

PG and HG  
ADVANCED PILOT  
EXAM NOTES

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# Advanced Pilot Notes

## 1. Introduction

These notes are designed to tell you all you need to know to pass your BHPA Advanced Pilot Exam. They tell you the flying tasks you should have done and go through the theory material you should know before sitting the exam.

## 2. Flying Tasks

### 2.1 Hang Glider

The pilot must complete: -

1. A 10km cross country flight
2. A 20km cross country flight
3. A 30km cross country flight
4. One of the above flights to a Declared Goal
5. A 20km (total) Out and Return cross country flight
6. A total of at least 75 hrs logged air time and pass both: -
7. The current AP (HG) written exam paper
8. A final assessment as to airmanship

### 2.2 Paraglider

The pilot must complete: -

1. Complete a minimum of 150 flights since attaining P rating
2. Complete at least 35 hrs since attaining P rating
3. Achieve the FAI Bronze Eagle Badge (15km distance; 500 metre height gain or one hour duration)
4. Complete a 20km cross country
5. Complete a 20 km out and return flight
6. Display an ability to fly competently and safely in the company of others; maintaining a good look out, complying with the Rules of the Air and exhibit good airmanship
7. Satisfy the Instructor as to the correct attitude to continue a flying career both safely and competently
8. Safely demonstrate slow flight awareness and discuss the relevant symptoms and dangers (WARNING: deliberate stalls must be avoided)
9. Demonstrate safe and effective use of rapid descent techniques (B lines and spiral dive), NOTE: if performed over land this manoeuvre is to be carried out using only specified gliders which have proven good recover characteristics
10. Demonstrate safe and effective recovery from a flat spin
11. Demonstrate safe and effective recovery from a amplitude max spin
12. Pass the AP (PG) written exam paper

Notes tasks 10 and 11 must be carried out over water with a recovery boat in attendance and with the pilot wearing a buoyancy aid and reserve parachute.  
 Note: the tasks are the same for both hill and tow discipline.

### 3. The Exam

#### 3.1 Instructions to candidates

- You have 1 hour to complete the exam
- There is a 4 month waiting period before you can resit the exam if you fail
- Pass mark is 70%

#### 3.2 Content

The exam is mainly aimed at pilots doing cross-country so is loads of airlaw revision from your Pilot exam.

##### 3.2.1 Airlaw

###### 3.2.1.1 General

###### 3.2.1.1.1 Airlaw documentation

Aviation law in the UK is enacted by parliament and published in statutory documents. The main one for UK pilots is the Air Navigation Order (ANO). Another is the Air Navigation Regulations. The authority responsible for Civil Aviation in the UK is the CAA (Civil Aviation Authority). They provide an Aeronautical Information Service (AIS) to collect and disseminate information. This is done through 4 documentation channels.

###### 3.2.1.1.1.1 Aeronautical Information Publication (UK AIP) or the UK Air Pilot

This contains essential information or instructions of a lasting nature. The UK AIP is published in 3 volumes with a regular amendment service.

###### 3.2.1.1.1.2 NOTAM's

Notices to Airmen. These contain information on any aeronautical facility, hazard etc. which might be of use to pilots. They are in 3 categories;

Notam type	Description
NOTAMN	New information
NOTAMR	Replacing previous information
NOTAMC	Cancelling a previous NOTAM

###### 3.2.1.1.1.3 Temporary Navigation Warning Bulletins

(TNW) and pre-flight route and aerodrome information bulletins (GEN's). Daily updated information and answers to queries may be obtained from the Aeronautical Information Service on 0208 754 3464 or in the internet at <http://www.ais.org.uk>. Updated info on royal flights and red arrows is available on 0500 354802.

#### 3.2.1.1.1.4 Aeronautical Information Circulars

These are otherwise known as AIC's. These are published monthly and concern advanced warnings of operational changes or changes of an administrative matter, i.e. corrections or changes to the Airspace charts. Depending on the type of AIC, then the colour of the paper it is printed on changes.

#### 3.2.1.1.2 Airspace classifications

There are 2 distinct categories of airspace – Controlled and uncontrolled. Within these categories it is further subdivided into a number of groups or classes. There are 7 different classes with some we can fly in legally and some we cannot. Each airspace class also has defined conditions for flying which would determine whether the flight is conducted under VFR (Visual Flight Rules) or IFR (Instrument flight rules). Usually the decision on if a flight is conducted in VFR is determined by the weather i.e. what can we see from the air, and as the Airspace becomes more “controlled”, then the quality of visibility needed increases. Class A to E inclusive are controlled, class F and G are uncontrolled airspace. The list of VMC versus Airspace class is shown in section 3.2.1.1.3.

##### 3.2.1.1.2.1 Class A

Class A is the most controlled airspace. All airways are class A except where they pass through a TMA, CTA or CTR of lower status. VFR flight is not permitted in class A and class A is **CLOSED** to us.

##### 3.2.1.1.2.2 Class B

Class B is only present above FL 245 – VFR flights in class B require appropriate flight notification and airspace clearance – Class B is **CLOSED** to us. Also we would be very cold and couldn't breathe!

