Gordon Bishop
Derbyshire Soaring Club

Pilot Rating - Airlaw

Can you cross this town?

Is this safe?

What should you do here?

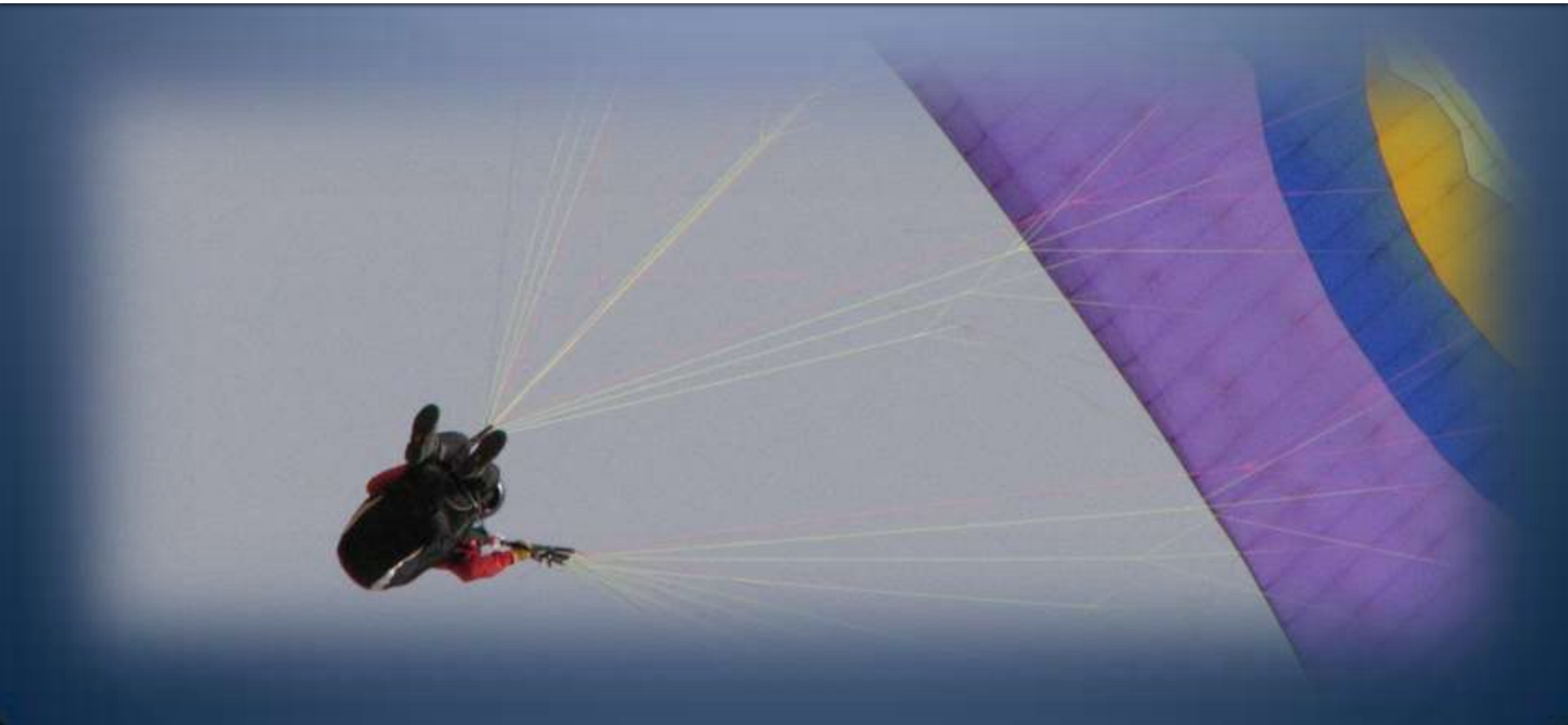
GLOSSOP
1791
1296
1348
Marple
1073
2087
1562
1805
1765
SHEFFIELD
ROTHERHAM
NDB SMF 333
EGSY SHEFFIELD/City
TDME 111.35
VRP SALE WATER PARK
EGCC
MANCHESTER 257
MCT 113.55 DME
MANCHESTER/ Woodford
EGCD
VRP HILLTOP
VRP ROSTHERNE
NDB MCH 428
TDME 109.5 111.55
NDB WFD 380 TDME 109.15
E/E VRP THELWALL VIADUCT
WARRINGTON
E/E VRP STRETTON AD
MAN CTR SFC-3500'
LOW LEVEL ROUTE MAX ALT 1250' MAN QNH
Lymm
Knutsford
VRP ALDERLEY EDGE
VRP JODRELL BANK
Northwich
MACCLESFIELD
radio telescope
CRANAGE
Holmes Chapel
salt mine
WHI 368.5
1345
Whaley Bridge
1663
1545
CAMPHILL 1350
1407
Hathersage
1500
1035
KITES
660 cables to 1200' AGL
COAL ASTON
Dronfield
731
Clowne
CHESTERFIELD
Baslow
Chatsworth Hse
Bakewell
VRP BUXTON
quarries
1834
1795
1810
1437
1683
§D314/2.9
§D304/3.5
DAVENTRY CTA FL45+
DAVENTRY CTA A FL55+ (MNM ALT 3500')
TMA A 3500'+ SFC-3500'
MAN CTR D
Winsford
Middlewich
VRP ASHCROFT
Sandbach
VRP CONGLETON
ARCLID 262
E/E WOODFORD
1657
1604
1519
LEEK
MAN TMA A 3500'+
Biddulph
Endon
1165
Alsager
Kidsgrove
CREWE
Nantwich
DAVENTRY CTA A FL45+
STOKE-ON-TRENT
908
774
CTA D FL75-FL85
MATLOCK
CTA D FL55-FL85
1306
DAVENTRY CTA A FL55+
Parwich
1243
Carsington Water
Wirksworth
1030
TNT 115.7 DME
978
CTA D FL75-FL105
1040
NOTTINGHAM E MIDS CTA D FL55-FL105
HILCOTE
Cross
1204
614
1097
CALTON MOOR 990
ASHBOURNE
1220
NOTTINGHAM E MIDS CTA 4000'-FL55 D
Belper
CTA D 4000'-FL105
Duffield
theme park
513
459
E/E LONG EATON LANE
Audlem
Woore
Aerials Cheadle
Alton Towers
830
709
833
2°W
ROCESTER 295
DARLEY MOOR
604
532
DAVENTRY CTA A FL55+
NOTTINGHAM E MIDS CTA D 2500'-FL55
DERBY
BROOK Fm
CHURCH BROUGHTON
CTA D 3000'-FL55
CTA D 3500'-FL45
CTR D SFC-FL55
CTR D SFC-FL105
436
607 (328)
Ashley
816
DAVENTRY CTA A FL55+
D211/12.4
Stone
571
TERNHILL 272
EGOE
Uttoxeter
524
Tutbury
EGBD DERBY
ARDEN HOUSE Fm 320
Eccleshall
Hodnet

