

CHAPTER 13 · GENERAL NAVIGATION

Topographical Maps and Map Reading

Visual navigation · Chart symbols · Scale · Terrain interpretation · MEF/MSA

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- › MEF, MSA & Clearance
- › Map Reading
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Introduction

Modern aircraft navigation systems — GPS, INS, FMS — are highly reliable, but they fail occasionally or suffer degraded accuracy. Many light aircraft are not equipped with sophisticated navigation systems at all. There is therefore an enduring need for pilots to develop and maintain **visual navigation skills** using the basic aids of map, compass, stopwatch, eye and brain.

It is essential that pilots can interpret the **conventional symbols** (the legend) of all the aeronautical charts they use. Misreading a symbol —

confusing a military airport with a civil one, an unlighted obstruction with a lighted one — can have serious consequences.

Aeronautical charts show three basic characteristics which form the structure of this chapter:

- **Relief (Terrain)** — the shape and elevation of the land surface
- **Other Features** — man-made and natural planimetric features
- **Scale** — the ratio between chart distance and Earth distance

GHOST AVIATOR

Relief (Terrain)

If an aircraft is to be navigated safely in poor weather, terrain must be identified and cleared — either by flying around high ground or over it at a safe altitude. In good visibility, terrain features are invaluable visual references. Either way, pilots must understand how the ground is depicted on aeronautical charts.

Contour Lines

Contour lines join all points on the ground at the same height above mean sea level. The pattern of contours reveals the shape of the terrain:

- **Closely spaced contours** = steep gradient
- **Widely spaced contours** = gentle slope
- **Concentric ovals, increasingly small** = hill or mountain summit
- **V-shapes pointing uphill (up-valley)** = valley (stream flows down the V)
- **V-shapes pointing downhill (down-slope)** = ridge spur

The **contour interval** — the vertical difference between adjacent contours — is stated in the chart legend. Common values: 500 ft on 1:500 000 charts; 1 000 ft on 1:1 000 000 charts. Every fifth contour (the *index contour*) is drawn thicker and labelled with its altitude in feet or metres.

Spot Heights and Mountain Triangles

A spot height is a precise, surveyed elevation of a specific point, shown as a black dot with a number alongside. A **mountain triangle** (▲) marks the summit with the highest accuracy. Spot heights are especially important where contour spacing makes exact summit height ambiguous.

Hypsometric Tinting (Layer Colouring)

Bands of colour between contour lines give an immediate visual impression of elevation without counting contour lines. Typical colour scheme: deep green for sea level, lighter greens for lowland, buff/tan for intermediate, orange-brown for highland, purple-grey for high mountain. The exact scheme is always defined in the chart legend.

Form Lines

In areas where survey data is sparse, **form lines** (dashed lines resembling contours) indicate the approximate terrain shape. They are less reliable than surveyed contours — treat them as indicative, not precise.

Hill Shading

Some charts superimpose grey-tone shading to simulate shadows cast by sunlight from the north-west. This gives a strong three-dimensional impression: ridges look raised, valleys look sunken. Hill shading is particularly effective at showing complex terrain quickly.

▲ THE "HILL IN FRONT OF THE HILL" TRAP

When approaching rising terrain, foreshortening can make a nearer, lower ridge appear to merge visually with a higher range behind it. As you fly forward, terrain clearance decreases much faster than expected. This is especially dangerous in reduced visibility or when flying low. **Always add a generous margin to your calculated terrain clearance.**

Visual Illusions Related to Terrain

Flying over a smooth water surface, fresh snow, or a featureless desert makes it extremely difficult to judge height. Scrub bushes in desert or tundra can appear to be full-size trees, creating a false impression of altitude. At night, scattered lights below (ships, oil rigs, isolated buildings) can be confused with stars — especially after manoeuvres when the horizon reference is lost.

MEF, MSA and Obstacle Clearance

Maximum Elevation Figure (MEF)

The MEF is shown in large type within each latitude/longitude grid rectangle on charts such as the TPC (Tactical Pilotage Chart) and ONC (Operational Navigation Chart). It represents the **highest known elevation** — natural or man-made — within that rectangle, with a clearance addition applied.

The MEF calculation:

1. Find the highest natural terrain peak within the rectangle.
2. Find the highest man-made obstruction (must be notified if ≥ 300 ft AGL in UK/US, ≥ 100 m in continental Europe).
3. Add the clearance buffer: 100 ft if the highest feature is below 5 000 ft; 200 ft above 5 000 ft (US practice).

4. Round up to the next 100 ft.

Minimum Safe Altitude (MSA)

Used primarily on European charts, MSA is conceptually similar to MEF but may include a larger terrain clearance margin. **Always check which value is shown on the chart in use** — confusing MEF with MSA could cost you the required safety margin. The difference may literally be a matter of life and death in IMC near high ground.