##### 3.2.1.1.2.3 Class C

There is no class C in the UK - Class C is **CLOSED** to us

##### 3.2.1.1.2.4 Class D

Class D is reserved for less busy controlled airspace (most UK CTR and CTA) and Scottish TMA above 6,000ft asl. VFR flights in class D require appropriate flight notification and airspace clearance – Class D is **CLOSED** to us

##### 3.2.1.1.2.5 Class E

Class E is only allocated to the Scottish CTR, the Scottish TMA at or below 6,000ft and the Belfast TMA – Class E is similar to Class D but does not require flight notification or ATC clearance – Class E is **OPEN** to us.

3.2.1.1.2.6 Class F

Class F – advisory routes for private pilots (Cessna’s). Deemed 10nm wide, the same at Airways, advisory routes are depicted on half million maps by blue dashed lines. If a PPL lodges a flight plan then they receive Air traffic Advisory Service while travelling on an advisory route. They are however uncontrolled airspace and a radio or clearance is not required for us. Class F is **OPEN** to us.

3.2.1.1.2.7 Class G

Class G is open airspace – free for everyone - Harrier jump jets and us. Class G actually covers about 50% of the UK airspace. Class G is **OPEN** to us.

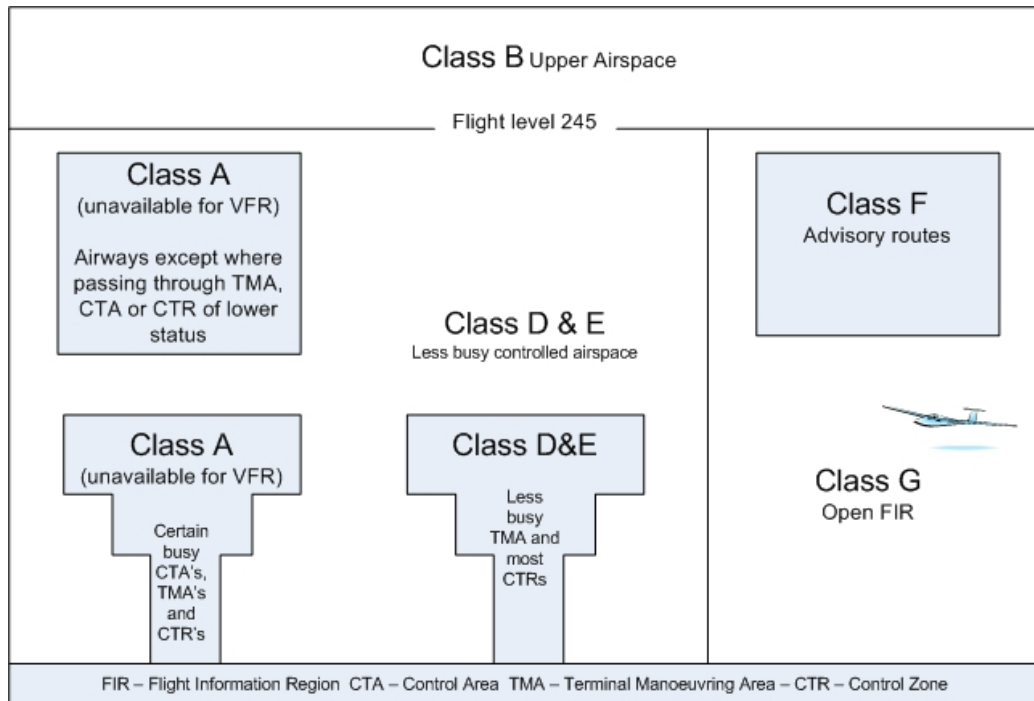


Figure 1 - Airspace summary

# UK ATS AIRSPACE CLASSIFICATIONS

## CONTROLLED AIRSPACE

	A	B	C	D	E	F	G
IFR	<p>SEPARATION: All aircraft</p> <p>SERVICES: Air traffic control service</p> <p>SPEED LIMITATION: <i>Not applicable</i> (Unless notified for ATC Purposes)</p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: All aircraft</p> <p>SERVICES: Air traffic control service</p> <p>SPEED LIMITATION: <i>Not applicable</i> (Unless notified for ATC Purposes)</p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: IFR from IFR IFR from VFR</p> <p>SERVICES: Air traffic control service</p> <p>SPEED LIMITATION: <i>Not applicable</i> (Unless notified for ATC Purposes)</p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: IFR from IFR</p> <p>SERVICES: Air traffic control service including traffic information about VFR flights (and traffic avoidance advice on request)</p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: IFR from IFR</p> <p>SERVICES: Air traffic control service and traffic information about VFR flights as far as practical</p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: IFR from IFR (participating IFR traffic)</p> <p>SERVICES: (See Note) Air traffic advisory service Flight information service</p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: Not required</p> <p>ATC CLEARANCE: Not required</p>	<p>SEPARATION: (See Note) Not provided</p> <p>SERVICES: (See Note) Flight information service</p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: Not required</p> <p>ATC CLEARANCE: Not required</p>
	VFR	<p></p> <p>VFR FLIGHT NOT PERMITTED</p>	<p>SEPARATION: All aircraft</p> <p>SERVICES: Air traffic control service</p> <p>VMC MINIMA </p> <p>SPEED LIMITATION: <i>Not applicable</i></p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: VFR from IFR</p> <p>SERVICES: Air traffic control service providing: i) Separation from IFR ii) VFR traffic information (and traffic avoidance advice on request)</p> <p>VMC MINIMA </p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: Not provided</p> <p>SERVICES: Air traffic control service providing: traffic information on all other flights</p> <p>VMC MINIMA </p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: </p> <p>ATC CLEARANCE: Required</p>	<p>SEPARATION: Not provided</p> <p>SERVICES: Air traffic control service providing: traffic information as far as practical</p> <p>VMC MINIMA </p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: Not required</p> <p>ATC CLEARANCE: Not required</p>	<p>SEPARATION: (See Note) Not provided</p> <p>SERVICES: (See Note) Flight information service</p> <p>VMC MINIMA </p> <p>SPEED LIMITATION:  below FL100</p> <p>RADIO: Not required</p> <p>ATC CLEARANCE: Not required</p>