Plan for the Evening

- Documents
- Altimeter Settings
- Zones and Airways
- Reading Airmaps
- VMC/VFR & IMC/IFR
- Rules of the Air
- Compasses & Radios
- Abbreviations
- More Information

Documents and Promulgation

What stuff is around and how we find it!



Aviation Law in the UK

- Enacted by parliament and published in statutory documents
  - Air Navigation Order (ANO) - Main one
  - Air Navigation Regulations
- Authority responsible for Civil Aviation in the UK is the CAA (Civil Aviation Authority)
  - Aeronautical Information Service (AIS) to collect and disseminate information (www.ais.org.uk)
  - 3 documentation channels…

Aeronautical Information Publication (AIP) or the UK Air Pilot

- Essential information or instructions of a lasting nature
  - Airfields, Airways, Airspace
- Published in 3 volumes with a regular amendment service
- Booklet CAP85 is the digest, available from the BHPA

NOTAMs

- Notification to Airmen
- Contain information on any aeronautical facility, hazard etc
  - Class I -for urgent matters
  - Class II - for less urgent matters
- Notices of condition of airfields, changes in services, air shows, etc.
- Temporary Restricted Areas

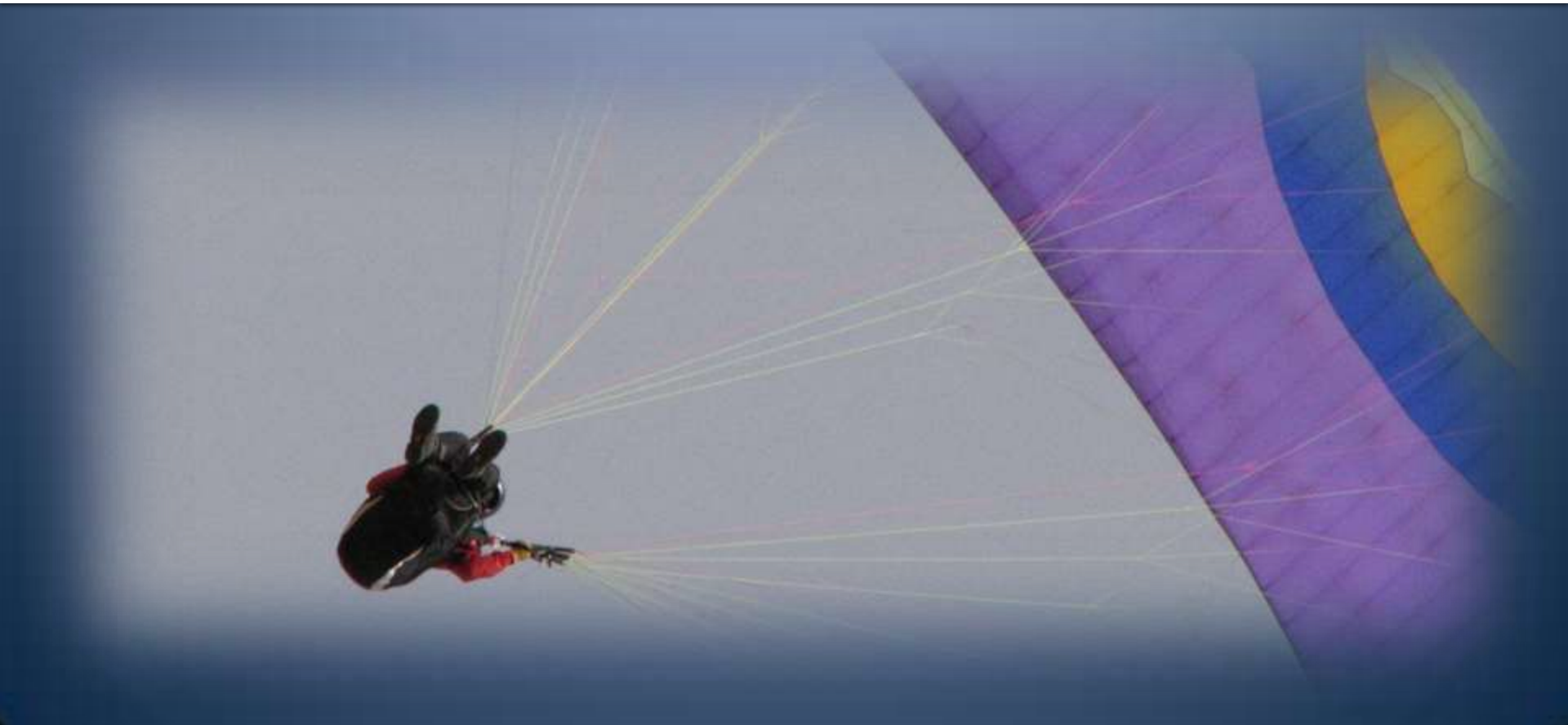
Aeronautical Information Circulars

- AICs
- Published monthly

- Advanced warnings of operational changes
- Changes of an administrative matter
  - Safety, Navigation, Technical, Administrative, Legal
  - Corrections or changes to the Airspace charts etc

Altimeter Settings

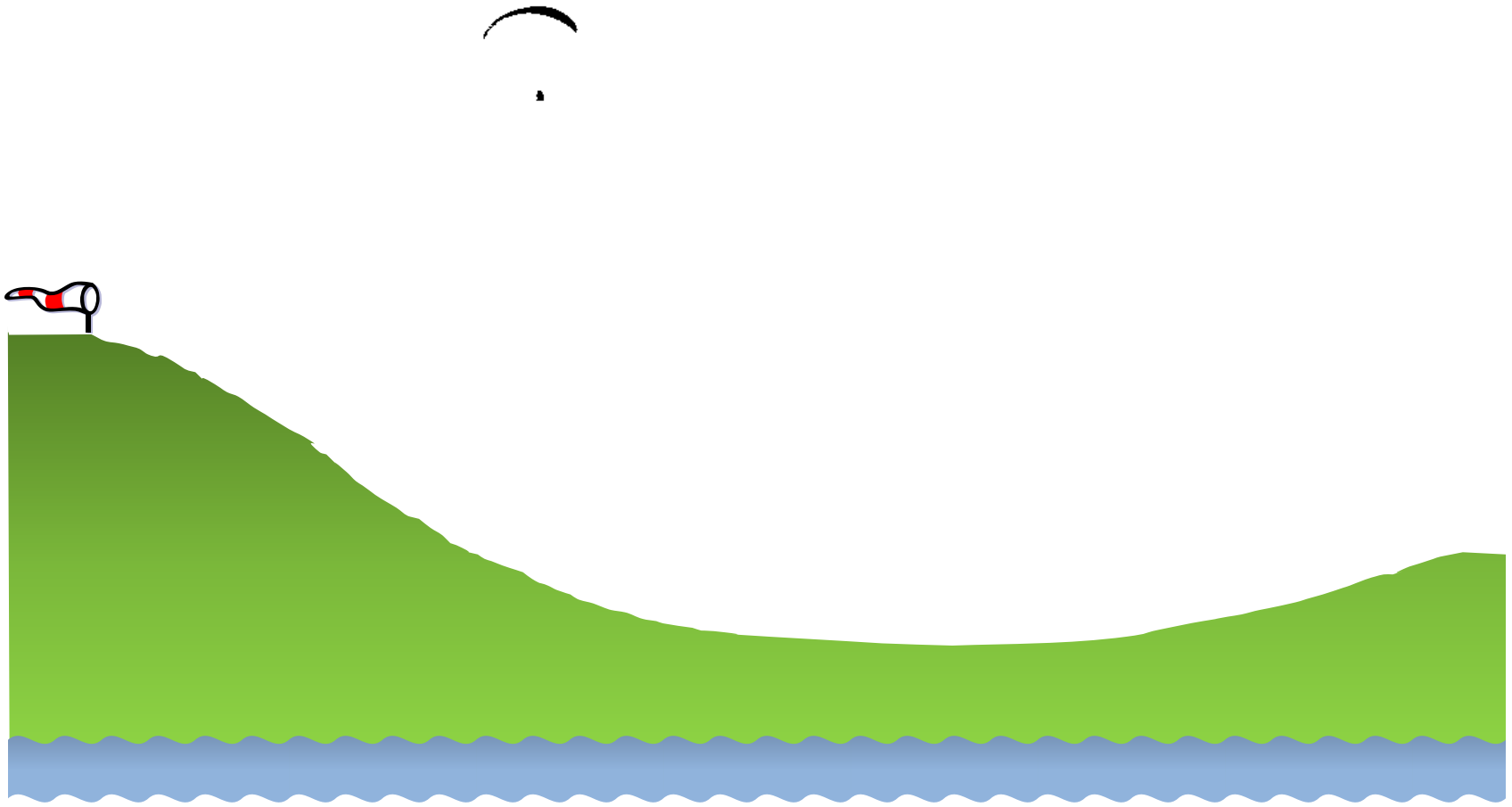
"Victor Bravo this is Golf Alpha circling at 1551 feet over my car"



Units

- ft - Feet
- m - Metres
- nm - Nautical Miles
- km - Kilometres
- mb - millibar (pressure)
- hPa - hectopascal 1mb = 1hPa

So How High Are You, Exactly?