Unnotified Obstructions

THE UNKNOWN HAZARD

Structures below the notifiable height (300 ft AGL, or 100 m in some countries) do *not* need to be reported. A new farm silo, a temporary crane, a wind turbine under construction — none of these may appear on the chart. The clearance buffer exists precisely to provide a margin against these unknowns. Flying at or near MEF is still not a guarantee of clearance from all obstacles.

Grid Rectangle Sizes by Chart Scale

Chart / Scale	Grid Rectangle
CAA 1:500 000 / TPC	$\frac{1}{2}^{\circ}$ lat $\times$ $\frac{1}{2}^{\circ}$ long
ONC 1:1 000 000	1° lat $\times$ 1° long
Jeppesen small-scale	5° lat $\times$ 5° long

Scale

Scale is the relationship between the length of a line drawn between two positions on a chart and the actual distance on the Earth between those same points. Three methods of expression are in common use.

1. Statement in Words

For example: *"One inch to ten nautical miles."* Entirely self-explanatory. One linear inch on the chart represents ten nautical miles on the Earth's surface. This is the most immediately understandable form but is awkward when a chart is reproduced at a different size.

2. Representative Fraction (RF)

The RF converts the verbal statement into a pure ratio:

FORMULA

$$\text{Scale} = \text{Chart Length} \div \text{Earth Distance}$$

(both in identical units; the result is dimensionless)

By convention the chart length is always expressed as 1. So a 1:500 000 chart means 1 unit on the chart = 500 000 units on the ground. The RF is written as 1 : 500 000.

Large scale vs small scale: Think of the fraction itself. $1/50\,000$ is a larger number than $1/500\,000$. A larger fraction = larger scale = more detail over a smaller area. A 1:50 000 map shows individual buildings; a 1:1 000 000 chart shows an entire country.

COMMON EXAM CONVERSIONS

- **1 : 500 000** → 1 cm = 5 km = 2.70 NM

- **1 : 1 000 000** → 1 cm = 10 km = 5.40 NM
- **1 : 250 000** → 1 cm = 2.5 km = 1.35 NM
- On any Lambert conformal chart, 1 minute of latitude = 1 NM

3. Graduated Scale Line (Scale Bar)

A graduated scale line is printed directly on the chart. It has the critical advantage of remaining correct even if the chart is enlarged or reduced for reproduction — the bar shrinks or grows with the image. Simply measure between two points with a straight edge and compare with the bar.

graduated scale line as is shown in figure 15.2.

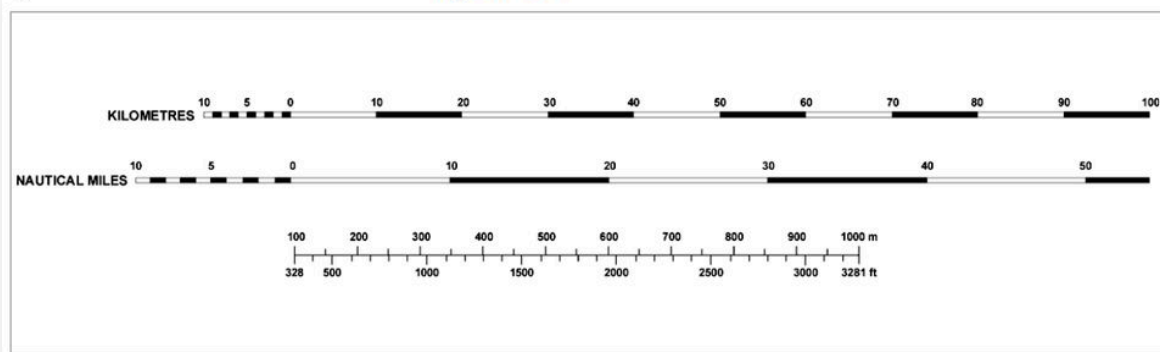


Figure 1 — Graduated scale line as printed on the chart — used to measure distances directly

The Latitude Scale

On aeronautical charts based on conic projections (Lambert Conformal, Transverse Mercator), the latitude scale on the chart margins can be used as a distance rule. One minute of arc of latitude = exactly 1 nautical mile at all latitudes on the Earth. Therefore a pair of dividers set to the distance between two points on the chart, then compared with the latitude margin, directly gives the distance in nautical miles.

