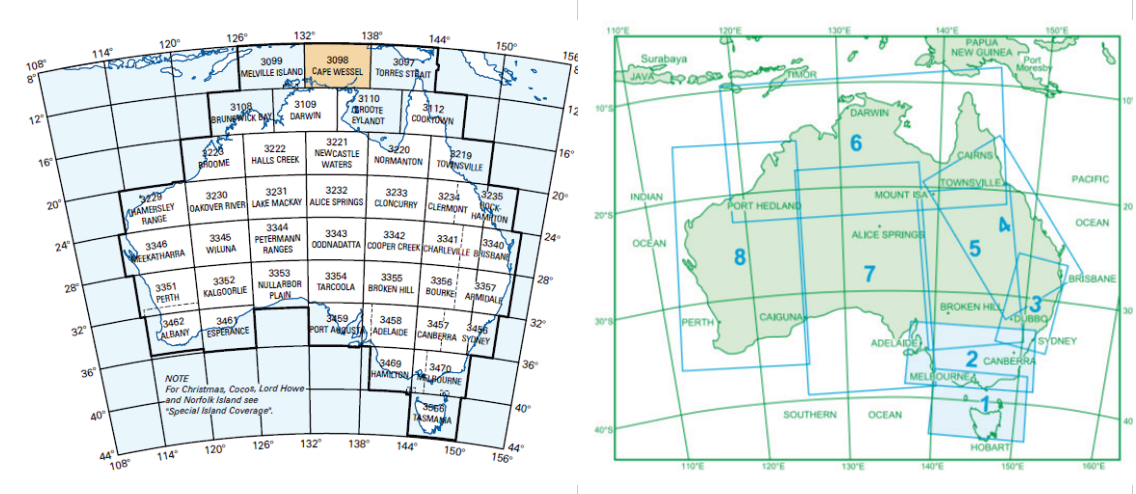

Table 6 – Location map

4.9 Ownership

The custodian of the chart is represented by the organisation logo.

airservices australia	IDS AUSTRALASIA an IDS Ingegneria Dei Sistemi company

Table 7 – Ownership

4.10 Copyright

A copyright notice or symbol is shown on all charts with instructions for how to seek permission to reproduce the charts for commercial reasons.

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Table 8 – Copyright

4.11 Morse code

Morse code is used to determine the serviceability of NAVAID. Morse code symbology is shown on applicable charts as either part of the legend, as a table in marginalia or on the chart itself.

MORSE CODE A .– H …. N –. T – B –… I .. O ––– U ..– C –.–. J .––– P .––. V …– D –.. K –.– Q ––.– W .–– E . L .–.. R .–. X –..– F ..–. M –– S … Y –.–– G ––. Z ––..	MORSE CODE A .– H …. N –. T – B –… I .. O ––– U ..– C –.–. J .––– P .––. V …– D –.. K –.– Q ––.– W .–– E . L .–.. R .–. X –..– F ..–. M –– S … Y –.–– G ––. Z ––..

Table 9 – Morse code

4.12 Horizontal and vertical datum

A datum is a system which allows the location of latitudes and longitudes and heights to be identified onto the surface of a spherical object, such as the earth. Datums are usually named with a regional or functional description and a date for when it was last updated. Australian charts use:

- AHD (vertical) – Australian Height Datum; and
- WGS84 (horizontal) – World Geodetic System 1984.

4.13 Conversion scale

Conversion scales are published to assist pilots with the conversions that may be required for navigation, i.e., FT to M and KM to NM and vice versa. More detailed conversion tables are published in *AIP GEN 2.6*.

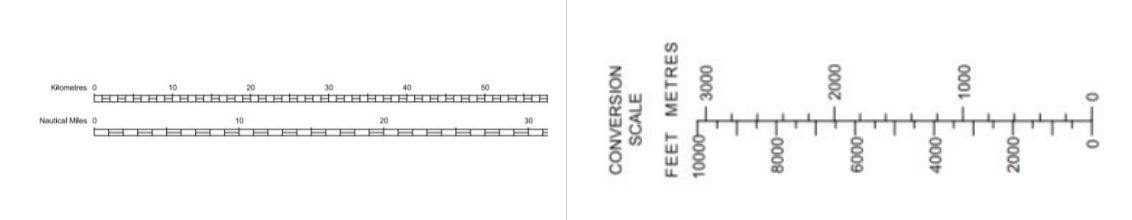
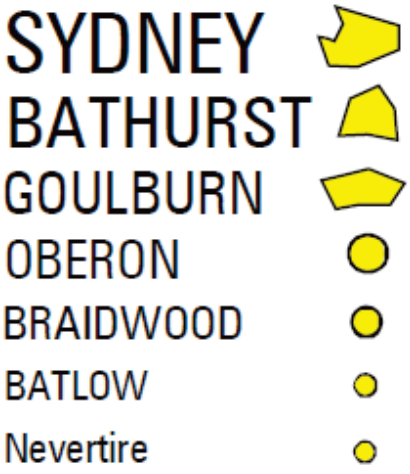


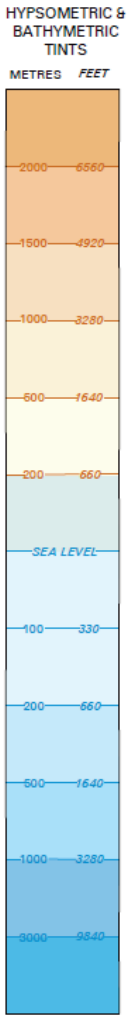
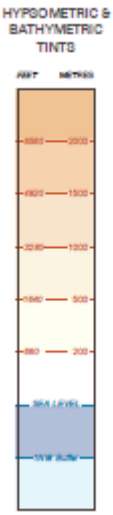
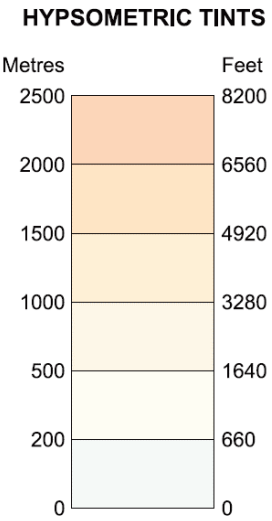
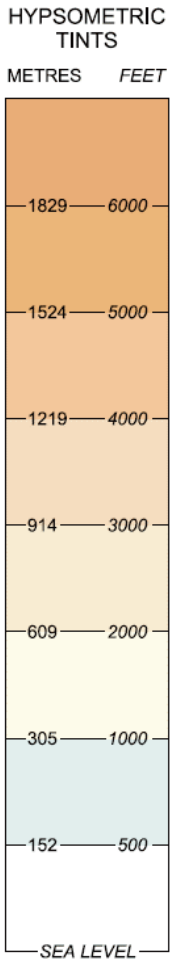
Table 10 – Conversion scale

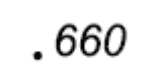
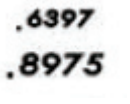
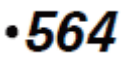
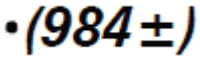
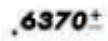
5 TOPOGRAPHIC FEATURES

Topographic features are shown on visual charts (VNC, VTC, and WAC) and some Aerodrome and Procedure Charts. These features identify cultural and natural ground features, including roads, buildings, urban development, boundaries, railways, power transmission lines, water features, mountains, and magnetic variation.

The symbols contained may not be published on all visual charts, however where there is a difference in symbology across different chart types this is identified. Chart specific information is contained in the legend for each chart.

Feature	Symbology	Alternate Symbology
Area subject to inundation		
Boundary, international		
Boundary, state		
Building, homestead, or post office		
Built up area		
Cities, towns, and villages are shown according to their relative importance to visual air navigation		
Cliff, bluff, or escarpment		
Contour		
Contour, approximate		
Dual carriageway		
Gas or Oilfield		
Grain storage		

Feature	Symbology	Alternate Symbology
Hypsometric and Bathymetric tints	 	 
Isolated offshore rock		
Lake, dry		
Lake, non-perennial (intermittent)		
Lake, perennial		
Mangroves		
Mine		
Other road		
Pipeline		

Feature	Symbology	Alternate Symbology
Power transmission line		
Principal road		
Railway		
Railway abandoned or under construction		
Railway with station or siding		
Retaining wall, weir, falls		
River, braided stream		
Sand ridges		
Sand, foreshore flat		
Secondary road		
Shoal or bank		
Spot elevation accurate		 
Spot elevation accurate maximum		 
Spot elevation calculated maximum		 
Swamp		
Tank		
Tidal ledge or reef		
Tower or mast		

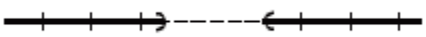
Feature	Symbology	Alternate Symbology
Tunnel		
Waterhole		
Yard		

Table 11 – Topographic features

5.1 Hypsometric and bathymetric tints

5.1.1 Hypsometry

The measurement of the elevation of the land with respect to sea level.

5.1.2 Bathymetry

The measurement of the depth of water bodies.

5.1.3 Elevation

Elevation on all charts is shown in Feet Above Mean Sea Level (FT AMSL), unless otherwise noted, e.g., Above Ground Level (AGL).

5.1.4 Contours

Contour lines mark points of equal elevation on a chart. They assist with understanding the elevation profile of the terrain, i.e., identifying peaks, depressions, cliffs, valleys, ridgelines, saddles, and ledges.