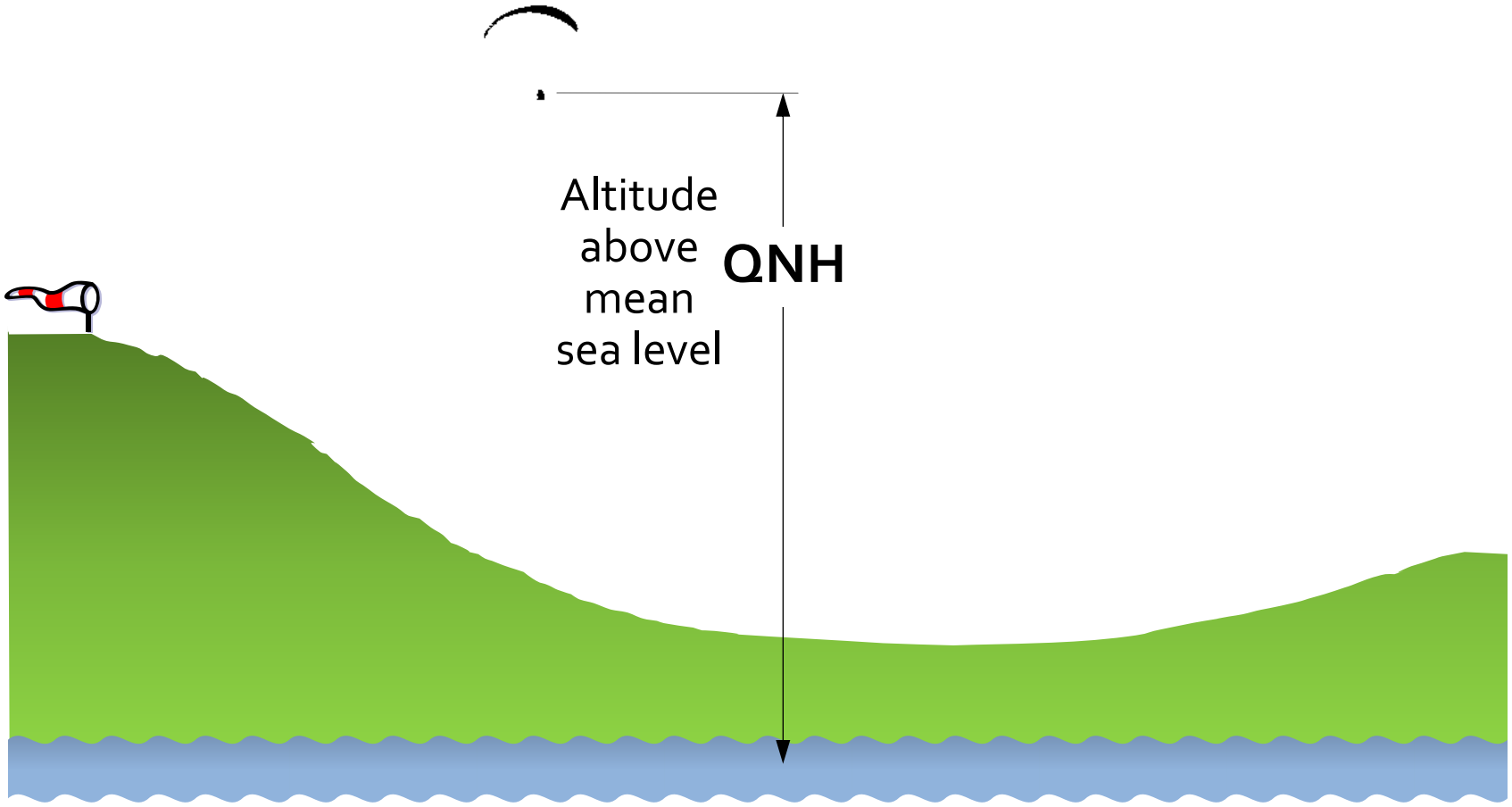


Altimeter Settings

- Measure change in air pressure as you gain height
  - Reduces about 1 millibar (1mb) per 30ft of height gained
- Pressure also changes with weather systems
  - UK split into Altimeter Setting Regions (ASR's)