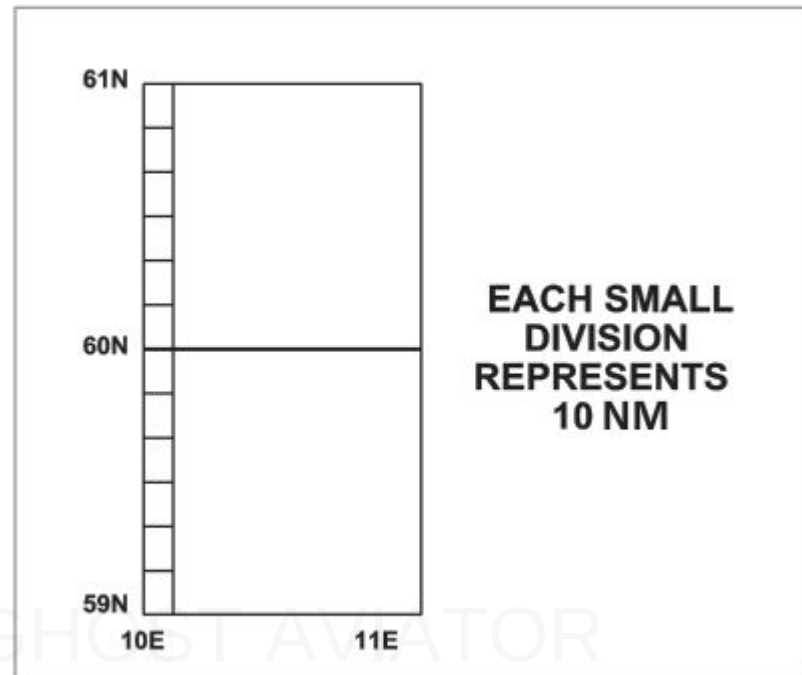


Figure 2 — Latitude scale — 1 minute of latitude = 1 NM; serves as a built-in distance ruler

Map Reading

Map reading is defined as *visualising the physical features of the ground as represented on the map by symbols, and forming a mental picture of the ground by relating those features to one another*. It is a cognitive skill that develops with practice.

Map-to-Ground (Confident Technique)

Used when you are confident of your approximate position. The sequence is:

1. Study the chart: note what features should be ahead, left and right.
2. Look outside and search for those features.
3. Confirm (or challenge) your expectations.
4. Update your mental model and look ahead to the next checkpoint.

This technique keeps you ahead of the aircraft. The map reading is done mostly in the air, in short glances, while maintaining lookout.

Ground-to-Map (Recovery Technique)

Used when position confidence has decreased. You observe the arrangement of features outside — a distinctive river bend, a coastal inlet, the shape of a town — and search the chart to find those same features, thus re-establishing your position. This technique is slower and requires more map-gazing, increasing head-down time.

Preflight Preparation

Good in-flight map reading starts on the ground. Preparation should include:

- Thorough study of the route; identify prominent features along and near track.
- Mark the chart with track lines, turning points, time/distance marks.
- Select visual checkpoints at 5–10 minute intervals (at planned groundspeed).
- Note altimeter settings required along the route.
- Brief yourself on any restricted or controlled airspace en route.

In-Flight Discipline

Navigation is only one of a pilot's responsibilities. Always:

- Maintain an active lookout — collision avoidance is paramount.
- Monitor weather and diversion options continuously.
- Check heading and compass synchronisation at regular intervals.
- Verify altimeter setting and terrain clearance altitude.
- Restart the stopwatch at each turning point and checkpoint.

Visual Checkpoints

A visual checkpoint is a ground feature that can be positively identified from the air and whose position is shown on the chart. The ideal checkpoint combines the following attributes:

- **Prominent** — visible at the planned altitude and in the expected weather
- **Unique** — cannot be confused with a similar feature nearby
- **Definable** — gives a precise position fix, not just an approximate area
- **Permanent** — unlikely to have changed since chart compilation
- **Contrasting** — visually distinct from its surroundings

Contrast changes with season (snow coverage, summer greenery), geographic location (desert vs temperate), time of day and altitude. Night visual navigation requires lit features entirely.

Coastlines

The best general-purpose visual checkpoint. Coastlines are unique (you cannot mistake a coast), highly distinctive in shape (bays, headlands, estuaries, islands), and visible at low altitude even in moderate visibility. A prominent headland or river mouth gives a precise position fix. Coastlines are also usable at night in good moonlight.

Motorways and Major Roads

A large motorway interchange (cloverleaf or trumpet junction) is arguably the finest inland checkpoint: unique shape, visible at high altitude, shown clearly on charts and rarely changed. Motorways themselves are wide, straight, often lit at night, and identifiable from the pattern of moving vehicles. Major A-roads are useful; minor roads are unreliable unless in sparse terrain.

Rivers and Coastlines

River meanders (S-bends) are highly distinctive from the air. A confluence (river junction) gives a particularly precise fix because two specific waterways must coincide. Large lakes with complex shorelines are excellent. Rivers are less useful in flood or when frozen, and lake shores can look different in drought years.

Railways

In open country, railway lines run in strikingly straight lines with very gradual curves. Junctions, stations and large viaducts are precise checkpoints. In industrial or urban areas, multiple lines make individual tracks hard to identify. Railways are rarely visible at night unless brightly lit at major stations.