5.1.5 Spot elevations

Spot elevations, which denote ground level, not tree top height, may not indicate the maximum elevation of the land in any area. The highest spot elevation in each 30-minute grid square is depicted in bold type. Spot elevations enclosed by brackets (+) indicate the highest elevation of terrain (not surveyed) based on best available contour information. Hypsometric information is accurate to the extent of the surveys available and should be accepted as only indicative of elevation and used with caution.

5.1.6 Highest point on the chart

The highest point on any VFR chart is noted, including its latitude and longitude, in the margin of the chart.

6 AERONAUTICAL ATTRIBUTES

The amount and type of published aeronautical data varies by chart type. The colour of the symbology may also vary by chart type.

6.1 Aerodromes

Feature	Symbology
ALA – unverified	
ALA – verified	
Civil – Certified	
Helicopter Landing Site	
Joint Civil – Military	
Military	
Water – unverified	
Water – verified	

Table 12 – Aerodromes

6.1.1 General information

- Heliports are not depicted on IFR charts
- Due to clutter, some heliports are not shown on VFR charts
- Unverified ALA are not shown on ERCH
- Verified ALA are only shown on high charts if they are part of a route
- Certified aerodromes are depicted on high charts only if the aerodrome is on a high route
- Where a NAVAID and an aerodrome co-exist, symbology priority is given to the NAVAID

6.1.2 Verified

Airservices has a responsible person registered for the location and associated information confirmed.

6.1.3 Unverified

Airservices has not been advised of a responsible person for the location. Status and serviceability are unknown.

6.2 Special use airspace

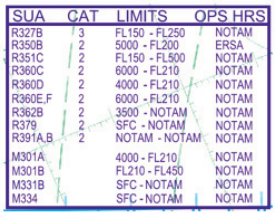
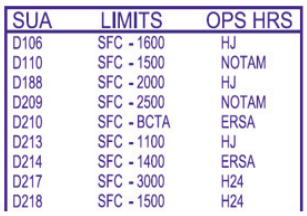
Feature	Symbology	
Danger Area/Military Operating Area Boundary		
Fly Neighbourly Area		
SUA Table	 	
Restricted Area Boundary		
Restricted/Danger - Area too small to be shown on chart		
Special Procedures Area		

Table 13 – Special use airspace

6.2.1 Restricted, Danger and Military Operating Areas

1. Restricted Areas (RA) are shown with a thick purple line on IFR charts, and a magenta verge on VFR charts. RA conditional status is displayed in tables on the chart.
2. Danger Area (DA) and Military Operating Area (MOA) boundaries are shown with a solid purple line on IFR charts, and a solid magenta line on VFR charts.
3. Where a DA and RA have a common lateral boundary, on the RA, verge is shown. The DA boundary is indicated by labels.
4. On VFR charts, where RA and DA have a common lateral boundary, only the RA verge is shown. The DA boundary is indicated by labels.

Note: *WAC released from June 2022 will show RA and DA. WAC released from June 2024 will show MOA.*

6.2.2 Navigational Aids (NAVAID)

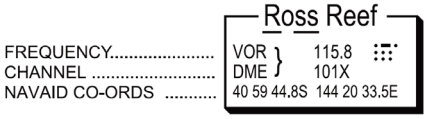
Feature	Symbology
Broadcast Station (showing call sign, frequency, and if Relay (R))	
DME	
ILS or Localizer	
Navigation Aid Limitation	
Navigation Box	
NDB	
TACAN	
VHF Contact with ATS possible on ground	
VOR	

Table 14 – NAVAID

Note:

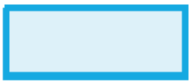
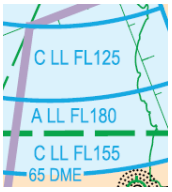
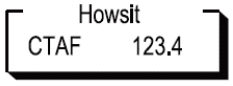
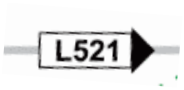
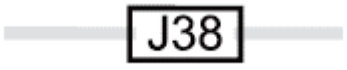
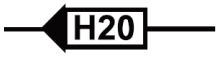
a. An asterisk (*) next to a NAVAID indicates that it is subject to an operating limitation such as reduced range, bearing fluctuations, terrain shielding etc. Details of the limitation are listed in ERSA FAC.

b. An asterisk will not be shown to indicate that an aid is pilot monitored.

c. Where there is a VOR/DME co-located with a NDB, the NDB symbol will not be shown.

d. *The ILS/Localizer beam value will only be published if it does not run along a route.*

6.3 Air Traffic Services (ATS)

Feature	Symbology
Boundary between CTA, UTA, OCA (OCA A Boundary on ERCL and TAC)	
Broadcast area boundary	
Civil control zone (Class C and D Control Zone on visual charts)	
Class G airspace Class G exists from SFC to the base of overlying Class A, C, D, or E airspace	
Class C and D airspace **Note:** Where LL is BLW FL200, check for underlying Class E	
Class E airspace. **Note:** Where LL is BLW FL180 (except where Class C exists above)	 
CTA boundary CTA limits **Note:** CTA distances	
CTAF	 
Designated route - arrow indicates where one way	
Designated route - high	 
Designated route - low	
E Frequency boundary	
Feature not on route	
FIS frequency information	 
FIR boundary	

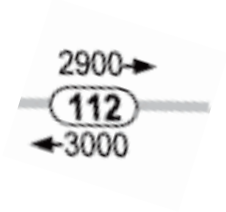
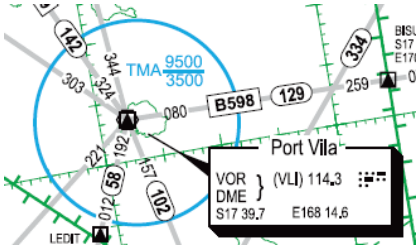
Feature	Symbology
G Frequency boundary	
Military control zone	
Sector mileage and lowest safe altitude **Note:** Always shown together Continental lowest safe altitude is only valid for RNP 2 Operations	
Note: Sub FIR boundary or sector	
Terminal control area (TMA) boundary	
Upper Information Region (UIR)	
VOLMET frequency with location	

Table 15 – ATS

6.3.1 Airspace depictions

Airspace categories and their lateral and vertical limits are indicated by labels, boundary lines and colour tints. The depictions used on the ERCL, ERCH and TAC are common across all these charts. Differing depictions have been utilised on the VTC to complement the topographic base.

The vertical limits of airspaces are shown on all charts by indicating the airspace class and the lower limit, i.e., LL 7500 (blue label), D LL 3500 (blue label), and E LL 8500 (brown label). Where different classes of airspace are vertically stacked the labels will be shown in layers, e.g.

- A LL FL180 (blue label)
- E LL 8500 (brown label)

IFR Charts	VNC	VTC
		

Table 16 – Airspace depiction (vertical limits)

When depicting airspace vertical limits, "SFC" indicates the lower limit is the surface of the earth.

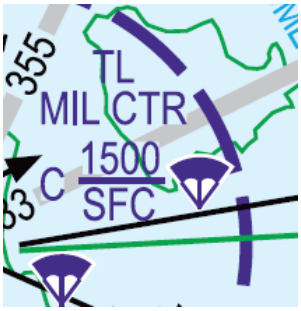
IFR Charts	IFR (MIL) Charts	VFR
		

Table 17 – Airspace depictions (vertical limits including SFC)

6.3.2 Airspace depictions used on the ERCH, ERCL and TAC

1. Class A airspace
   a. The lateral limits of Class A airspace are depicted with blue lines.
   b. The lower limit of Class A airspace is shown with blue labels.
   c. The vertical limit of Class A airspace is shown with blue labels along the lateral boundary.
2. Class C airspace
   a. The lateral limits of Class C control area steps below Class A airspace are depicted with blue lines and a blue tint.
   b. The lower limit of Class C control area is shown with blue labels.
3. Class D airspace
   a. The lateral limits Class D control area steps are depicted with blue lines and a blue tint.
   b. The lower limit of Class D control area is shown with blue labels.
4. Class E airspace
   a. The lateral limits of Class E airspace are depicted with a brown line and a brown tint.
   b. The lower limit of Class E airspace is shown with brown labels.
5. Class G airspace
   a. Class G airspace is all airspace not promulgated as Class A, C, D, or E.
   b. Class G airspace is not tinted or specifically labelled.

6.3.3 Airspace depictions used on the VTC

1. Blue lines indicate the lateral boundaries of classes A, C and D airspace.
2. The lower limits of Class A, C and D airspace are shown with blue labels.
3. A brown line indicates the lateral boundary of Class E airspace.
4. The lower limits of Class E airspace are shown with brown labels.
5. Class G airspace is designated as all airspace not already promulgated as Class A, C, D, or E. Class G airspace has not been specifically labelled.

6.3.4 Airspace boundary information

Distances associated with airspace boundaries indicate the datum on which the airspace is based, and is shown as follows:

1. “NM” indicates a distance from the ARP.
2. “DME” or “TAC” indicates a distance based on that navigation aid.
3. Some control zones have boundaries based on a runway threshold, e.g., “7NM FM THR RWY 33” indicates a distance based on the threshold of Runway 33 at the associated aerodrome.

6.3.5 Frequency information

- Flight Information Area (FIA) frequencies and associated boundaries are depicted in green.
- ATC frequencies and associated boundaries for use in Class E airspace are depicted in brown.
- The prefix to a frequency indicates the provider of the service.
- Where a single area is divided vertically between different frequencies, the vertical limits applicable to each frequency will be indicated.

6.3.6 Depiction of Common Traffic Advisory Frequency (CTAF)

At non-controlled aerodromes where MULTICOM 126.7MHz is not the CTAF, or non-controlled aerodromes that have an associated NAVAID, an entry “CTAF” followed by the designated frequency, is annotated in a box associated with the location.