- Average air pressure 1013.2mb at sea level
- AMSL - Above Mean Sea Level

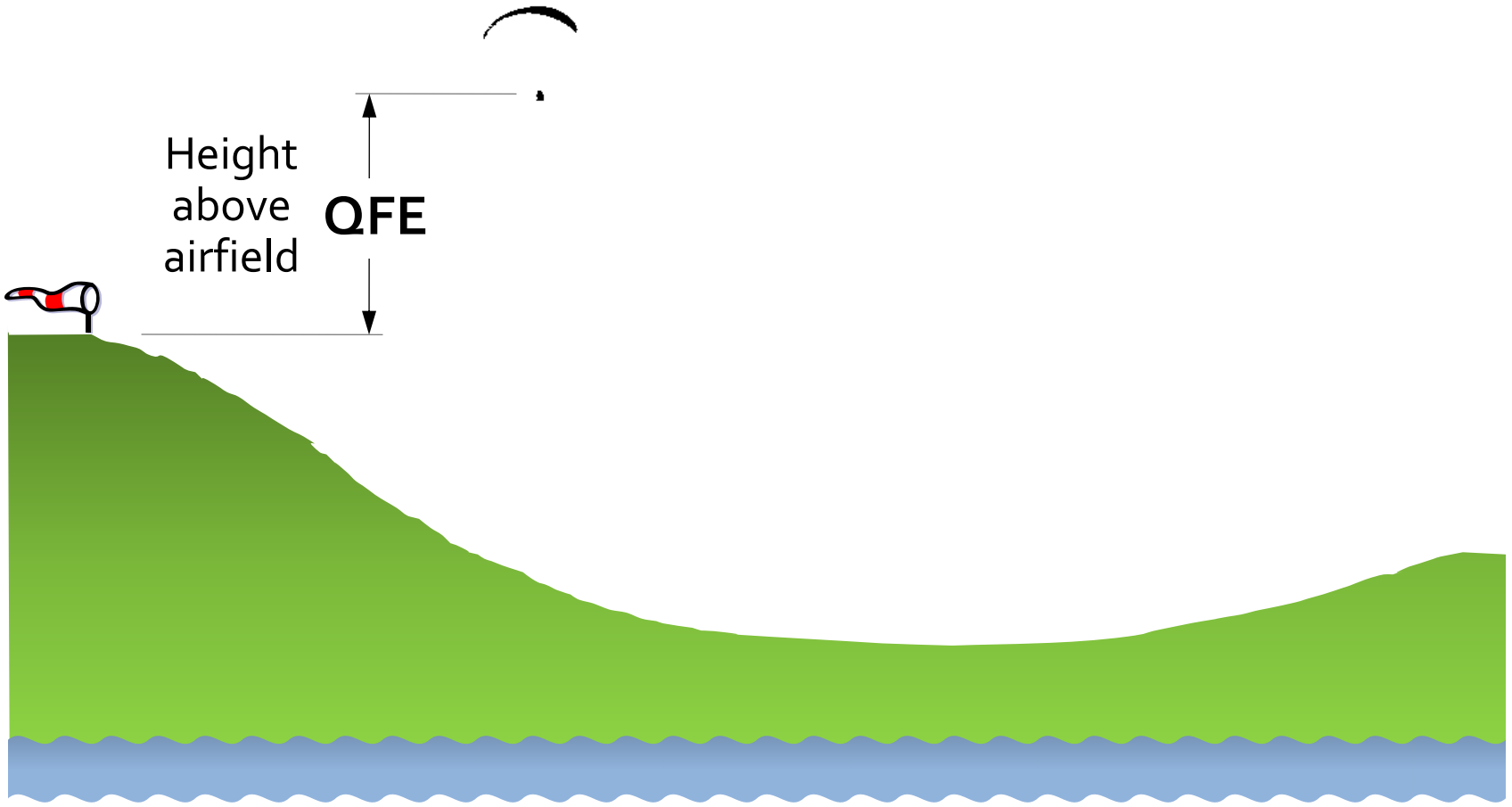
QNH



QNH

- QNH given by Air traffic control
- Current pressure reading at Mean Sea Level - pilot sets it into his altimeter
- The altimeter then displays his height above Sea level

QFE



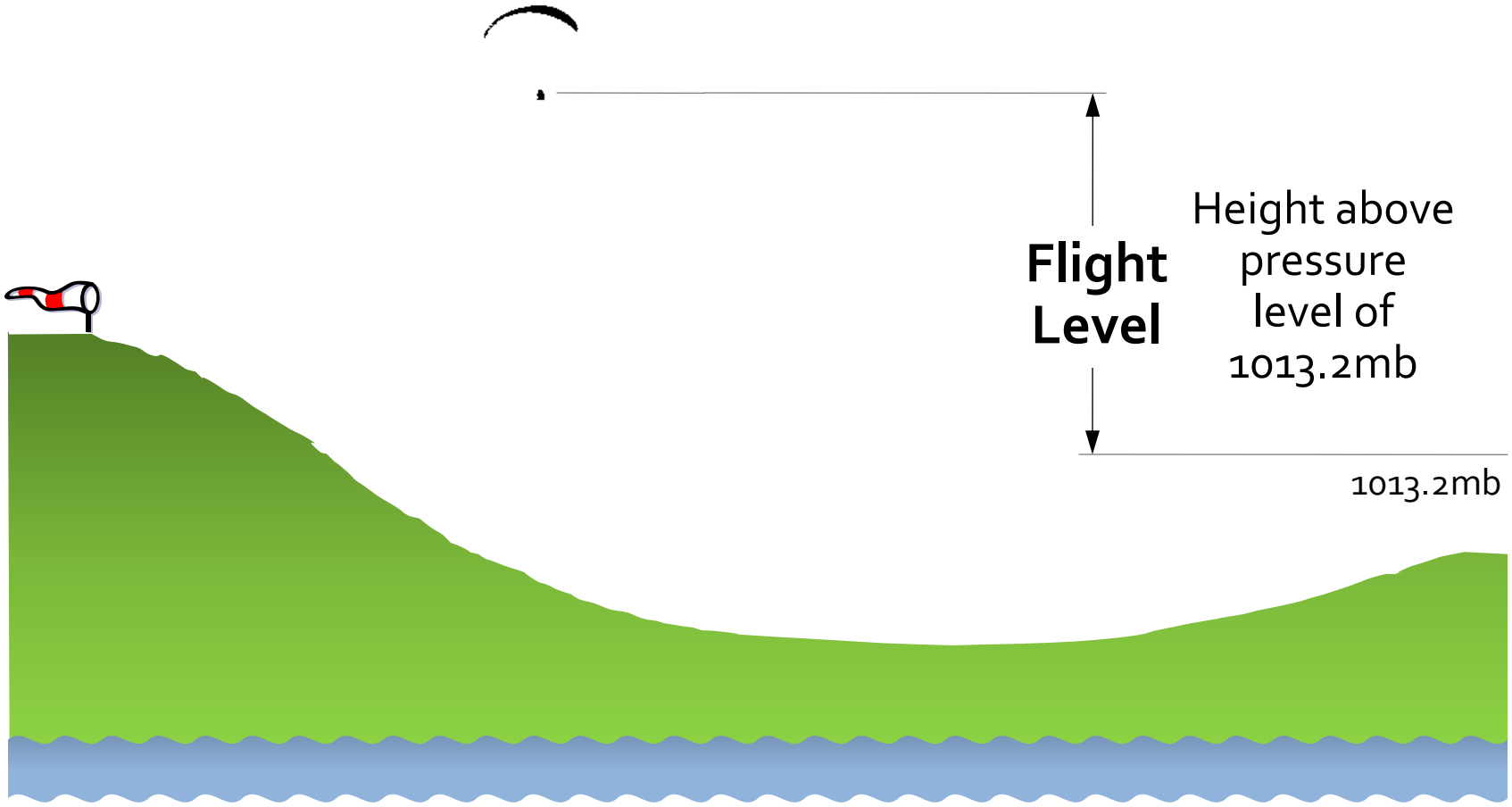
QFE

- QNH might not be accurate enough
- Pilot needs the pressure setting for the airfield.