Woods

Variable utility. A large wood with a distinctive shape (irregular outline, isolated from other woodland) is useful above 1 000 ft AGL. Below that altitude, the shape is hard to assess. Coniferous plantations are prone to shape changes from felling and replanting. Snow can make trees blend with fields; conversely, early spring snow-melt makes a canopy stand out strikingly. Use woods cautiously as primary checkpoints.

Other Features

Power stations, wind farms, large reservoirs, prominent isolated hills, and aeronautical ground lights (aero beacons) all make useful checkpoints. Wind farms are increasingly common and visible at great range, but may not yet appear on older chart editions. Power lines can be seen from their towers but require care — they cross large areas and individual spans are invisible until very close.

Uncertain of Position — Procedures

⚠ THE MOST DANGEROUS ACTION: PRESS ON REGARDLESS

Flying on in the hope that something familiar will appear is how pilots end up controlled into terrain, in airspace they have no clearance for, or over the sea with insufficient fuel. **At the first sign of position uncertainty, take action immediately.**

Immediate Actions When Uncertain

1. **Climb** — if terrain permits. Greater altitude extends your visual range and increases obstacle clearance while you resolve the uncertainty.
2. **Maintain heading and log the time** — continue on the last known heading. This builds a reliable DR track from the last known position.
3. **Define your circle of uncertainty** — based on elapsed time since last known fix and your estimated navigation accuracy, work out the area within which you must be.
4. **Use radio aids** — a VOR radial, DME distance, ADF bearing, or QDM from a D/F station can resolve the uncertainty in seconds. Call the nearest ATC unit.
5. **Apply ground-to-map** — look for the most prominent feature visible and search the chart within your circle of uncertainty.

The Line Feature Technique

If still uncertain after the above steps, turn toward a prominent linear feature that lies *outside* your circle of uncertainty — a coastline, a motorway, a main railway. When you reach it, you know your position with certainty on that line. Turn and follow the feature until you find a definite visual checkpoint from which normal navigation can resume.

Q1 ANSWER LOGIC

Q1 of this chapter asks the best course of action when uncertain. The answer is **a — set heading towards a line feature (coastline, river or motorway)**. This is the classic "lost" recovery: reach a known line, then follow it to a fix. Flying in reverse along the flight plan (b, d) compounds the problem without resolving it. Expanding circles (c) wastes time and fuel.

If All Else Fails

Do not fly toward high ground in poor weather below safety altitude. Do not enter controlled airspace without clearance. Declare urgency (MAYDAY or PAN PAN) on 121.5 MHz. ATC can provide radar identification, vectors to the nearest airport, and SAR assistance if required.

Chart Symbol Reference

The following pages are reproduced from the chapter appendix and contain the numbered aeronautical chart symbols referenced in Questions 2, 5, 6, 7 and 8. Study these carefully — obstruction symbols and radio navigation aid symbols are high-frequency examination topics.

Key Symbol Groups to Prioritise

Category	What to Learn
Radio Navigation Aids	VOR (symbol 13), VORTAC (symbol 14), NDB (symbol 5), DME
Airports	Civil vs military; hard/soft surface; with/without control tower

Obstructions

Symbol 9 (lighted, <1 000 ft), 10 (lighted, >1 000 ft), 12 (group lighted), 15 (unlighted)

Aeronautical Lights

Symbol 3 = aeronautical ground light

Reporting Points

Compulsory (solid triangle) vs non-compulsory (open triangle)