6.3.7 Broadcast Areas (BA)

BA are depicted on charts by a dashed dark green line and a label stating, ‘for operations in this area SFC -<altitude> use CTAF <frequency>’.

6.4 Airways and route symbols

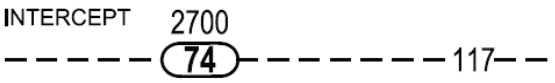
Feature	Symbology
AIREP Section 3 required from designated flights	
Bearing to Navigation Aid (Abeam when no bearing value shown)	
Compulsory Position Report for all aircraft	
Compulsory reporting required only in the directions indicated	
Position Report for aircraft with less than 300KT and for other aircraft on request	
Route flight planning requirement (see AIP/ERSA)	
Subject to ATC clearance, track to be flown to obviate holding prior to commencement of instrument approach	
Tactical Waypoint - No report required	
When planning in controlled airspace prior ATC approval required for flight in direction indicated	

Table 18 – Airways and route symbols

6.4.1 Air routes

The following designators are used to identify ATS routes:

- A, B, G, R for routes which form part of the regional networks of ATS routes and are not area navigation routes.
- L, M, N, P for area navigation routes which form part of the regional networks of ATS routes.
- H, J, V, W for routes which do not form part of the regional networks of ATS routes and are not area navigation routes.
- Q, T, Y, Z for area navigation routes which do not form part of the regional networks of ATS routes.
- The additional prefix U may be added to indicate that the route or portion thereof is established in the upper airspace.

A black arrowhead on a route designator box indicates that the route is to be used, within controlled airspace, only in the direction shown by the arrow. Air routes are divided into route segments. Each route segment contains data for the magnetic track, distance, LSALT and reporting requirements.

6.4.2 LSALT

The LSALT specified for a route segment is only valid for RNP 2 operations. For operations other than RNP 2 operations, operators and pilots must use a pilot calculated LSALT or grid LSALT.

The minimum LSALT published is 1,500FT due to lack of data concerning terrain near sea level. Techniques for calculating LSALT are published in AIP GEN 3.3.

LSALT details for Area Navigation routes are shown in each grid square formed by the parallels and meridians. The grid is at the intervals shown in Table 19:

Chart		Interval
ERCH	H1 H2, 3 and 5 H4	1° 2° 4°
ERCL		1°
TAC		1°

Table 19 – LSALT

On IFR charts, some LSALT on one way air routes have an associated direction arrow. This arrow indicates that the LSALT is only applicable in the direction of the one-way route, and a LSALT has not been calculated for the opposite direction.

A LSALT without a direction arrow on any air route indicates that the LSALT is the same in both directions. However, one-way routes should only be flown, in controlled airspace, in the direction indicated by the route designator box.

On ERC, the LSALT figure is always attached adjacent to the distance “bubble” of the route to which the LSALT applies.

CAUTION: In areas of chart clutter, these LSALT figures may sometimes cross adjacent route tracks.

6.4.3 Track Bearing Specifications

Each route segment is shown as the minor arc of a Great Circle passing through the end points. The track angles of the Great Circle segments are measured at the end points. Rhumb line track angles can be determined by taking the track out and the track into the next waypoint, and then averaging the Great Circle track angles.

6.4.4 Reporting points

Reporting points are normally referenced to a radio-NAVAID, aerodrome, or town or within 10NM of a town or a geographical feature. Where this is not possible, waypoint names have been computer generated.

The following examples and diagrams detail the reporting requirements that apply on crossing air routes that intersect at a reporting point:

1. A report is required on both routes

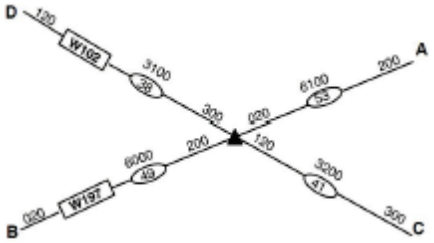


Figure 2 – Reporting points (example 1)

2. A report is required only on W435. The route segment on W242 is a single segment between D and C and the compulsory point report does not apply.

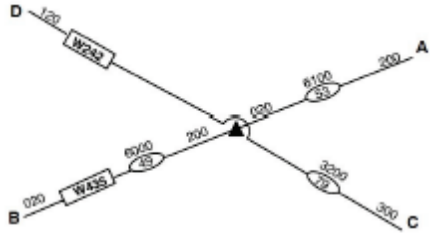


Figure 3 – Reporting points (example 2)

3. A compulsory position report is required on W646, indicated by the arrows associated with the report symbol. A compulsory position report for aircraft with TAS less than 300KT and for other aircraft on request applies on W570.

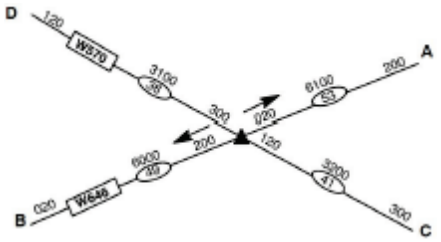


Figure 4 – Reporting points (example 3)

Where arrows are associated with a reporting point, then a solid triangle (compulsory report for ALL aircraft) applies in the direction indicated by the arrows, and an open triangle (compulsory report for aircraft with TAS less than 300KT and for other aircraft on request) applies on the crossing route. The same principle applies if the AIREP Section 3 report is required.

6.4.5 Intersection waypoint

An intersection waypoint is included at the intersection of two air routes but is not included in the description of either air route. Effectively, this waypoint is a “point in space”.

For a flight that will plan via one air route, the intersection waypoint is not displayed in the FMS route data. However, if the crossing route is to be flown from the intersection, the waypoint is included in the flight plan and appears in the FMS.

An intersection waypoint is displayed on en route charts as a Type 1 (Solid Square) waypoint and the tracks arc around that waypoint. The legend defines a Type 1 reporting point as “waypoint - no report required unless used as a turning point between two routes”. This is shown in the following example:

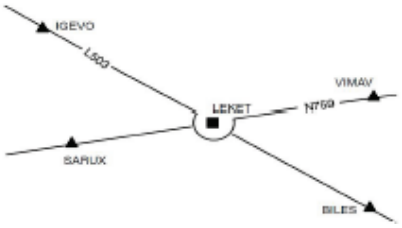


Figure 5 – Intersection waypoint

As the intersection waypoint is not included on either air route, operators wishing to plan two routes will flight plan via:

1. the air route to the waypoint short of the intersection waypoint, then
2. direct to the intersection waypoint, then
3. direct to the first waypoint on the second air route, then
4. via the new air route.

An example of a flight plan entry based on the map shown in the above image, is as follows:

L503 IGEVO DCT LEKET DCT VIMAV N759.

6.5 Sports symbols

Feature	Symbology
Balloon Ascents Manned	
Glider Operations	
Hang Glider	
Model aircraft	
Model rocket operation	
NOTAM	
Parachute Jumping	
Ultralight	
Winch or auto-tow launched sports aviation operation	

Table 20 – Sports symbols

Note:

a. Gliders use and monitor frequencies 122.5, 122.7 and 122.9.

b. Where applicable, launching cables may extend to 3,000FT AGL.

6.6 Obstacles

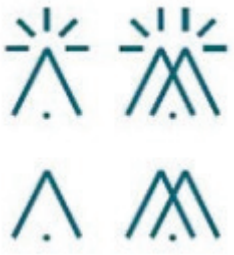
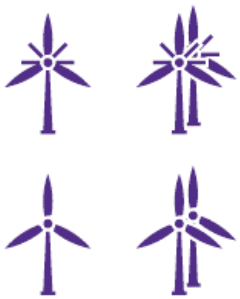
Feature	Symbology	
	Verified	Unverified
Obstacle and group obstacle (lit/unlit)		
Wind turbine and windfarm (lit/unlit)		
Grid maximum elevation for obstacle		

Table 21 – Obstacles

Note:

a. *Verified obstacles meet horizontal and vertical accuracy requirements according to ICAO Area 1 standards.*

b. *An unverified obstacle has been reported at that location, but not all horizontal and vertical accuracy requirements as per ICAO standards have been met.*

c. *Numerals in italics indicate elevation AMSL of the top of the mast or obstruction.*

d. *Height above ground is shown in upright text within brackets.*

e. *Only structures above 300FT AGL are shown, structures up to 300FT AGL may exist that are not depicted on charts.*

6.7 PCA symbology

Feature	Symbology
Aerodrome (locations)	
Briefing/QNH area identification number	
Briefing/QNH area zone boundary	
Estimated VHF coverage at 5,000FT	
Estimated VHF coverage at 10,000FT	
Estimated VHF coverage at 10,000FT **Note:** For emergency use only	
Graphical area forecast boundary	
Graphical area forecast identifier	
HF network and frequencies	
HF network boundary	
WAC number	
VOLMET	

Table 22 – PCA symbology

6.8 Miscellaneous symbology

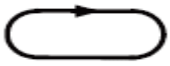
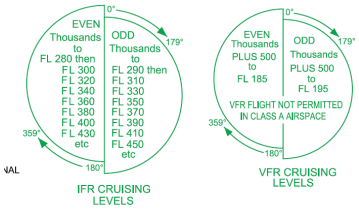
Feature	Symbology
Bearings, tracks, and radials	
Holding pattern	
IFR/VFR cruising levels	
Magnetic variation	
TAC coverage	
VTC coverage	

Table 23 – Miscellaneous symbology

7 AERODROME AND PROCEDURE CHARTS

7.1 Introduction

This section contains information regarding the Departure and Approach Procedure charts for Australia, including aerodrome, ground movement and apron charts, noise abatement procedures, Standard Instrument Departure (SID) and Standard Arrival Route (STAR) charts, Distance Measuring Equipment (DME) and Global Positioning System (GPS) arrival charts and Instrument Approach and Landing (IAL) charts.