- ATC might say "QNH is 1015mb, QFE is 1000mb
  - Air pressure at this airfield is 1000mb
  - Setting the altimeter to this, we get the height above the airfield.

- So QFE is a pressure setting by ATC and is the current pressure reading at the airfield now.

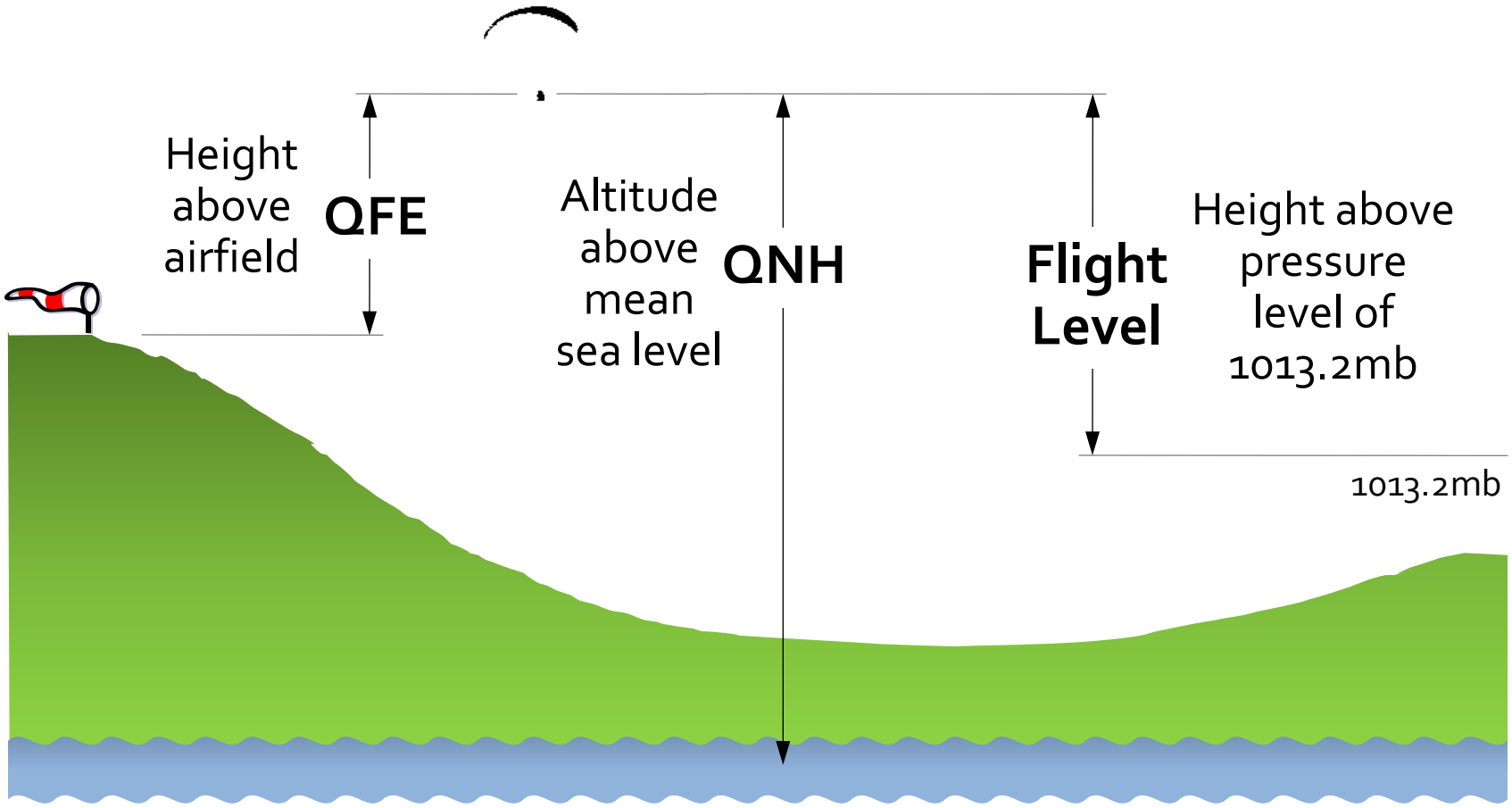
Flight Level



Flight level

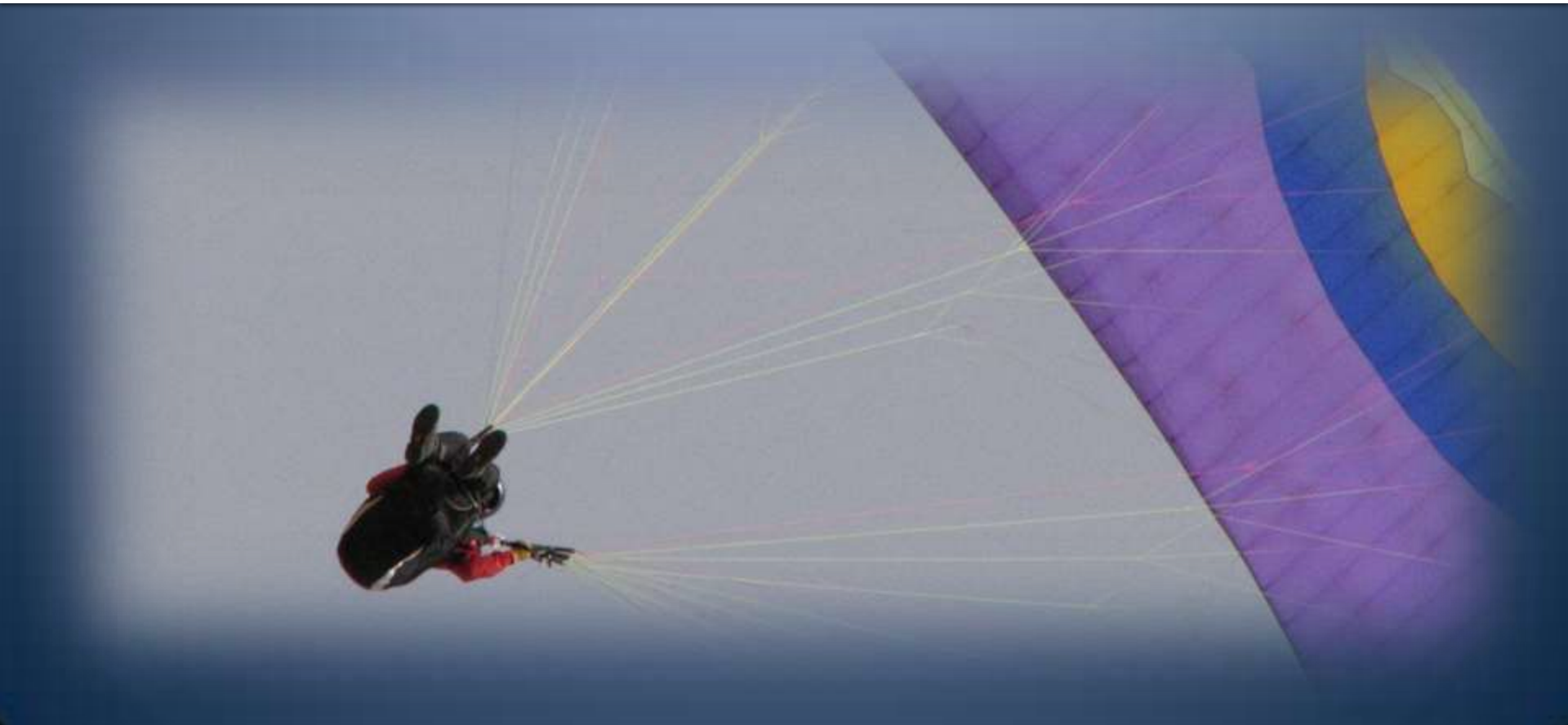
- FL65 is flight level 65 which is 6,500ft…ish
- When high enough can forget about the ground
  - More important to keep away from each other