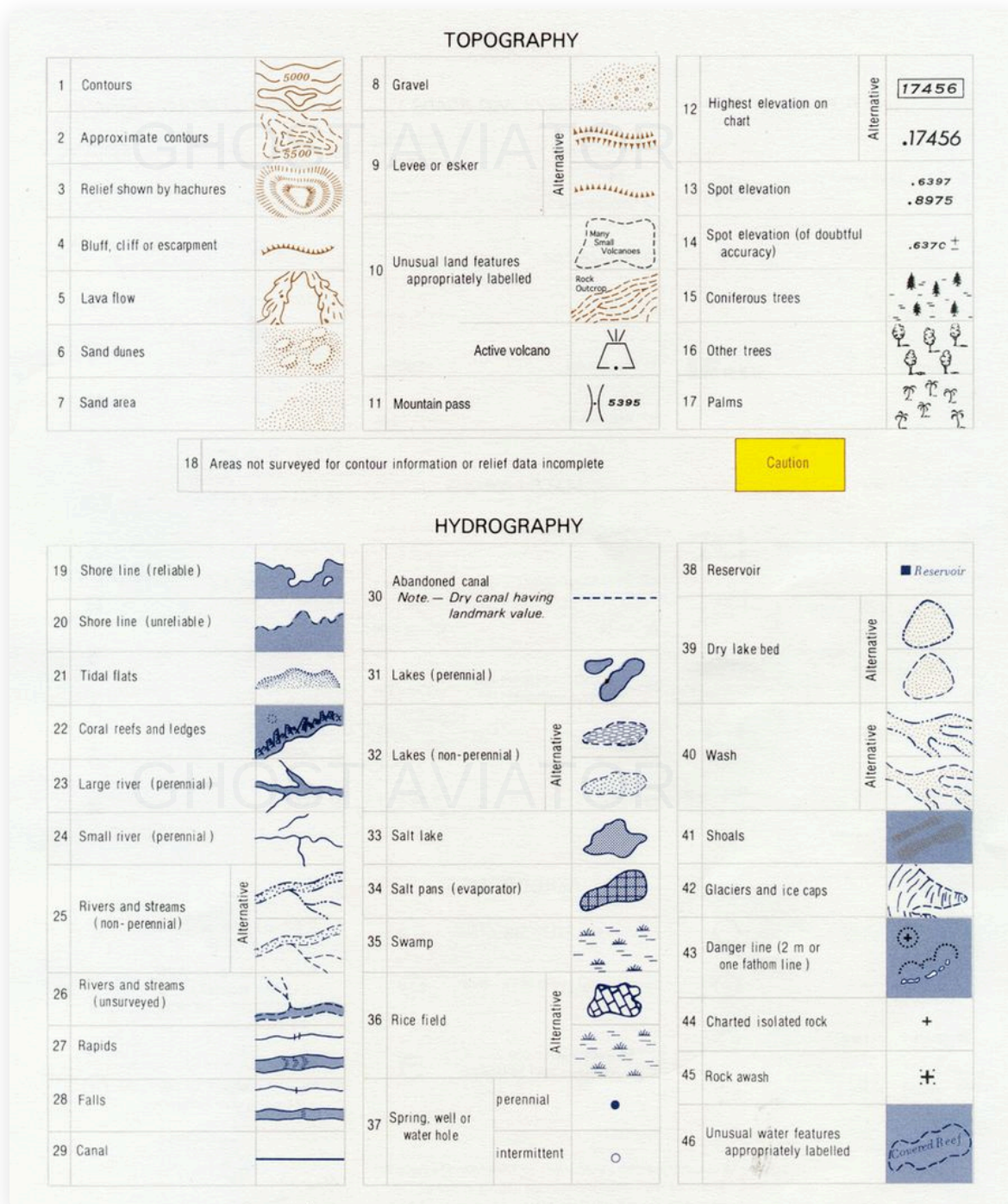


Figure 3 — Chart symbol reference — page 1

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CULTURE

BUILT-UP AREAS			HIGHWAYS AND ROADS			MISCELLANEOUS (Cont'd)		
47	City or large town		57	Dual highway		69	Pipeline	
48	Town		58	Primary road		70	Oil or gas field	
49	Village		59	Secondary road		71	Tank farms	
50	Buildings		60	Trail		72	Coast guard station	
RAILROADS			61	Road bridge		73	Lookout tower	
51	Railroad (single track)		62	Road tunnel		74	Mine	
52	Railroad (two or more tracks)		MISCELLANEOUS			75	Forest ranger station	
53	Railroad (under construction)		63	Boundaries (international)		76	Race track or stadium	
54	Railroad bridge		64	Other boundaries		77	Ruins	
55	Railroad tunnel		65	Fence		78	Fort	
56	Railroad station		66	Telegraph or telephone line (when a landmark)		79	Church	
			67	Dam		80	Mosque	
			68	Ferry		81	Pagoda	
						82	Temple	
AERODROMES								
83	Civil	Land	87	Joint civil and military	Land	90	Sheltered anchorage	
84	Civil	Water	88	Joint civil and military	Water	91	Aerodrome for use on charts on which aerodrome classification is not required e.g. Enroute Charts	
85	Military	Land	89	Emergency aerodrome or aerodrome with no facilities		92	Heliport	
86	Military	Water				Note.- Aerodrome for the exclusive use of helicopters		
93			Note.— Where required by the function of the chart, the runway pattern of the aerodrome may be shown in lieu of the aerodrome symbol, for example:					

Figure 4 — Chart symbol reference — page 2

AERODROMES (Cont.)

**AERODROME DATA IN ABBREVIATED FORM WHICH MAY BE
IN ASSOCIATION WITH AERODROME SYMBOLS**
(Reference: 16.9.2.2 and 17.9.2.2)

94	Name of aerodrome	
	Elevation given in the units of measurement (metres or feet) selected for use on the chart	Length of longest runway in hundreds of metres or feet (whichever unit is selected for use on the chart)
	Minimum lighting — obstacles, boundary or runway lights and lighted wind indicator or landing direction indicator	Runway hard surfaced, normally all weather
Note. — A dash (—) is to be inserted where L or H do not apply.		