7.2 General information

7.2.1 Use of navigation aids

Instrument approach procedures are based on specific NAVAID, with the applicable navigation tolerance(s) used in the development of the procedure's obstacle protection surfaces. The NAVAID upon which the procedures are based is identified on each instrument approach chart. Only the NAVAID identified on each approach chart may be used to fly the procedure; use of a non-specified aid, such as another DME located on the airfield, is prohibited as it may seriously jeopardise the integrity of the instrument approach procedure.

7.2.2 Units of measurement

Bearings and tracks are shown in degrees magnetic, elevations in feet and navigational distances in nautical miles. In the aerodrome meteorological minima tables, altitudes and ceilings are shown in feet and visibilities are shown in kilometres or metres.

7.2.3 Line annotations

On the plan and profile diagrams full lines are used to indicate approach procedures, broken lines to indicate missed approach procedures, light lines to indicate holding procedures and dotted lines to indicate procedures for leaving holding patterns and for supplementary procedures.

CAUTION: Spot heights on IAL charts do not necessarily indicate the highest terrain or obstacle in the immediate area.

7.2.4 Distance/altitude table

A DME distance/altitude table is provided on charts where runway approach minima are published and the DME and azimuth facilities are suitably located. This table is provided to assist in maintaining an optimum descent profile where glideslope guidance may not be available. Wherever possible the profile has been designed to allow for a descent of 3° (approximately 320FT per mile) to the touch-down point (nominally 300M past the runway threshold). The designed rates of descent for profiles more than 3° are noted on the chart. Altitudes have been rounded to the nearest 10FT.

7.2.5 Altitude correction versus temperature

All altitude information has been calculated for ISA conditions. Correction to altitudes/heights shown on procedures must be made when the temperature at the QNH source (usually the destination aerodrome) is less than ISA-15°. Correction can be added in accordance with the charts at 7.5.2 and 7.5.3, as appropriate.

Note: The example shown is an aerodrome at 2,000FT elevation reporting a surface temperature of -9°C. The procedure IAF is at 5,250FT (3,250FT HAA) and DA at 2,400FT (400FT DH). At 2,000FT aerodrome elevation, ISA-15° is -4°C, therefore a correction should be applied. The correction is to IAF, add 250FT; to DA add 30FT.

7.2.6 Minima table and aerodrome lighting

Published visibility on IAL charts for straight in minima specifies a distance, measured in KM, from the aircraft position at MDA/DA on the published vertical path angle to a point 160M (500FT) past the approach threshold, or approach landing lights if appropriate. Runway aligned approaches may have a reduction of visibility minima at aerodromes with approach lighting, however further considerations exist for higher than CAT 1 operations.

The visibility for circling procedures is a standard value based on the category of aircraft. It is related to the nominal turn radius at maximum IAS for the category and provides for aircraft on a downwind leg in a circuit pattern to maintain visual contact with the aerodrome environment.

7.2.7 Climb or descent limitations

Climb or descent limitations are shown as a heavy line above or below the appropriate altitude on the profile diagram. Non-limiting altitudes are shown in italics.

All procedures depict tracks, and pilots should attempt to maintain the track by applying corrections to heading for known or estimated wind.

7.2.8 Profile and plan diagrams

Profile diagrams of approach procedures are diagrammatic. Plan diagrams are shown to scale, except that the depicted length of outbound and inbound legs on timed procedures (e.g., NDB procedures) are diagrammatic. The profile line depicted on approach procedures is representative of the descent profile designed for the approach. However, the angles may be exaggerated for illustrative purpose. On those charts where a DME-based procedure is combined with a non-DME based procedure, the altitude/distance scale (where provided) applies only to the DME-based procedure. That is, it is not necessary to fly a time-based procedure to conform to the altitude/distance scale. However, if a limiting fix or radial is shown on these procedures, the segment must be terminated at the earlier limit of time or fix/radial.

Times shown on outbound legs of holding and approach procedures provide for optimum manoeuvring in zero wind. These times may be adjusted only to the extent that allows for known or estimated wind component.

On profile diagrams where an approach without DME is combined with one using DME (e.g., VOR/DME or VOR), any reference to a DME FIX refers only to the approach using DME. The reference to time only refers to the approach not using DME. Compliance with indicated fix positions and DME distances of DME descent procedures is mandatory.

Further, where a common step-down limitation applies to both procedures, generally only one altitude is shown with arrows pointing to the position on each procedure at which the restriction applies, as per Figure 6.

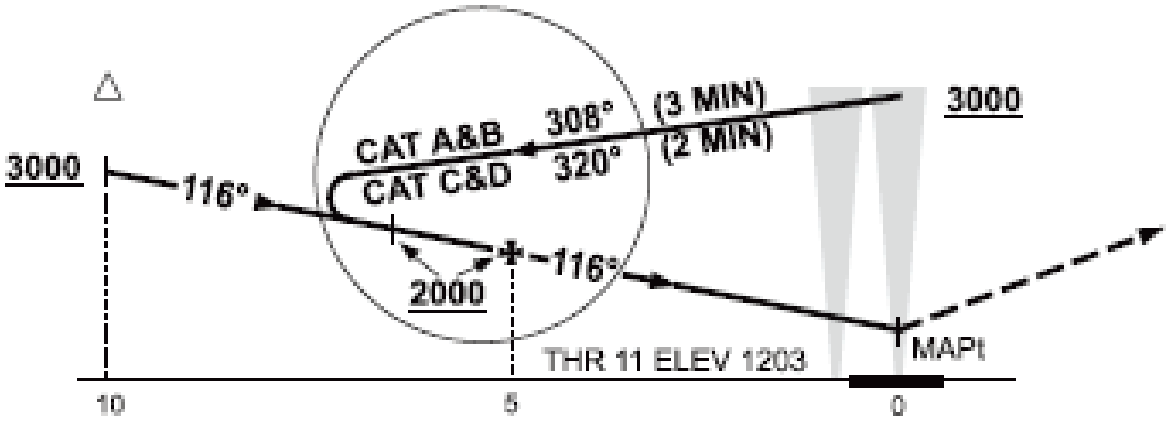


Figure 6 – Profile and plan diagram

Speed restrictions shown on individual approach charts apply to holding and the initial segment of reversal procedures only. When speed restrictions are required for DME arcs or other segments of the approach, text will be included specifying the restriction.

The circling restrictions shown apply by day in less than VMC and at night.

7.2.9 Chart title

The titles on Australian IAL charts conform to a convention to allow commonality of names between the chart title and electronic databases. The convention uses only the NAVAID providing final approach lateral guidance in the title. If another NAVAID is required to fly the procedure but is not needed to provide final approach guidance, this aid will be identified in the top right-hand corner of the chart, under the title, in the 'NAVAID RQ' box.

Where the use of a NAVAID that is not identified as a required NAVAID permits a lower minimum altitude, a separate line in the minima box is provided.

Where more than one approach of the same type is provided to the same runway, these are identified by an alphabetical suffix commencing at the end of the alphabet: e.g., RWY 19 ILS-Z, and RWY 19 ILS-Y identify two different ILS approaches to the same runway.

Where more than one circling approach is published at the same aerodrome, each procedure is identified by an alphabetical suffix, commencing at the beginning of the alphabet: e.g., NDB-A, VOR-B, VOR-C.

Note: *RNP or RNP AR procedures which have become circling retain a suffix indicative of the direction of approach i.e., N, E, S, W.*

RNP-AR approach procedures published by Airservices are designed according to criteria contained in *ICAO Doc 9905*. Unless noted on the approach procedure chart, standard RNP values for each segment apply. These values are shown in Table 24.

Segment	RNP values
ARRIVAL	2
INITIAL	1
INTERMEDIATE	1
FINAL	0.3
MISSED APPROACH	1

Table 24 – RNP AR standards

7.2.10 Aerodrome information

Runway and strip dimensions are shown in metres, elevations in feet and bearings in degrees magnetic. In the take-off minima tables, ceilings are in feet and visibilities are in kilometres.

See *AIP GEN 2.6* for NM/KM/NM conversion tables.

Where Pilot Activated Lighting (PAL) is indicated, T-VASIS, AT-VASIS and PAPI installations are not necessarily activated. See *ERSA* for details.

7.2.11 Standard take-off minima

Standard take-off minima are applicable at all aerodromes except where otherwise detailed on individual Aerodrome Charts.

Obstacles penetrating departure surfaces are depicted in accordance with *ICAO Annex 4*. Where penetrations occur prior to departure end of RWY (DER), visibility and ceiling requirements are promulgated on the procedure chart where they exceed standard take-off minima, including for IFR operations are published in *AIP ENR 1.5*.

The values published, where greater than standard, require the pilot to visually acquire the obstacle prior to departure. In these cases, caution notes (see example in Figure 7) will indicate the type and position of the critical obstacle.

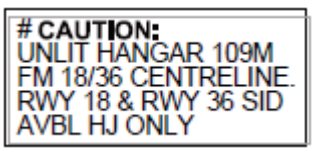


Figure 7 – Critical obstacle type and position

7.3 Special notices

7.3.1 Magnetic variation/bearing

Due to changes in magnetic variation, runway bearing information published in *DAP* may differ slightly from what published in *ERSA*. Where the difference exceeds 2 degrees, *DAP* will be corrected at the next amendment cycle.