Not applicable to Military aircraft

† Helicopters may fly at or below 3000ft AMSL clear of cloud and in sight of the surface.

\*At speeds of 140kt IAS or less flight is permitted in flight visibilities to 1500m. Helicopters may operate in less than 1500m flight visibility at a speed which, having regard to the visibility, is reasonable.

NOTE: In Class F and Class G airspace a Radar Advisory Service (RAS), a Radar Information Service (RIS) and Approach Control Service may be available from Air Traffic Service Units. Pilots are urged to make use of these services, details of which are published in AICs and other documents.



Figure 2 - Airspace details



**3.2.1.1.3 VMC minima conditions in Airspace**

Our flights are usually carried out in fine weather. We do not have the ability to fly safely in reduced visibility such as ground fog or cloud. There are stipulated minimum conditions of visibility that must be measurable to allow any flight in airspace classes to be valid flights under visual flight rules (VFR). Each class carries visual meteorological conditions (VMC) minima. Flights in conditions where visibility is less than the VMC minima are carried out under IFR Instrument flight rules.

*3.2.1.1.3.1 Class E (aircraft < 140ktIAS)*

Altitude	Ground ref	Cloud ref	Visibility
<3,000ft 3,000 – FL100	In sight	Clear of cloud 1,000ft vertical separation below cloud 1,500m horizontal separation from cloud	5km 5km

*3.2.1.1.3.2 Class F (aircraft < 140ktIAS)*

Altitude	Ground ref	Cloud ref	Visibility
<3,000ft 3,000 – FL100	In sight	Clear of cloud 1,000ft vertical separation below cloud 1,500m horizontal separation from cloud	1500m 5km

*3.2.1.1.3.3 Class G (aircraft < 140ktIAS)*

Altitude	Ground ref	Cloud ref	Visibility
<3,000ft 3,000 – FL100	In sight	Clear of cloud 1,000ft vertical separation below cloud 1,500m horizontal separation from cloud	1500m 5km

**3.2.1.1.4 VFR, IFR and cloud flying cleared up**

If you look at the diagram of detailed airspace (Figure 2), you see it is split into the upper row which is IFR flight and the lower row which is VFR flight. As we can see, VFR flight without a radio or clearance is allowed in class E, F and G. We can also see that IFR flight is allowed in class F and G without a radio or

clearance. Thus if we are in uncontrolled airspace, and above 3,000ft, VMC minima is 1,000 vertical separation and 1,500m horizontal separation from a cloud. If we fly nearer the cloud than that then we are flying in IMC and thus flying under IFR rules. This is perfectly legal.

As for flying in cloud, Sailplanes are allowed to fly in cloud. In many countries, including most of Europe, the USA and Australia, cloud flying by glider pilots is prohibited.

Commercial aircraft generally speaking are restricted to controlled airspace, and pilots of light aircraft tend to avoid cumulus clouds because they are so rough. Many private pilots do not have the necessary rating for blind flying. A special radio frequency (130.4MHz) is reserved for sailplane pilots flying in cloud to communicate with each other in order to avoid conflict.

So entering cloud in uncontrolled airspace is not actually illegal but how much risk it incurs, and if you want to do it or not is up to you. In some comps entering cloud is disqualification for obvious reasons, but in an open XC and you are on your own, and then it's at your risk.

#### **3.2.1.1.5 Converging aircraft – different types**

An aircraft in the air must give way to other converging aircraft as follows:-

- Flying machines must give way to airships, gliders and balloons
- Airships must give way to gliders and balloons
- Gliders must give way to balloons

#### **3.2.1.1.6 Airspace dimensions**

##### *3.2.1.1.6.1 Control Zones (CTZ)*

Control Zones are shown as CTZ on maps and extend from surface to a specified altitude or flight level. Remember it from (Z)ones go from (Z)ero feet.

##### *3.2.1.1.6.2 Control Area (CTA)*

Control Areas are shown as CTA on maps and is a portion of airspace in which air traffic control is provided and which extends upwards from a specified base altitude or flight level to an upper limit expressed as a flight level.

##### *3.2.1.1.6.3 Terminal Control Area (TCA/TMA)*

Terminal Control Areas is a control area established at the confluence of controlled airspace routes in the vicinity of one or more major aerodromes. Abbreviated as TCA or more usually TMA (from Terminal Manoeuvring Area). There are 4 TMA's in the UK. London and Manchester are class A, Belfast is class E and the Scottish TMA is class D above 6,000ft and class E at or below 6,000ft. They extend from a specified base altitude or flight level to an upper limit expressed as a flight level.