AERODROME SYMBOLS FOR APPROACH CHARTS

95	Aerodromes affecting the traffic pattern on the aerodrome on which the procedure is based		96	The aerodrome on which the procedure is based	
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RADIO NAVIGATION AIDS*

97	Basic radio navigation aid symbol <i>Note. — This symbol may be used with or without a box to enclose the data.</i>			Radio marker beacon		Elliptical 								
98	Non-directional radio beacon	NDB		107	Bone Shape 	<i>Note. — Marker beacons may be shown by outline, or stipple, or both.</i>								
99	VHF omnidirectional radio range	VOR		Compass rose To be orientated on the chart in accordance with the alignment of the station (normally Magnetic North) 										
100	Distance measuring equipment	DME												
101	Collocated VOR and DME radio navigation aids	VOR/DME		Compass rose to be used as appropriate in combination with the following symbols:										
102	DME distance	Distance in kilometres (nautical miles) to DME Identification of radio navigation aid	15 km KAV	108	<table><tr><td>VOR</td><td></td></tr><tr><td>VOR/DME</td><td></td></tr><tr><td>TACAN</td><td></td></tr><tr><td>VORTAC</td><td></td></tr></table>		VOR		VOR/DME		TACAN		VORTAC	
VOR														
VOR/DME														
TACAN														
VORTAC														
103	VOR radial	Radial bearing from, and identification of, VOR	R 090 KAV											
104	UHF tactical air navigation aid	TACAN												
105	Collocated VOR and TACAN radio navigation aids	VORTAC												
106	Instrument landing system	ILS	PLAN VIEW PROFILE 	* <i>Note. — Guidance material on the presentation of radio navigation aid data is given in the Aeronautical Chart Manual (Doc 8697).</i>										

Figure 5 — Chart symbol reference — page 3

AIR TRAFFIC SERVICES									
109	Flight information region	FIR							
110	Aerodrome traffic zone	ATZ							
111	Control area Airway Controlled route	CTA AWY	Alternative						
112	Uncontrolled route								
113	Advisory airspace	ADA							
114	Control zone	CTR							
115	Advisory route	ADR	Alternative						
116	Scale-break (on ATS route)		Alternative						
117	Reporting point	REP							
118	Change-over point To be superimposed on the appropriate route symbol at right angles to the route.	COP							
119	ATS/MET reporting point	MRP							
120	Way-point WPT								

AIRSPACE RESTRICTIONS									
121	Restricted airspace (prohibited, restricted or danger area)								
Note. — The angle and density of rulings may be varied according to scale and the size, shape and orientation of the area.									
122	International boundary closed to passage of aircraft except through air corridor								

OBSTACLES									
123	Obstacle								
124	Lighted obstacle								
125	Group obstacles								
126	Lighted group obstacles								
127	Exceptionally high obstacle (optional symbol)								
128	Exceptionally high obstacle — lighted (optional symbol)								
Note. — For obstacles having a height of the order of 300 m (1 000 ft) above terrain.									
129	Elevation of top (italics)								

MISCELLANEOUS									
130	Prominent transmission line								
131	Isogonic line or isogonal								
132	Ocean station vessel (normal position)								

VISUAL AIDS									
133	Marine light								
134	Aeronautical ground light								
135	Lightship								

Figure 6 — Chart symbol reference — page 4

136	Hard surface runway		144	Pierced steel plank or steel mesh runway	
137	Unpaved runway		145	Point light	
138	Stopway SWY		146	Obstacle light	
139	Taxiways and parking areas		147	Landing direction indicator (lighted)	
140	Helicopter alighting area on an aerodrome		148	Landing direction indicator (unlighted)	
141	Aerodrome reference point ARP		149	Stop bar	
142	VOR check-point		150	Taxi holding position	Pattern A Pattern B
143	Runway visual range (RVR) observation site				

Note.— For application, see Annex 14, Volume I, paragraph 5.2.9

	Plan	Profile
151	Tree or shrub	
152	Pole, tower, spire, antenna, etc.	
153	Building or large structure	
154	Railroad	
155	Transmission line or overhead cable	