7.3.2 Contours on procedure charts

The contours shown are in increments of 500FT starting from the next higher contour line at least 500FT above aerodrome elevation.

The printed version of these charts will show shades of grey. A colour version of the same chart showing shades of brown is available from the Airservices website, http://www.airservicesaustralia.com/aip/aip.asp.

7.3.3 Changes to NAVAID RQ boxes on procedure charts

A change is being made to the NAVAID RQ boxes shown in the top right corner of some approach charts. Where the NAVAID RQ box is shown on an approach chart, the text refers to the NAVAID or GNSS that the aircraft must use for the approach. Where an IDENT is currently shown it is being removed (example ICB DME will become DME). On ILS charts where waypoints are being introduced at the FAF so GNSS can be used to identify the altitude verification check point (in lieu of the DME distance) the NAVAID RQ box will have ‘DME or GNSS’.

7.4 Instrument Approach and Landing (IAL) legends

7.4.1 General symbology

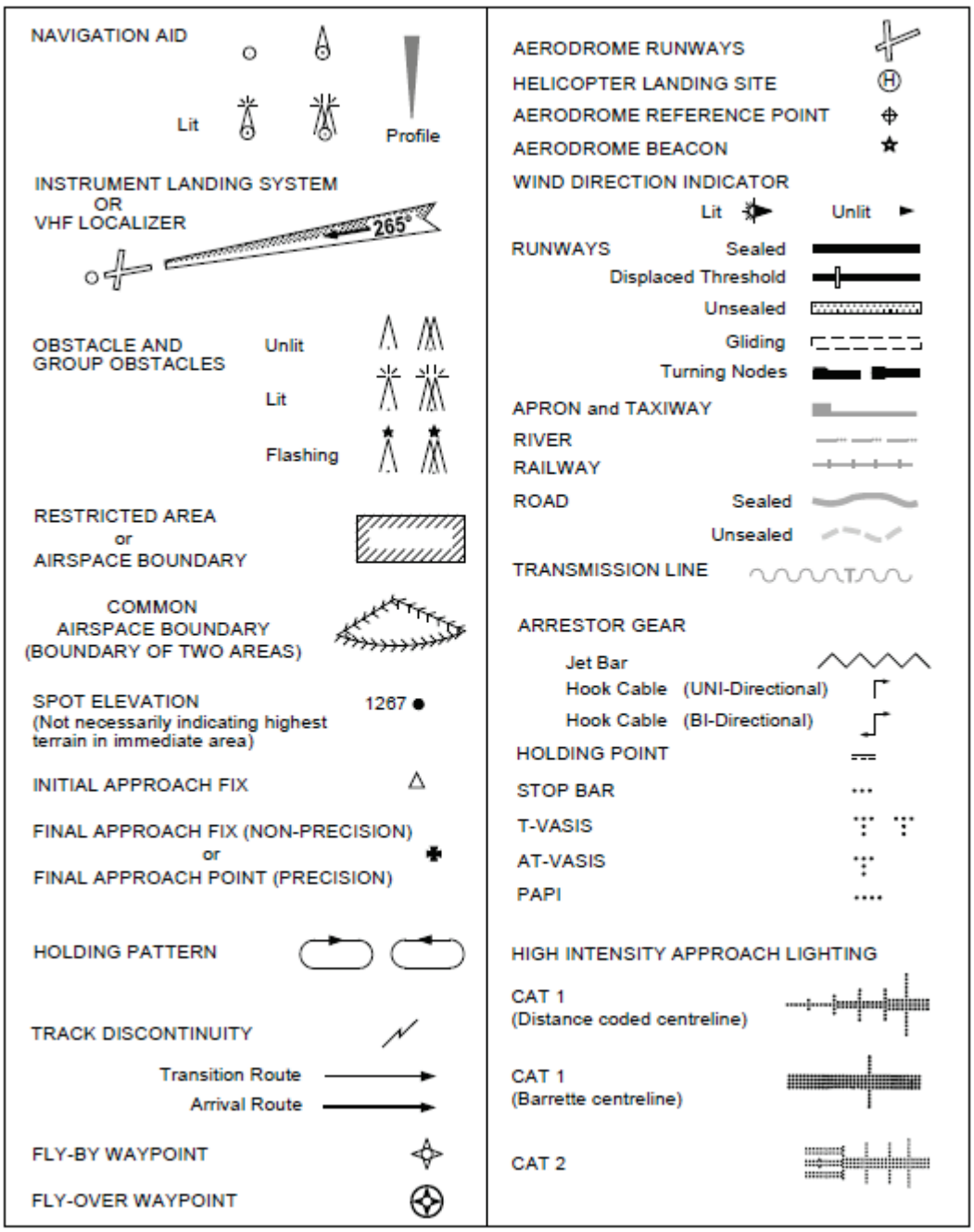


Figure 8 – General symbology (IAL charts)

7.4.2 Procedure chart

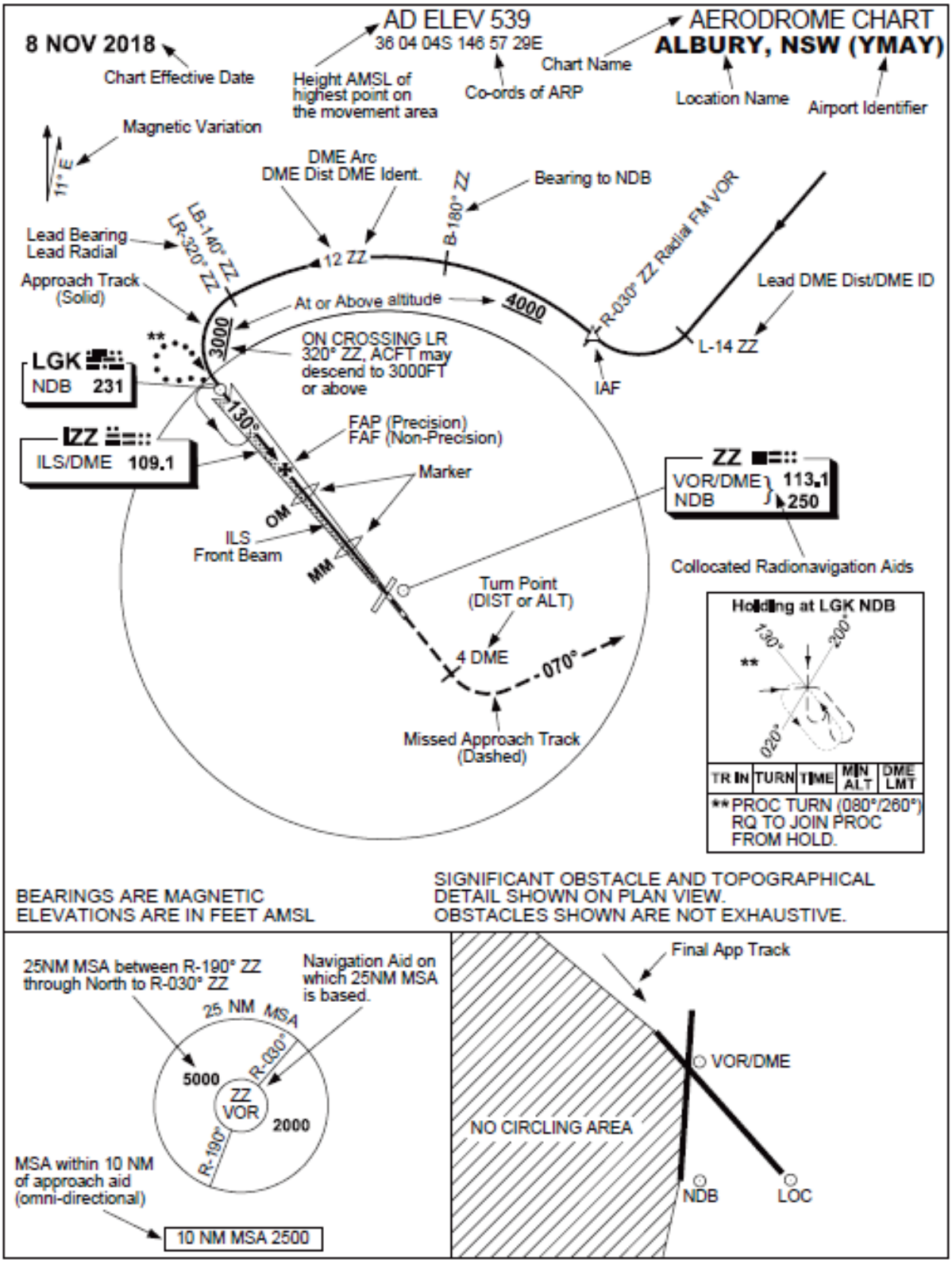


Figure 9 – Procedure chart (IAL)