3.2.1.1.6.4 Aerodrome Traffic Zone (ATZ)

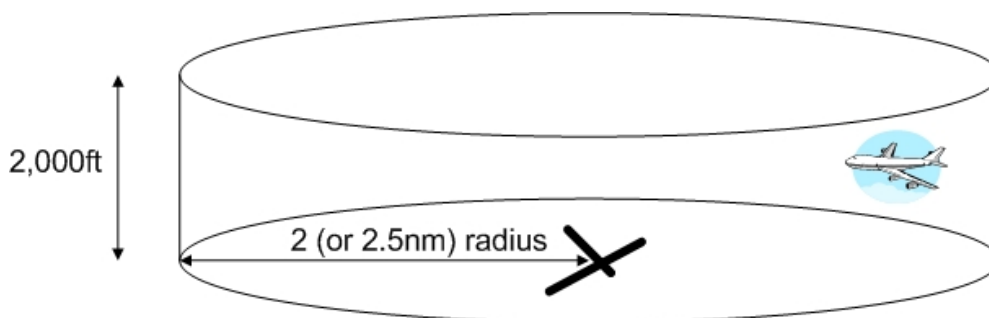


Figure 3 - ATZ dimensions

ATZ extend from surface to 2,000ft above aerodrome level and a circle of radius:

- 2nm where the length of the longest runway is 1,850m or less; or
- 2.5nm, where the longest runway is greater than 1,850m

The aircraft must not enter an ATZ unless the pilot in command has permission of the ATC or AFIS (Aerodrome Flight Information Service) – so generally closed to us.

3.2.1.1.6.5 Military Aerodrome Traffic Zone (ATZ)

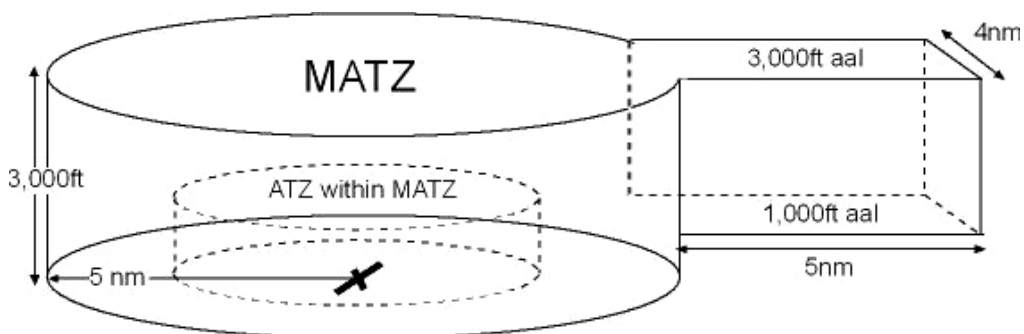


Figure 4 - MATZ dimensions

A military aerodrome traffic zone is specified airspace surrounding military aerodromes. Dimensions are:

- From the surface up to 3,000ft above aerodrome level within a radius of 5nm
- With stub (or stubs) width 4nm, extending out 5nm and from 1,000ft aal to 3,000ft aal

MATZ is technically non-regulated and we can enter (though it's not a good idea!) but the ATZ is closed unless the pilot in command has permission.

3.2.1.1.7 Cable launching

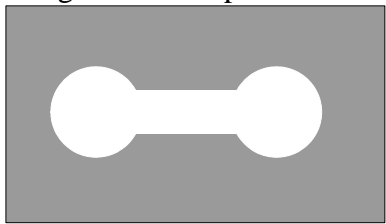
Cable launching inside an active ATZ or to a height of 60m above ground required CAA Tow site permission.

Permission allows towing to take place only in accordance with approved operating procedures (BHPA technical manual) and the maximum height which is set by the CAA in the written permission

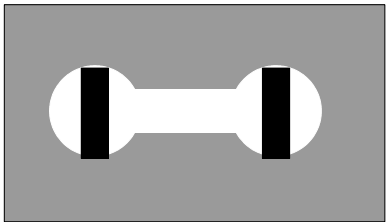
### 3.2.1.1.8 Markings at Aerodromes

#### 3.2.1.1.8.1 Signals and markings at the signals area

A signals area is positioned near to the control tower at aerodromes to allow messages to be passed to the pilot without the use of radio.



A white dumb bell signifies that movements of aeroplanes and gliders shall be confined to paved, metalled or similar hard surfaces.



The addition of black stripes in each circular portion of the dumb bell at right angles to the shaft signifies that aeroplanes and gliders taking off or landing must do so on a runway but that movement on the ground is not confined to hard surfaces.