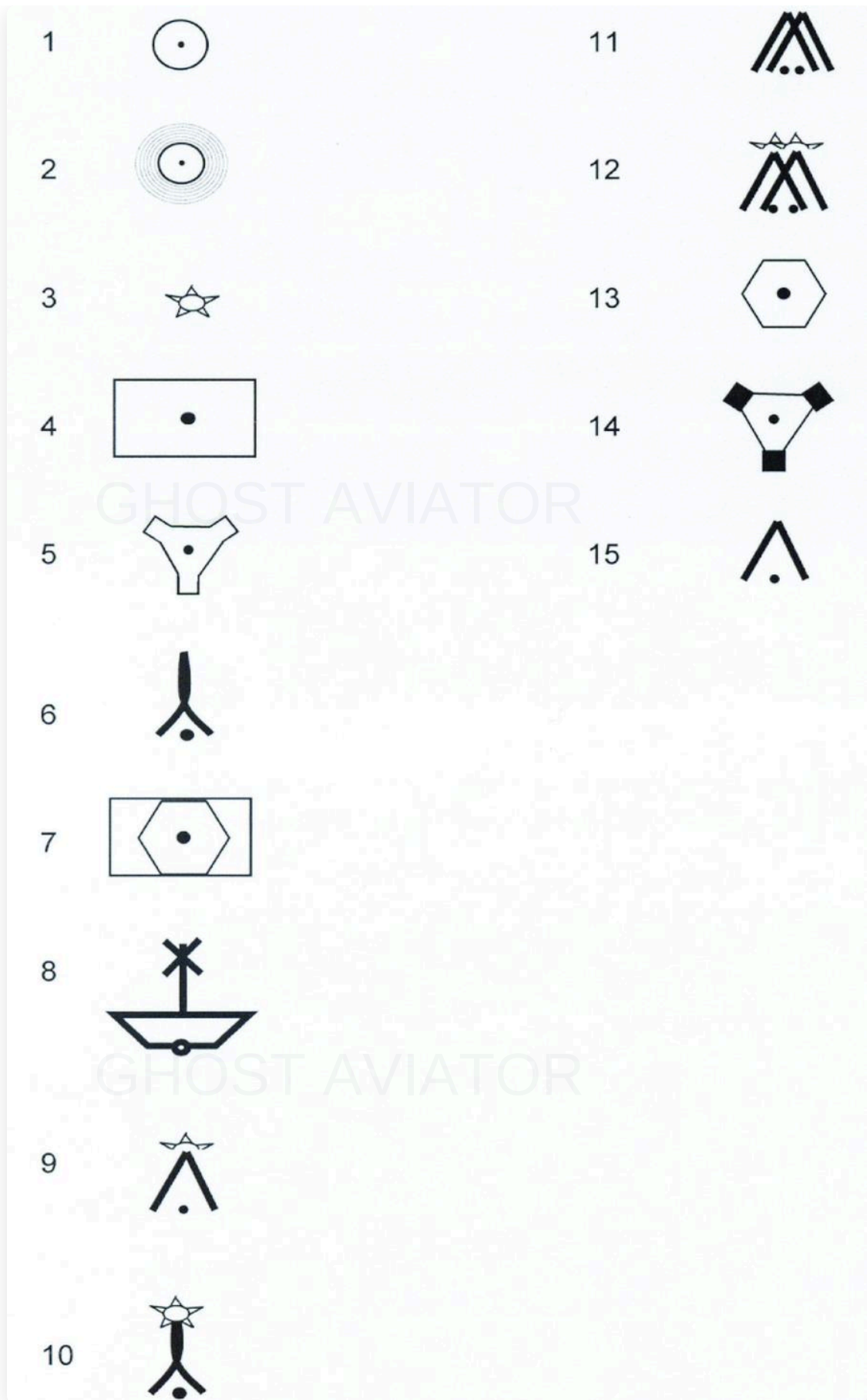
	Plan	Profile
156	Terrain penetrating obstacle plane	
157	Escarpment	
158	Stopway SWY	
159	Clearway CWY	

Figure 7 — Chart symbol reference — page 5

Appendix A — Symbols 16–21

Appendix A is specifically referenced in the practice questions below.

Questions 3 and 4 additionally require an external Jeppesen E(LO)1 chart.



Practice Questions

Ten questions. Questions 3 and 4 require the Jeppesen E(LO)1 chart (an external publication). Questions 2, 5, 6, 7 and 8 use the symbol tables above. Tap any question to reveal the answer.

Q1 You are flying a VFR route and have become uncertain of your position. Which is the best course of action?

- a.** Set heading towards a line feature — coastline, river or motorway
- b.** Turn round and fly your flight plan tracks in reverse until you see something you recognised before
- c.** Fly a series of ever-expanding circles from your present position till you find your next checkpoint
- d.** Turn round and fly your flight plan in reverse back to base

ANSWER: A

Set heading toward a prominent linear feature outside your circle of uncertainty. When you reach it you have a certain position on that line. Follow it to a definite fix and resume navigation. Reversing (b/d) retraces unknown territory; expanding circles (c) waste time and add distance to an already diminishing fuel state.

Q2 Please refer to Appendix A (Figure 8 above). What is the symbol for an unlighted obstacle?

a. 9

b. 10

c. 12

d. 15

ANSWER: D

Symbol 15 is the unlighted obstacle. Symbol 9 = lighted obstacle below 1 000 ft AGL. Symbol 10 = exceptionally high (over 1 000 ft AGL) lighted obstruction. Symbol 12 = group of lighted obstructions. Note: the absence of the lightning-bolt 'lit' indicator is the key discriminator for an unlighted obstacle.