7.4.3 ILS/LOC combined procedures

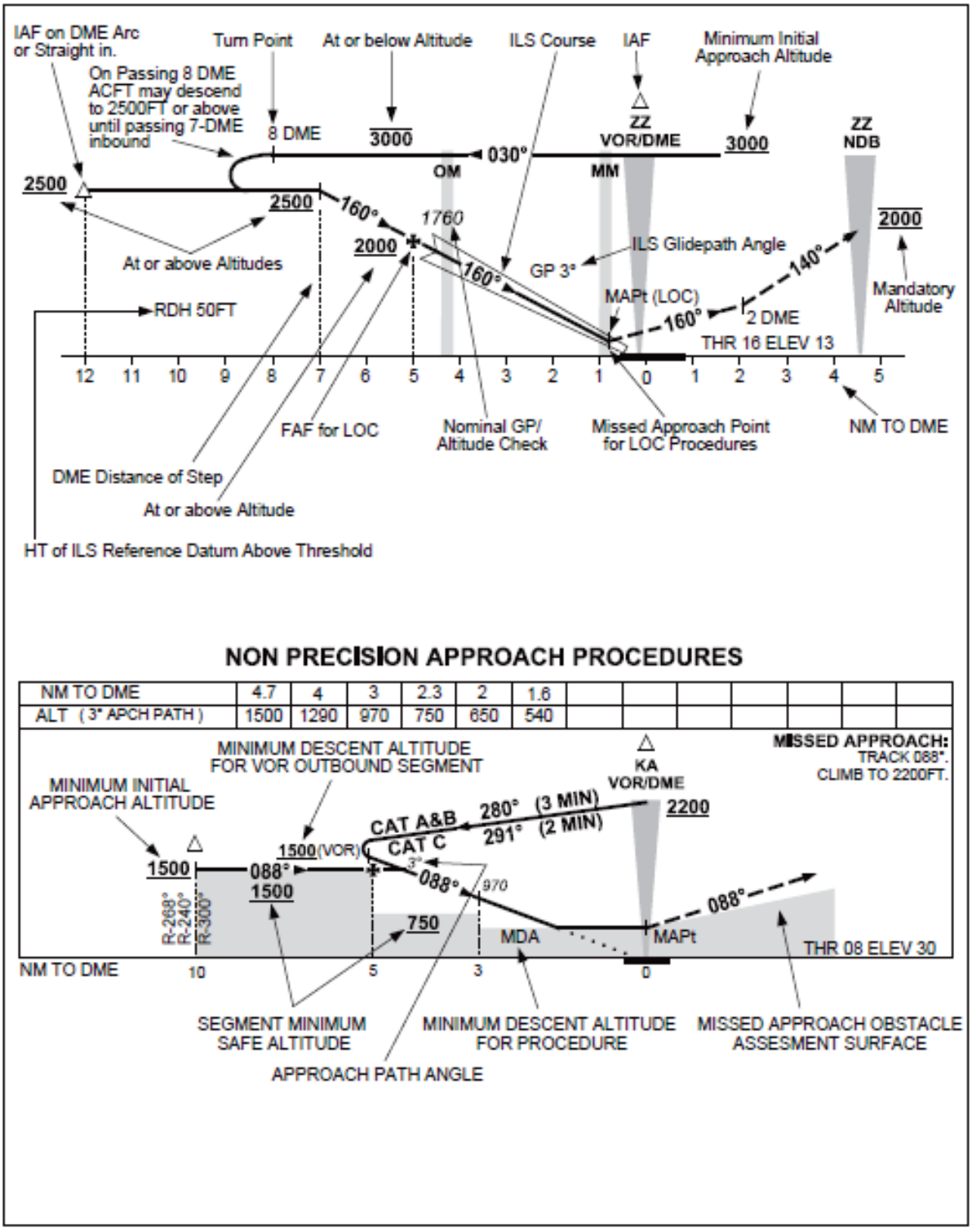


Figure 10 – ILS/LOC combined procedures

7.4.4 RNP non-precision and APV approach procedures

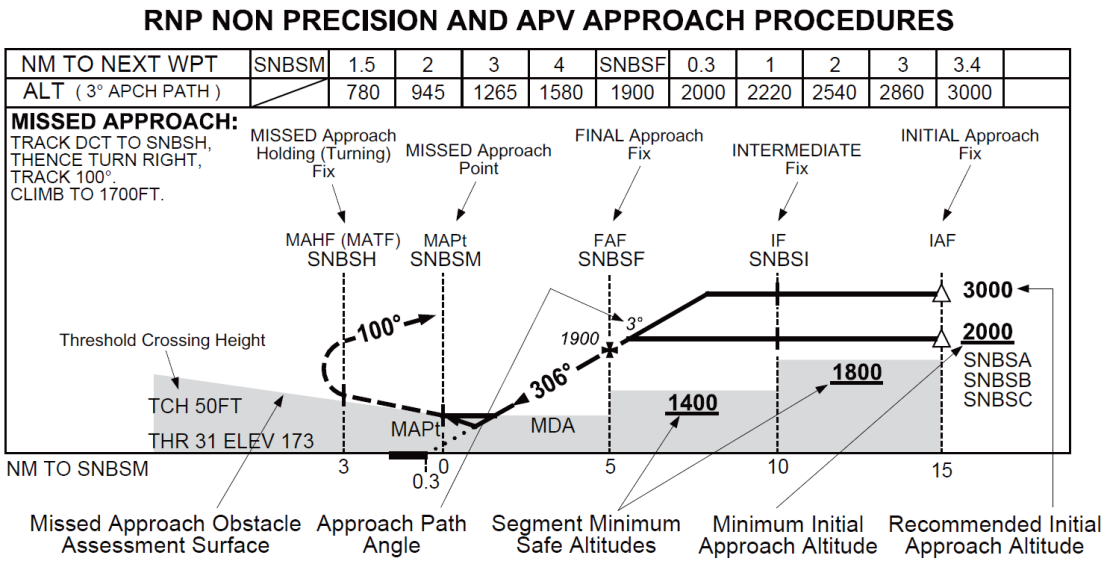


Figure 11 – RNP non-precision and APV approach procedures

7.4.5 RNP approach procedures

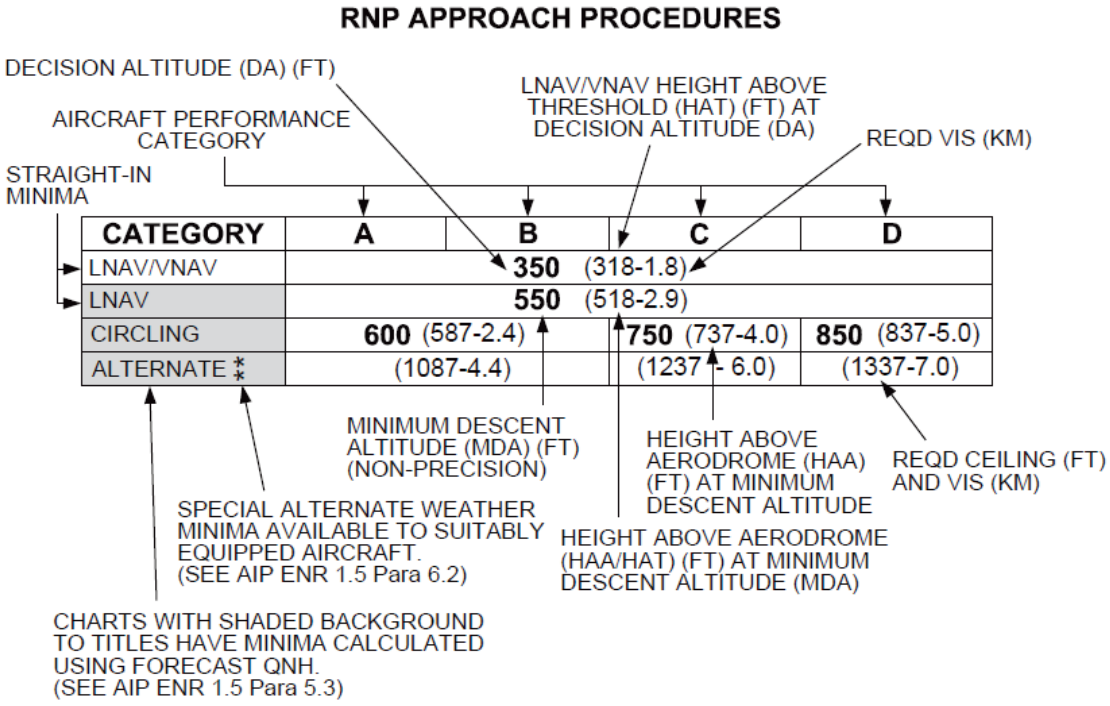


Figure 12 – RNP approach procedures

7.4.6 Minima table and aerodrome lighting

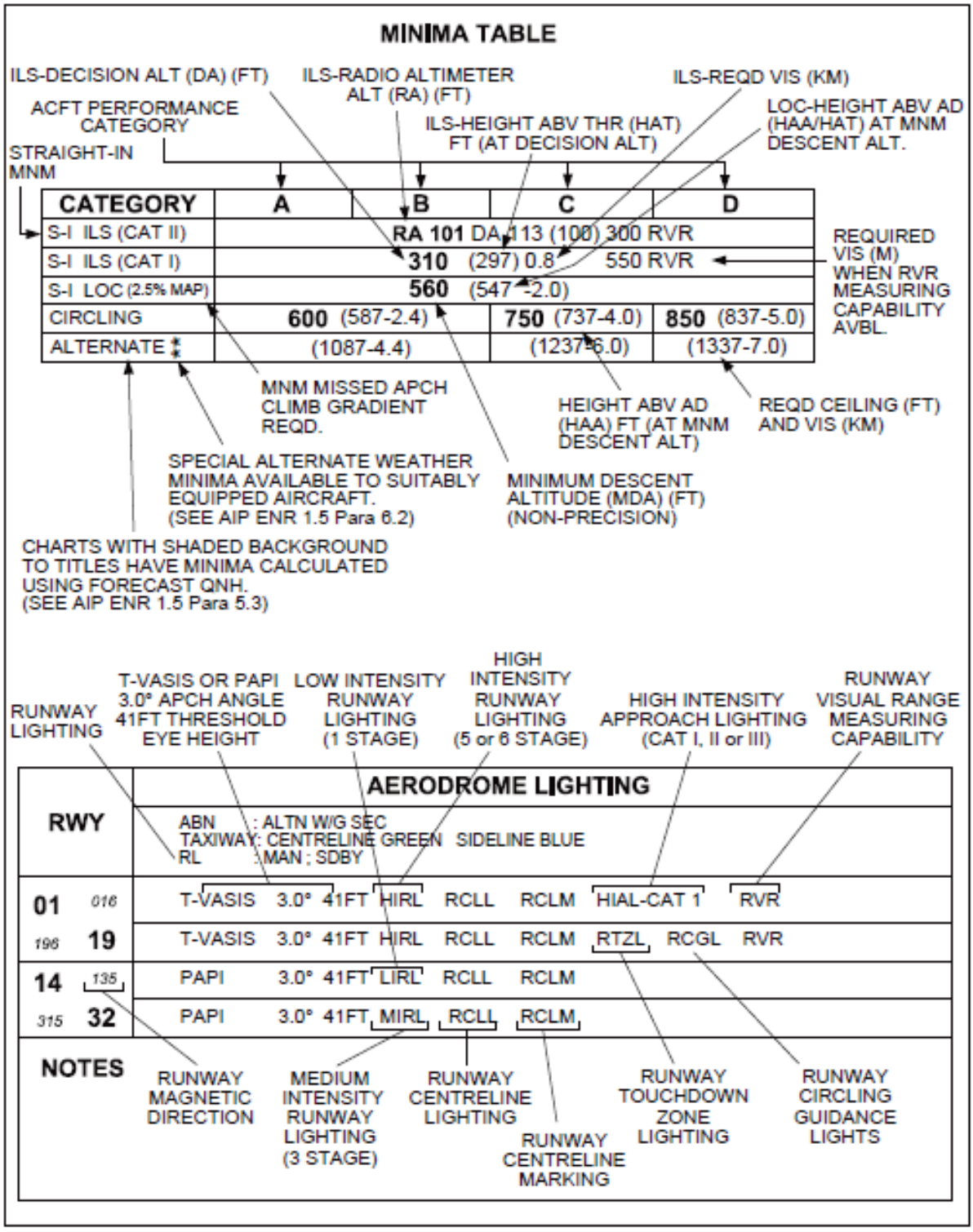


Figure 13 – Minima table and aerodrome lighting

7.4.7 Procedure altitude/flight levels

125	Procedure altitudes/flight levels	Altitude/flight level "window"	17 000 10 000	FL 220 10 000