#### 3.2.1.1.8.2 Gliding signals

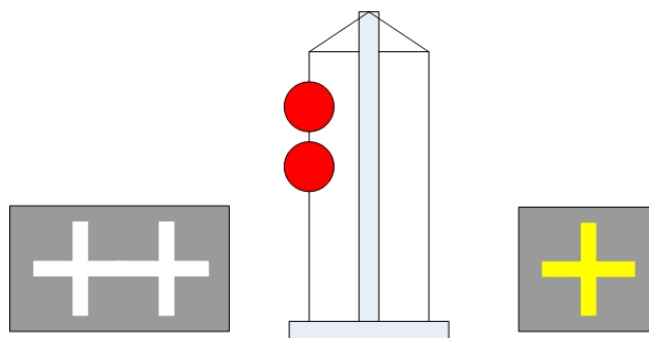


Figure 5 - Gliding signals at aerodromes

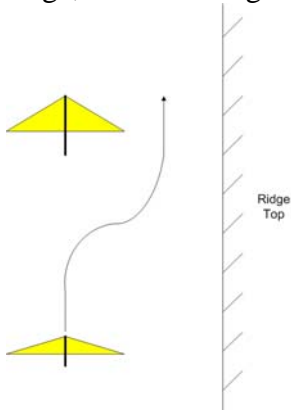
A double white cross and/or two red balls suspended from a mast one above the other signify that glider flying is taking place at the aerodrome.

A yellow cross indicates the tow rope dropping area

### 3.2.1.2 Rules of the road and recommendations

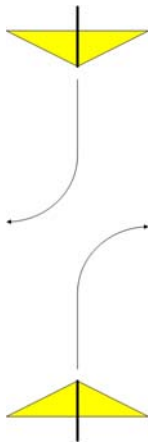
#### 3.2.1.2.1 Overtaking

When overtaking when ridge soaring, if you are the faster glider wanting to overtake a slower glider, you should pass between the slower glider and the ridge, thus allowing the slower glider to turn away from the hill if required.



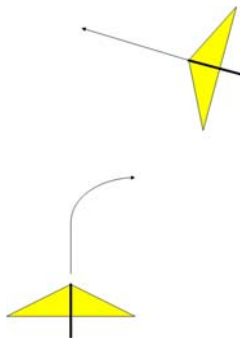
If you are a glider in free air however, you may overtake by turning either left or right of the slower aircraft.

#### 3.2.1.2.2 Meeting head on



When meeting head on, over very nearly head on, each aircraft must turn to the right (pass port to port)

#### 3.2.1.2.3 Aircraft Converging



When converging, the one which has the other on its right must give way, avoiding crossing ahead of the other unless passing well clear (on the right, in the right).

#### 3.2.1.2.4 Gliders landing

In the case of 2 or more flying machines, gliders or airships approaching any place for landing, the lower aircraft has right of way (although it must not cut in front of, or overtake another which is on final approach).

A flying machine must after landing move clear of the landing area as soon as possible.

### 3.2.1.2.5 The right hand rule

The right hand rule is used by Cessna pilots when following obvious land features such as a road or a railway to help them navigate across country. The right hand rule says that the aircraft should keep the line of landmarks on its **left** (unless otherwise advised by ATC).

### 3.2.1.3 Air Maps

Lots of questions on airmaps – make sure you know the symbols

#### 3.2.1.3.1 Types of airmap

Two type in airmap in common use for us.

The 1:500,000 scale or half million map.

- Shows approx 1 inch to 8 miles

The 1:250,000 scale or quarter million map.

- Shows approx 1 inch to 4 miles
- Only shows airspace with a base level below 5,000ft.

If you have both, look at Camphill on both maps. On the half million the airway with its lower level of FL65 is shown, on the quarter million it is not. An important difference.

#### 3.2.1.3.2 Symbols

You will know all these but just to recap..!

##### 3.2.1.3.2.1 Civil Aerodromes

All civil aerodromes below are shown on half million maps in BLUE



Civil Aerodrome

Usually have a name and airfield elevation (ASL) in feet in a box next to the symbol



Civil Aerodrome – limited or no facilities



Disused or abandoned aerodrome

Shown for navigational purposes



Civil Heliport

3.2.1.3.2.2 *Government aerodromes*

Government aerodromes are in MAGENTA



Government Aerodrome – available for civil use

UK AIP shows which ones can be used



Government Aerodrome – NOT available for civil use



Government heliport

3.2.1.3.2.3 *Microlight flying sites*

Shown in BLUE



Microflight flying sites.

3.2.1.3.2.4 *Gliding sites*

Shown in BLUE



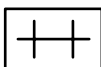
Primary winch launched gliding site

Height of max altitude of launch is shown (2,500ft) above mean sea level



Additional activity winch launched gliding site. Also shown as crosses on older maps as below

Height of max altitude of launch is shown (2,500ft) above mean sea level



Additional activity without cables

No height shown therefore no cables

3.2.1.3.2.5 *Hang/para sites*

Shown in BLUE

Note that foot launched sites are now **NOT** shown on airmaps



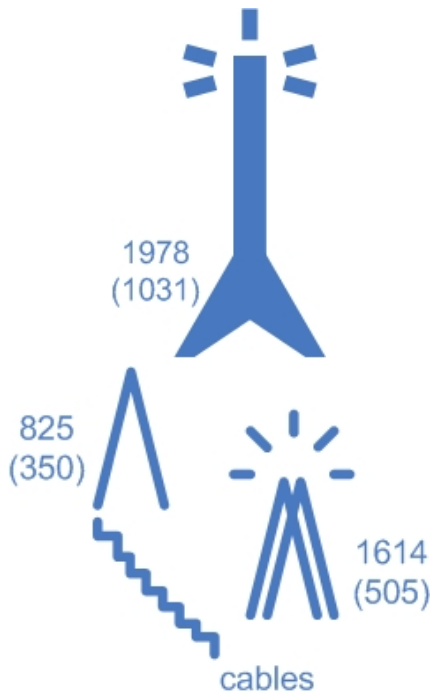
Winch launched hang/para site

Height of max altitude of launch is shown (2,500ft) above mean sea level

3.2.1.3.2.6 *Obstacles*



Shown in BLUE



Exceptionally high obstacles (lighted)