- All use the same pressure setting on their altimeters. The International Standard Atmosphere (ISA) sea level pressure of 1013.2mb is used and then vertical position is called flight level.
- In the UK the transition altitude can be as low as 3,000ft
  - 6,000ft in some areas, including locally
  - 18,000ft proposed
- Flight levels go up in regions of high pressure and go down in low pressure

Altimeter Settings



Zones and Airways

More about where you can't go



Controlled Airspace

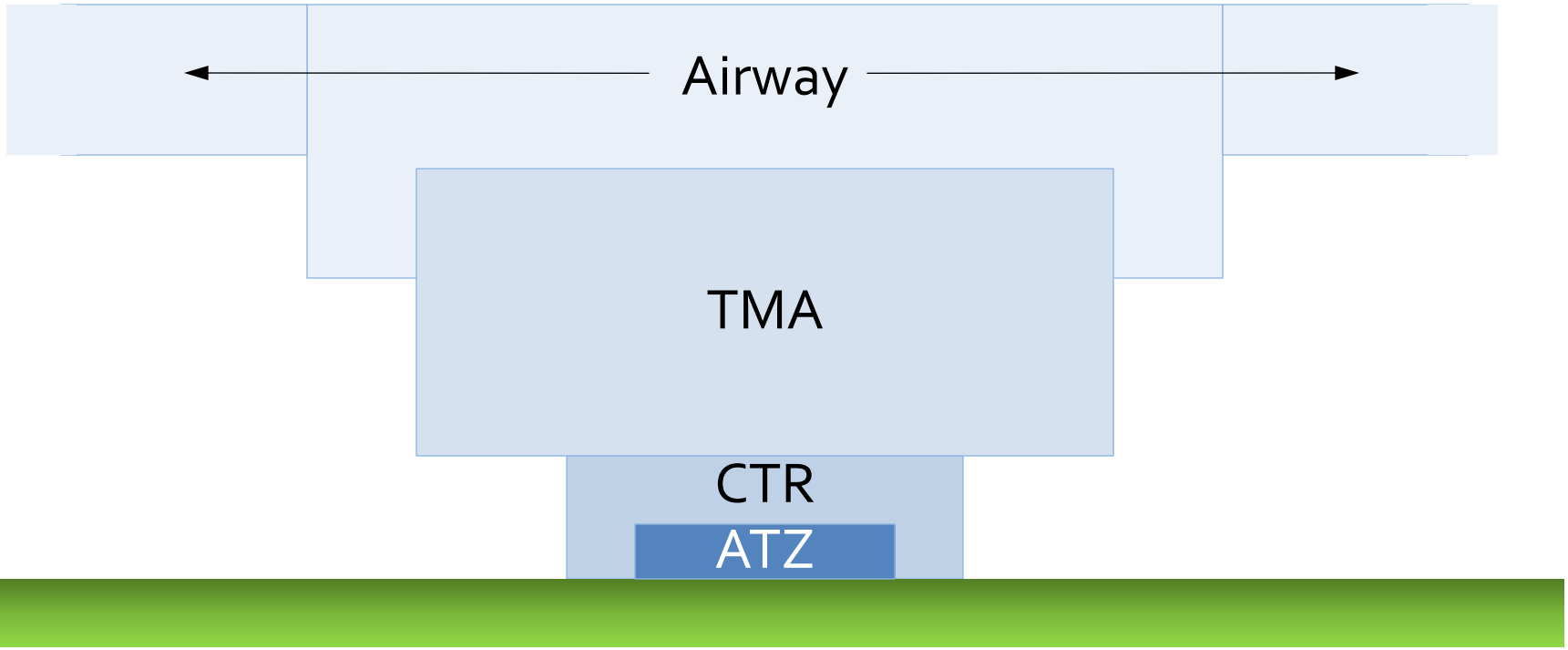
- Classes A, B, C and D
  Controlled by Air Traffic Control (ATC)