Q3 Using the Jeppesen E(LO)1, position 5211N 00931W — which of the following denotes all the symbols?

a. Military airport, ILS, NDB

b. Civil airport, VOR, ILS

c. Military airport, VOR, ILS

d. Civil airport, ILS, NDB

ANSWER: D

Answer retained verbatim from the published answer key: civil airport, ILS, NDB.

■ **Instructor's Note** — This question requires the Jeppesen E(LO)1 chart — an external publication not included in this study note. Answer **d** is taken directly from the published key and reproduced without independent verification. Cross-check with the current chart edition if there is any doubt.

Q4 Using the Jeppesen E(LO)1 chart, what are the symbols at Galway Carnmore (5318.1N 00856.5W)?

a. VOR, NDB, DME, compulsory reporting point

b. Civil airport, NDB, DME, non-compulsory reporting point

c. Civil airport, VOR, DME, non-compulsory reporting point

d. VOR, NDB, DME, non-compulsory reporting point

ANSWER: B

Answer retained verbatim from the published answer key: civil airport, NDB, DME, non-compulsory reporting point.

■ **Instructor's Note** — This question requires the Jeppesen E(LO)1 chart. Answer **b** is taken directly from the published key. Galway Carnmore (EICM) is a regional Irish airport; navaid fits are periodically updated and chart editions must be checked for currency.

Q5 Which of the following is the symbol for an exceptionally high (over 1 000 feet AGL) lighted obstruction?

a. 6

b. 9

c. 10

d. 15

ANSWER: C

Symbol 10 is the exceptionally high lighted obstruction — the one that exceeds 1 000 ft AGL. Symbol 9 is the lower lighted obstruction (below 1 000 ft AGL). The 1 000 ft threshold is the key discriminator between symbols 9 and 10. Symbol 15 is the unlighted obstruction. Symbol 6 is in a different category.

Q6 What symbol is used to show a VORTAC on a map/chart?

a. 5

b. 7

c. 13

d. 14

ANSWER: D

Symbol 14 is the VORTAC — a combined VHF Omnidirectional Range (VOR) and UHF Tactical Air Navigation (TACAN) facility. It provides both bearing information (from the VOR component) and distance information (from the TACAN component). Symbol 13 is the standalone VOR. Symbol 5 is an NDB. Mnemonic: VOR=13, VORTAC=14 — consecutive numbers.

Q7 Which is the symbol for a VOR?

a. 4

b. 5

c. 13

d. 14

ANSWER: C

Symbol 13 is the VOR. The VOR symbol is traditionally drawn with a compass rose around the station. Symbol 14 is the VORTAC. Symbol 5 is an NDB (Non-Directional Beacon, which transmits on MF/LF). Symbol 4 is a different aid category.

Q8 What does symbol 3 represent?

a. Lit obstacle

b. Lighthouse

c. Visual Reporting Point (VRP)

d. Aeronautical ground light

ANSWER: D

Symbol 3 is an aeronautical ground light — a fixed light, often an aviation beacon, that assists pilots in visual navigation. An aeronautical ground light

may be located at an aerodrome (the aerodrome beacon) or on prominent terrain. A lighthouse (b) is a marine navigational aid and uses a different, internationally standardised symbol. A VRP (c) uses a triangle or flag symbol.

Q9 An aircraft flying VFR using visual navigation crosses two parallel roads at right angles to the track. For what purpose could that information be used?

a. Tracking check

b. Ground speed check

c. Heading check

d. Deviation check

ANSWER: B

When the aircraft crosses two parallel roads at right angles to track, it obtains two distinct position fixes separated by a known distance (the road spacing, read from the chart). If the pilot records the time taken to fly between the two roads, groundspeed can be calculated: $GS = \text{distance} \div \text{time}$. Crossing roads at right angles gives no heading information — you could be on exactly the correct track or significantly off it and still cross them at 90° .

Q10 Which of the following would be most useful as a visual checkpoint when planning a flight?

a. A small copse

b. A large wood

c. A large motorway junction

d. A bend in a river

ANSWER: C

A large motorway junction scores highly on all checkpoint criteria: very prominent at altitude, unique in shape (cloverleaf/trumpet interchanges are unmistakable), precisely definable position, permanent (motorway routes

rarely change), and contrasting (grey concrete against surroundings). A small copse (a) is too small and not unique. A large wood (b) is better but changes over time. A river bend (d) is useful but many bends look similar; it is a secondary choice.

Quick Answer Key

Q1 a	Q2 d	Q3 d 	Q4 b 	Q5 c
Q6 d	Q7 c	Q8 d	Q9 b	Q10 c

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GHOST AVIATOR