This is 1,978 ft ASL and 1,031ft AGL

1,00ft or more AGL

Single obstacle (unlit)

825ft AGL

Cables

Multiple obstacles (lit)

1614ft AGL

3.2.1.3.2.7 Drop zones

Shown in BLUE

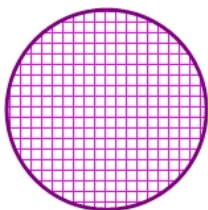


Free fall parachuting drop zone

Circle of radius 1.5nm or 2nm of the DZ up to FL150

3.2.1.3.2.8 HIRTA

Shown in MAGENTA

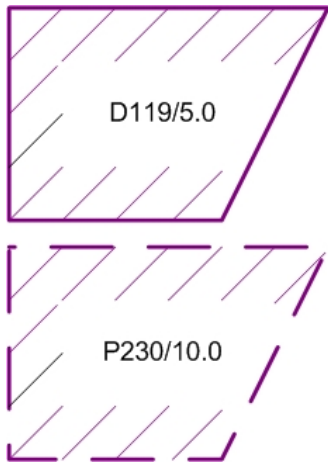


High intensity radio transmission

Do NOT enter

Areas with radius of 0.5nm or more have a name and an effective height in thousands of ft

3.2.1.3.2.9 *Danger/Restricted/Prohibited areas*



D119 = danger area reference number 119 with effective height in thousands of feet.

D = Danger area  
R = Restricted area  
P = Prohibited area

Prohibited area 230 effective up to 10,000ft

A solid outline is active all the time; Areas with pecked outlines are activated by Notams.

Do not enter Notamed areas unless you know them to be inactive.

3.2.1.3.2.10 *Bird sanctuaries*

Shown in BLUE

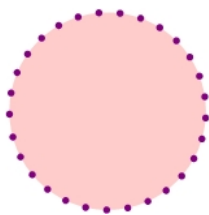


Bird sanctuaries

Do NOT enter

Shown with name and effective altitude in thousands of feet

3.2.1.3.2.11 *ATZ*

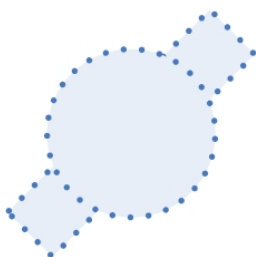


Shown as magenta dots with a magenta tint

Do NOT enter

The blue or magenta aerodrome symbols are shown within the overall ATX delimitation

3.2.1.3.2.12 *MATZ*



Shown as blue dots with blue tint

Will usually have a magenta ATZ inside.

### 3.2.1.3.3 Compass use on a map

XC flying a compass is a must. Note that a 1 degree error in track will put you out a mile in 60 miles.

#### 3.2.1.3.3.1 Deviation

Deviation is the effect that the airframe has on the compass. This can lead to errors if uncorrected. Some compasses for gliders have internal magnets used to correct for this.

#### 3.2.1.3.3.2 Variation

This is the difference between real North and the North that the compass points to i.e. the difference in degrees between true North and magnetic North. This moves very slowly and compass North is about 5 1/2 West of true north. Because of this difference you need to understand variation.

On most maps there will be some indication of the variation between true North and magnetic North, either by a symbol or a statement to the suchlike "magnetic north at 1980 is 9 degrees West of True North decreasing by 1/2 degree per 5 years". So in the year 2000 you know that magnetic North is by now 1/2 degree x 4 years = 7 degrees West of True North.

When taking bearings off maps, you will be using the map grid as a reference so if you want to use this as a flying bearing with a compass, you need to convert between the two and I remember it with the phrase "MUGS" or "Magnetic Unto Grid Subtract". So, if you take a bearing from a map and to get from point A to point B the grid bearing is 207 degrees, then in our example in the year 2000 we need to Add 5 degrees to give us a magnetic bearing of 212 degrees to fly by compass.

#### 3.2.1.3.3.3 Isogonals.

Isogonals are lines joining points of equal magnetic variation.