		"At or above" altitude/flight level	7 000	FL 070
		"At or below" altitude/flight level	5 000	FL 050
		"At" altitude/flight level	3 000	FL 030
		"Recommended" altitude/flight level	5 000	FL 050
		"Expected" altitude/flight level	Expect 5 000	Expect FL 050

Figure 14 – Procedure altitude/flight levels

7.4.8 Holding pattern

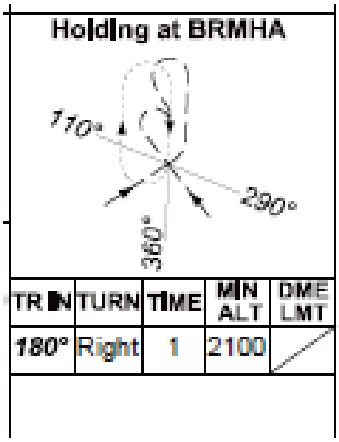


Figure 15 – Holding pattern

7.5 Conversion tables

7.5.1 Gradient rate nomograph

The nomograph below gives the climb/descent rate for entering arguments of gradient (%, FT/NM, degrees) and ground speed.

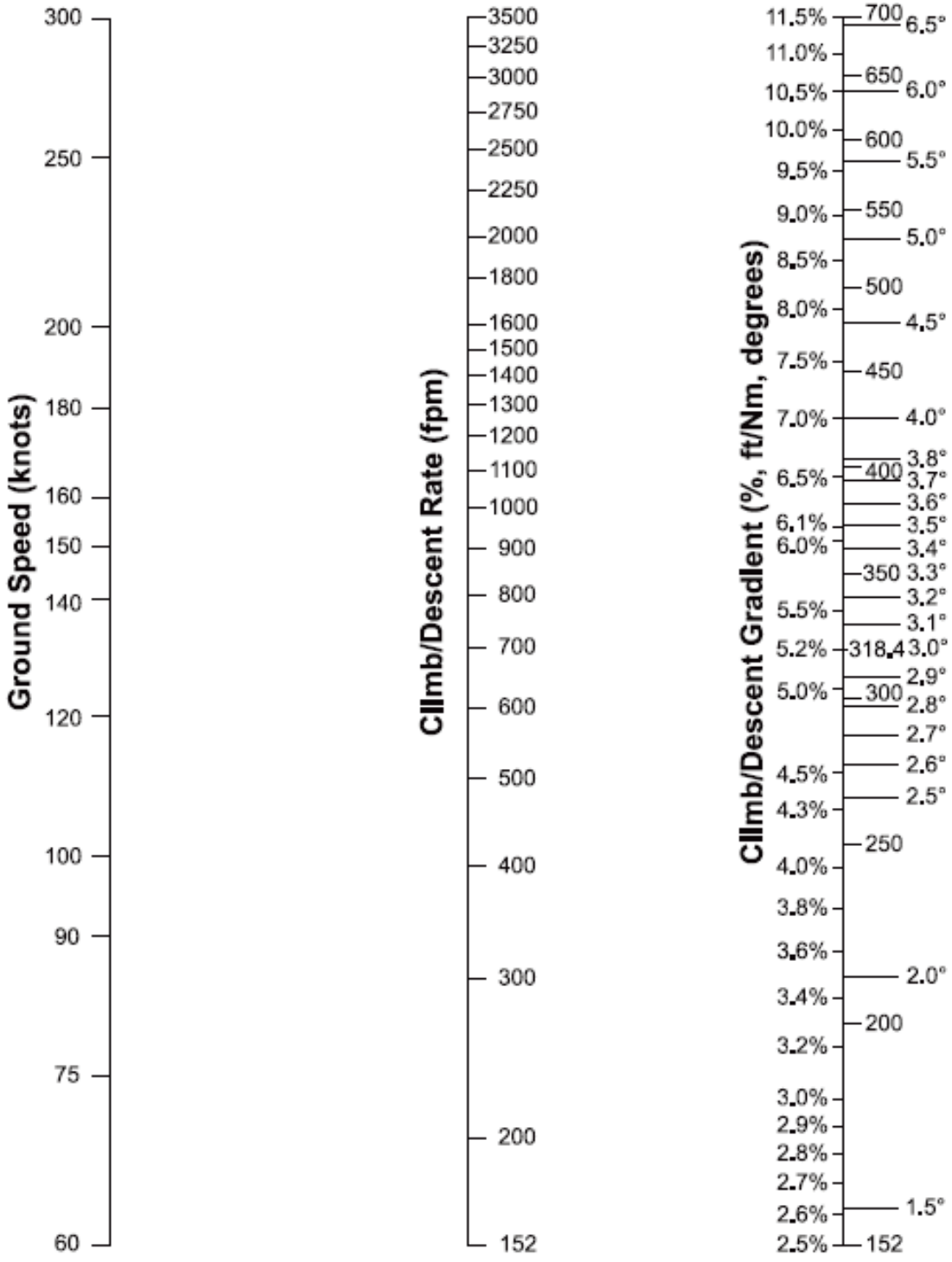


Figure 16 – Conversion table (gradient rate nomograph)