### 3.2.1.4 Low flying rules

Certain rules exist for low flying. There are exceptions for gliders and these are listed below

#### 3.2.1.4.1 Flight over congested areas

A congested area in relation to a city, town or settlement means any area which is substantially used for residential, industrial commercial or recreational purposes. An aircraft must not fly over a congested area:-

- Below a height that would allow it to glide clear of the area
- Less than 1500ft above the highest fixed object within 600m of the aircraft, whichever is higher

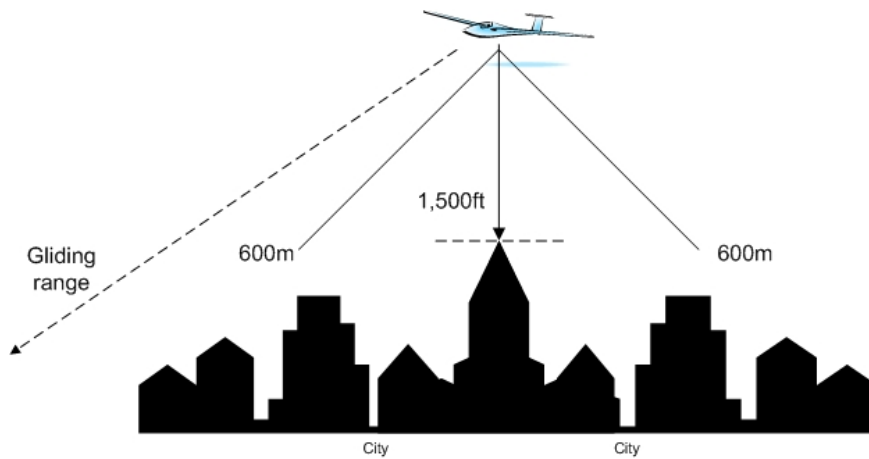


Figure 6 - Flight over congested areas

### 3.2.1.4.2 Large open air gatherings

No aircraft may fly over or within 1000m of an open air gathering of more than 1,000 people except with the permission of the CAA.

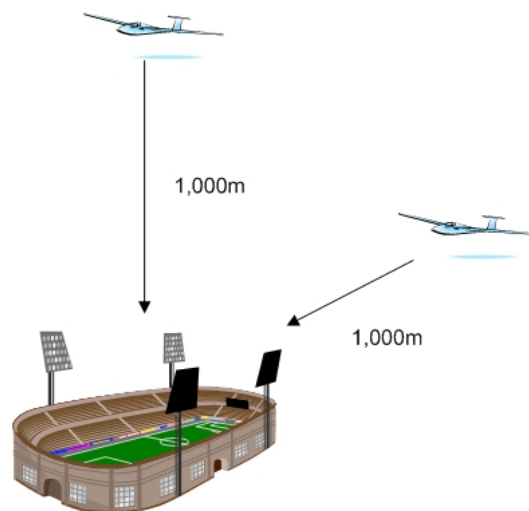


Figure 7 - large open air gatherings

### 3.2.1.4.3 The 500ft rule

An aircraft must not fly closer than 500ft to any person, vessel, vehicle or structure. This does not apply to gliders hill soaring nor to any aircraft taking off or landing in accordance with any normal aviation practice.

### 3.2.1.5 Radios

#### 3.2.1.5.1 Legal types

There are 2 types or radio commonly in use in hang gliding and paragliding.

##### 3.2.1.5.1.1 Air-band

The air-band radio is the only legal means of communication from the air. The air-band radio is AM and has 720 channels, of which gliders are allocated 5. The air-band radio must be type approved. This means that the maker must have submitted a radio of the same type to the CAA who have then taken it to bits and said it's OK to use. Without taking a Radio telephony (RT) test, glider pilots are limited to 5 frequencies (129.9, 129.975, 130.1, 130.125, 130.4 and the International Distress frequency of 121.5). The British Gliding Association recommends that certain frequencies be allocated certain tasks such as ground to air etc.

Radios used by glider pilots in this way must be type approved and lockable to those frequencies only. The CAA has approved the allocation of 118.675 for exclusively our use. This is OK for our use anywhere in the UK FIR up to 5,000ft asl. Approval for the radio type must be sought and a license held for the radio.

#### *3.2.1.5.1.2 2 Metre Band*

In the UK, Radio Amateurs have the use of many frequency bands including 144 to 146 MHz on FM. There are numerous hand held sets available for this band. This entire band is in use. It is possible to "open up" the transmit and receive capabilities of some hand helds to operate out of band. A lot of pilots use the frequencies just below this range for flying use but unlawful use is prohibited. It is illegal to use a 2m set from the air, whether you are a licensed amateur or not.

### **3.2.2 Altimeter settings**

Vertical distances are hard to measure accurately. Most altimeters work by measuring the change in air pressure as you gain height. Pressure reduces about 1 millibar (1mb) per 30ft of height gained. At higher levels this relationship is not linear but good enough for us. Note that millibar is the same as hectopascal. Hectopascal might be used in more metricated countries - it means the same - but in the UK, the millibar is more commonly used at present.

Pressure also changes as air pressure systems - lows and highs - move across the country. Since the air pressure in Scotland may be quite a bit different from the South of the UK, the UK is split into Altimeter Setting Regions (ASR's). These are shown on the air chart. An airline pilot flying from one region to another will check the altimeter setting and readjust if necessary to take account of the general change in air pressure as he flies across the UK.

There are 3 methods of height representation.

#### **3.2.2.1 QNH**

QNH is given by Air Traffic Control (ATC) as a pressure reading that the pilot sets on his expensive altimeter. The altimeter then displays his height above Sea level. The ATC will broadcast the regional QNH to aircraft to take account of

pressure changes caused by atmospheric conditions to make sure the pilot does not crash into a hill unexpectedly.