7.5.2 Altitude correction versus temperature

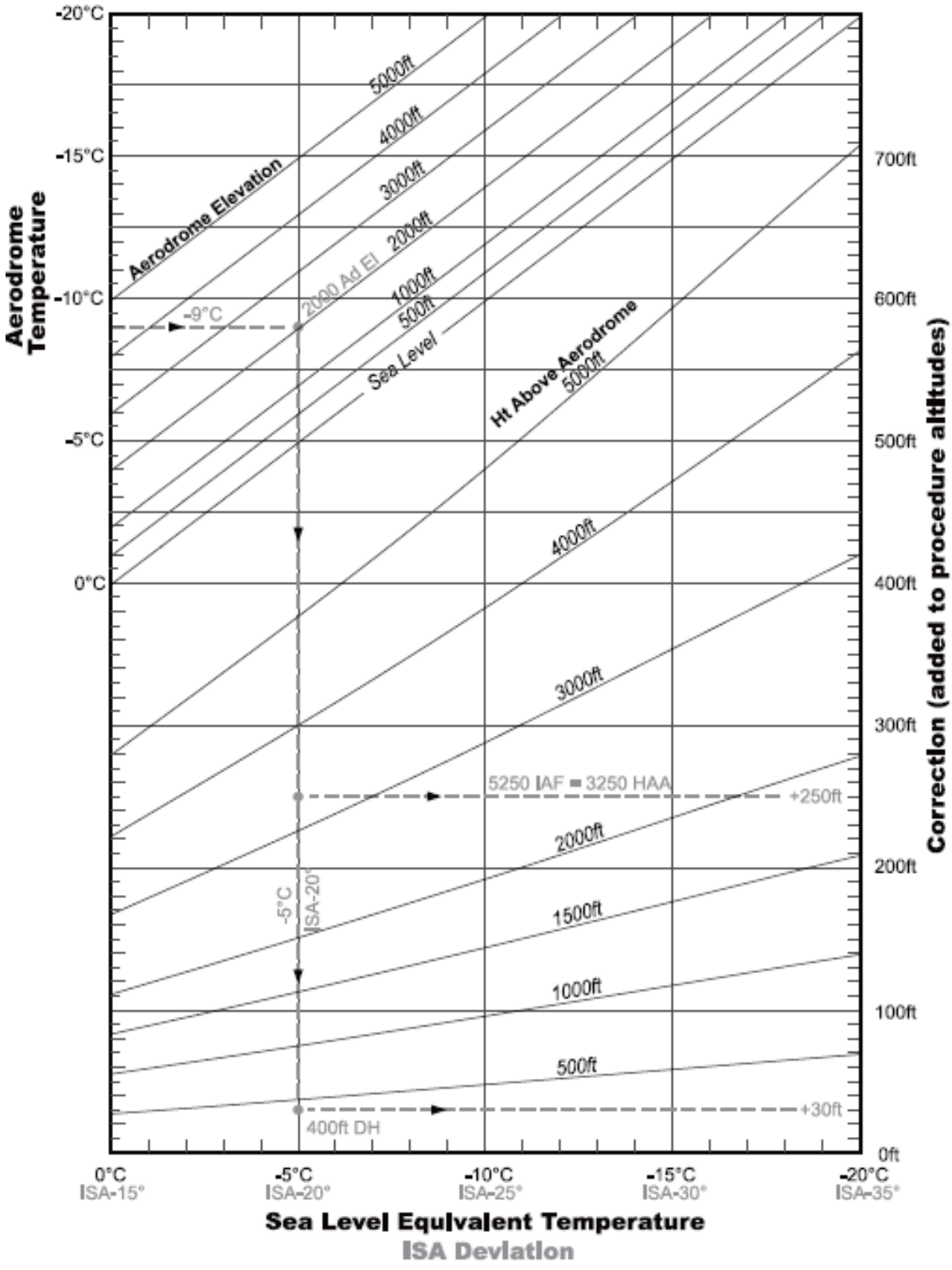


Figure 17 – Conversion table (altitude correction versus temperature #1)

7.5.3 Altitude correction versus temperature

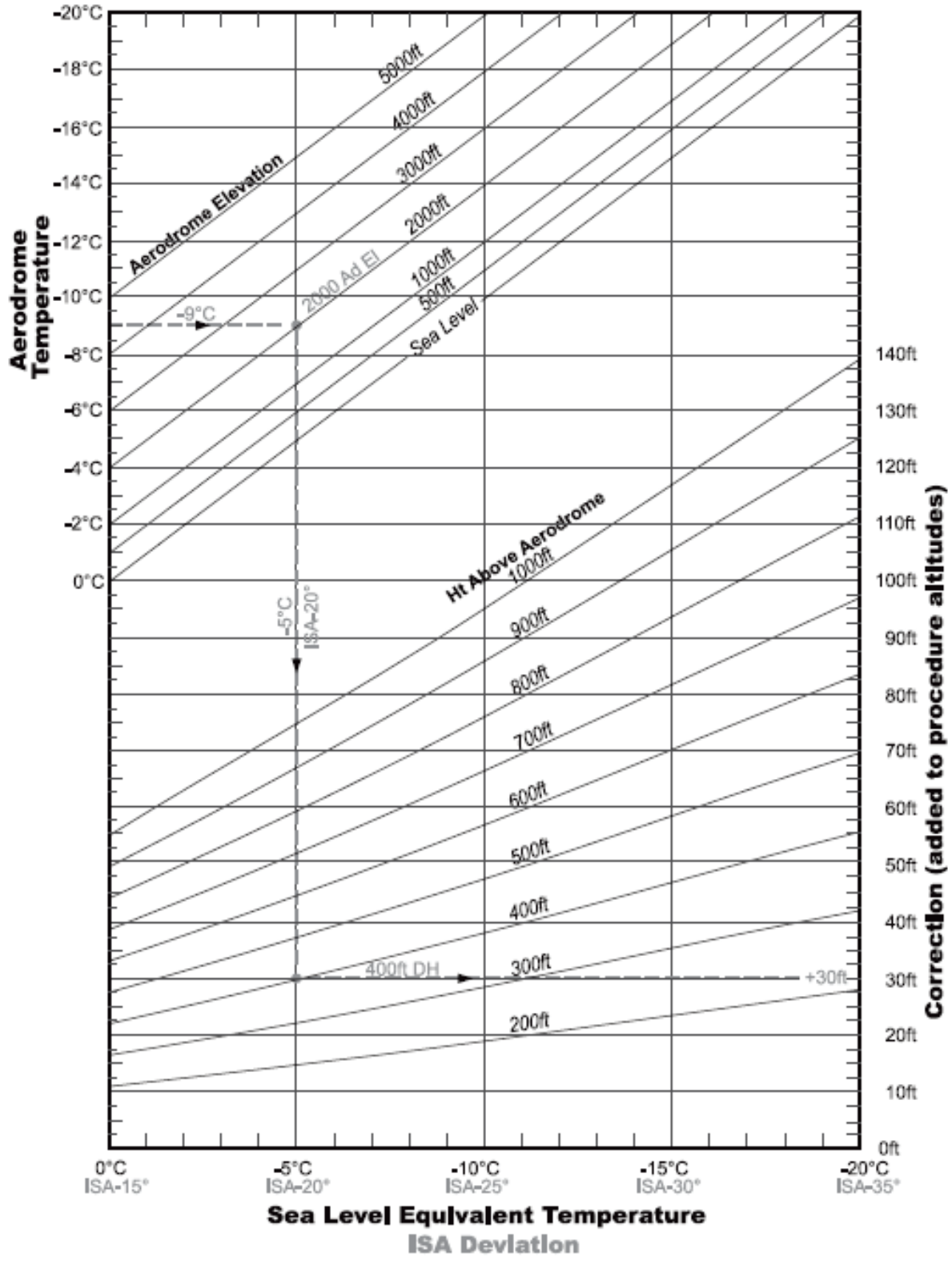


Figure 18 – Conversion table (altitude correction versus temperature #2)

8 Definitions

Within this document, the following abbreviations will be used:

Term	Definition
AD	Aerodrome
AFRU	Aerodrome Frequency Response Unit
AGL	Above Ground Level
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIREP	Air Report
AIS	Aeronautical Information Services
ALA	Aircraft Landing Area
AMSL	Above Mean Sea Level
APV	Approach Procedure with Vertical Guidance
ARP	Aerodrome Reference Point
ATC	Air Traffic Control
ATS	Air Traffic Services
AT-VASIS	Abbreviated "T" Visual Approach Slope Indicator System
Baro-VNAV	Barometric Vertical Navigation
BLW	Below
CASA	Civil Aviation Safety Authority
CAT	Category
CM	Centimetre
CTA	Control Area
CTAF	Common Traffic Advisory Frequency
DA	Danger Area
DA	Decision Altitude
DER	Departure End of Runway
DH	Decision Height
DME	Distance Measuring Equipment
ERCH	En Route Chart High
ERCL	En Route Chart Low
ERSA	En Route Supplement Australia
FAC	Facilities (individual aerodrome entries in ERSA)
FAF	Final Approach Fix
FIA	Flight Information Area

Term	Definition
FIR	Flight Information Region
FIS	Flight Information Service
FL	Flight Level
FM	From
FT	Feet
GDA	Geodetic Datum of Australia
GEN	General (section of the AIP Book)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HAA	Height Above Aerodrome
HF	High Frequency
IAF	Initial Approach Fix
IAIP	Integrated Aeronautical Information Package
IAL	Instrument Approach and Landing charts
ICAO	International Civil Aviation Organization
IDENT	Identification
IFR	Instrument Flight Rules
ILS	Instrument Landing System
ISA	International Standard Atmosphere
KM	Kilometre
KT	Knot
LL	Lower Level
LNAV	Lateral Navigation
LSALT	Lowest Safe Altitude
MDA	Minimum Descent Altitude
MOA	Military Operating Area
NAVAID	Navigation Aid
NDB	Non-Directional Radio Beacon
NM	Nautical Mile
OCA	Oceanic Control Area
PAL	Pilot Activated Lighting
PAPI	Precision Approach Path Indicator
PCA	Planning Chart Australia
PRD	Prohibited, Restricted and Danger (Areas)
QNH	Altimeter subscale setting to obtain elevation or altitude

Term	Definition
R	Relay
RA	Restricted Area
RNAV	Area Navigation
RNP	Required Navigation Performance
RQ	Require(d)
RWY	Runway
SFC	Surface
SID	Standard Instrument Departure
STAR	Standard Arrival Route
SUA	Special Use Airspace
SUP	Supplement (to the AIP)
TAC	Terminal Area Chart
TACAN	UHF Tactical Air Navigation Aid (Military)
TAS	True Airspeed
THR	Threshold
TMA	Terminal Control Area
T-VASIS	"T" Visual Approach Slope Indicator System
UIR	Upper Information Region
UTA	Upper Control Area
UTC	Coordinated Universal Time
UTM	Universal Transverse Mercator
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VNC	Visual Navigation Chart
VOLMET	Meteorological Information for Aircraft in Flight
VOR	VHF Omnidirectional Radio Range
VTC	Visual Terminal Chart
WAC	World Aeronautical Chart
WGS	World Geodetic System

9 References

Title	Number
AIP Book	
Civil Aviation Order (CAO)	20.1.1B
ERSA	
ICAO Annex 4	
ICAO Doc 8697	
ICAO Doc 9905	