Imagine a deep low over the UK and the pilot is flying from the outside of the low (where the pressure is higher) to the inside of the low (where the pressure is lowest), If the pilot keeps to the same displayed altitude on his altimeter as he flies into the low what happens. As the pressure outside the aircraft falls, the altimeter will show a higher altitude (lower pressure = higher altitude) and so the pilot will descend the keep the displayed altitude the same. The pilot does not know he is descending since he is watching his altimeter and its reading the same. Unfortunately for him, he is descending!! The premise is that an altimeter will reference a pressure so in order to keep a constant height; the altimeter needs to reference a constant pressure.

So QNH is a pressure setting given by ATC and is the current pressure reading at Mean Sea Level.

### **3.2.2.2 QFE**

If our pilot is landing at a small airfield with not many facilities, then QNH might not be accurate enough for him to land without hitting some houses maybe. The pilot needs the pressure setting for the airfield. ATC might say "QNH is 1015mb, QFE is 1000mb". I.e. the air pressure at this airfield is 1000mb. So by setting the altimeter to this, the pilots get the height above the airfield.

So QFE is a pressure setting by ATC and is the current pressure reading at the airfield now. In general, when we say QNH it is the height above sea level, and when we say QFE is it the height above "the field", maybe takeoff or landing - it's up to you

### **3.2.2.3 QNE**

This one is the strange one. QNE refers to the height indicated on a pressure altimeter when the aircraft is on the ground at an aerodrome and the pressure setting of 1013.2mb (remember this) is set on the sub scale. I.e. it is the height of the 1013.2mb pressure level. Note that this is the only reference which is a height, the others are pressure settings.

It is used when the height of the aerodrome is beyond the range of adjustment of the Boeings altimeter scale. It is sometime displayed on some altimeters but erroneously. The setting on the altimeter you might have would display flight level

### **3.2.2.4 Flight Levels**

Shown on charts as FL something. FL65 is flight level 65 which is 6,500ft. Why have it?

Airlines flying everywhere would have to keep adjusting their altimeter every 10 minutes to make sure that the height they should be at is the height that are indeed at and not at the height displayed by their altimeter which has drifted out of alignment in the last 5 minutes due to rapidly changing air pressure outside the cabin. Since all aircraft, once they are high enough can forget about the ground - it's more important to keep away from each other in terms of vertical separation, so they all use the same pressure setting on their altimeters. The International Standard Atmosphere (ISA) sea level pressure of 1013.2mb is used and then vertical position is called flight level. As an aircraft climbs away from the airport, once past the transition altitude, he retunes his altimeter to 1013.2mb and so every else who does the same can keep accurate relative distances apart.

It is worth remembering that flight levels go up in regions of high pressure and the go down in regions of low pressure. Thus in a deep depression, Buxton (first stop after Shining Tor) which is in Daventry Control Area, Class A airspace starts at flight level 45, could have its airspace lower limit reduced to 4,000 ft asl - worth knowing. You can work this out if you know the sea level barometric pressure. For example, in summer in a high pressure, the sea level barometric pressure may be 1040mb. We know that Flight levels are referenced against the ISA which is 1013.2, so in the example, the pressure increase over the ISA at sea level is  $(1040-1013.2 = 26.8\text{mb})$

This difference equates to a height (1mb = 30ft) of  $(26.8 \times 30 = 804\text{ft})$ . So the flight level of say FL60 will not be at 6,000ft but will have risen to 6,804ft.

### 3.2.3 Crashes and incidents

Any incident involving serious injury must be reported to, the CAA, the police and the BHPA

### 3.2.4 Glossary

Name	Description
AGL	Above Ground Level
AIAA	Area of intense Aerial Activity
AMSL	Above Mean Sea Level
ATC	Air Traffic Control
ATZ	Aerodrome Traffic Zone
FIR	Flight Information Region
HIRTA	High Intensity Radio Transmission Area
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
MATZ	Military Aerodrome Traffic Zone
Notam	Notice to Airmen
Purple airways	The old reference to Royal flights and the airspace that surrounded them – a no go area
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VRP	Visual Reporting Point

#### **4. Sitting your AP exam**

When you are ready to take the exam tell your coach and he will ask the BHPA for the paper – you need to tell the coach your BHPA number and Elaine at the BHPA will send a paper to the coach. Bring a pencil, pen, calculator, your pilot task book with the page for the AP rating filled in (be confident!) and a cheque for £10 made payable to the BHPA. Make sure the coach has a quiet place for your exam and when you take it - YOU ARE READY!

AP exams can only be invigilated by AP coaches – so make sure the coach should be AP rated else the BHPA might invalidate your hard work.

#### **5. Passing your AP exam**

Make sure you have done your flying tasks and they are in your log book so the coach can sign them off – hardest tasks in the UK...definitely the out and return. Remember a 20km out and return is 10km out and then 10km back. I did mine in France; best bet in the UK is a long ridge run but in the Alps, it's easy to do on a good day. If you do a good flight on a holiday, then get it signed off for posterity even if you are not ready for your AP exam so your AP tasks are sorted for the future.

Make sure before the exam you know your airmap inside out – revise airmap and map symbols till it comes out of your ears and you will be OK.

Do the exam technique of reading the paper first, then selecting the questions you are dead sure about and answering those, then move onto the not so sure questions and work the percentages, then at the end check and double check your answers to make sure you are not out of step on your multiple choice answers.



## 6. Revision History

Issue	Date	Comments
1	Feb 2004	First Issue

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