- Classes F and G - Uncontrolled

Controlled Airspace

- CTR - Control Zone - Around major airports - Surface upwards.
- TMA - Terminal Control Area - Controlling airways meeting over major airports
- CTA - Control Area - Other controlled area
- Airway - Controlled corridor marked by navigation beacons - 10nm wide

Controlled Airspace



Controlled Airspace

Royal Flights

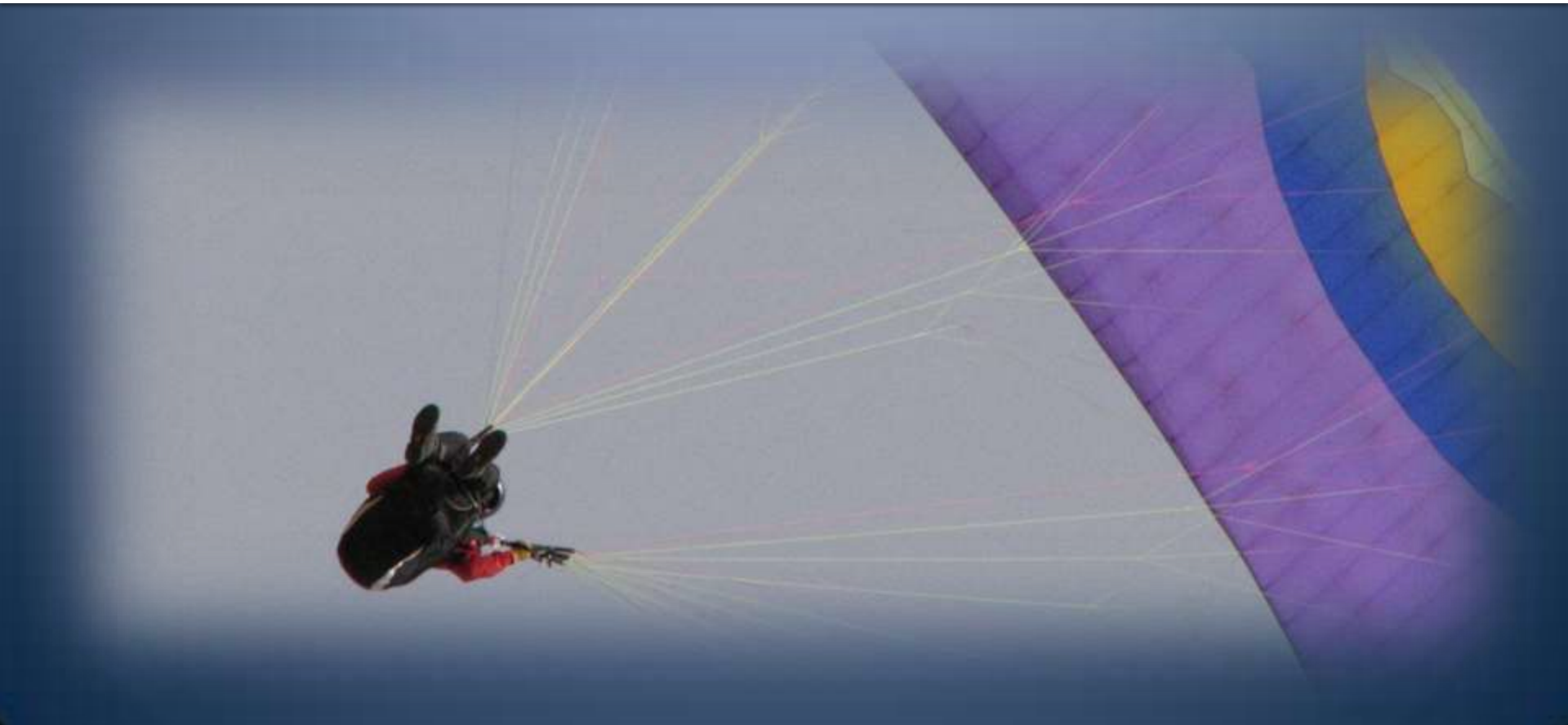
- Civil or military flight over the UK carrying principal members of the Royal Family

- **Fixed Wing**
- Conducted where possible in existing airspace
- Or temporary controlled airspace (CAS-T)
  - Class D Airspace
  - Not open to HG or PG

- **Helicopter flights**
- No special procedures are set up

VMC/VFR and IMC/IFR

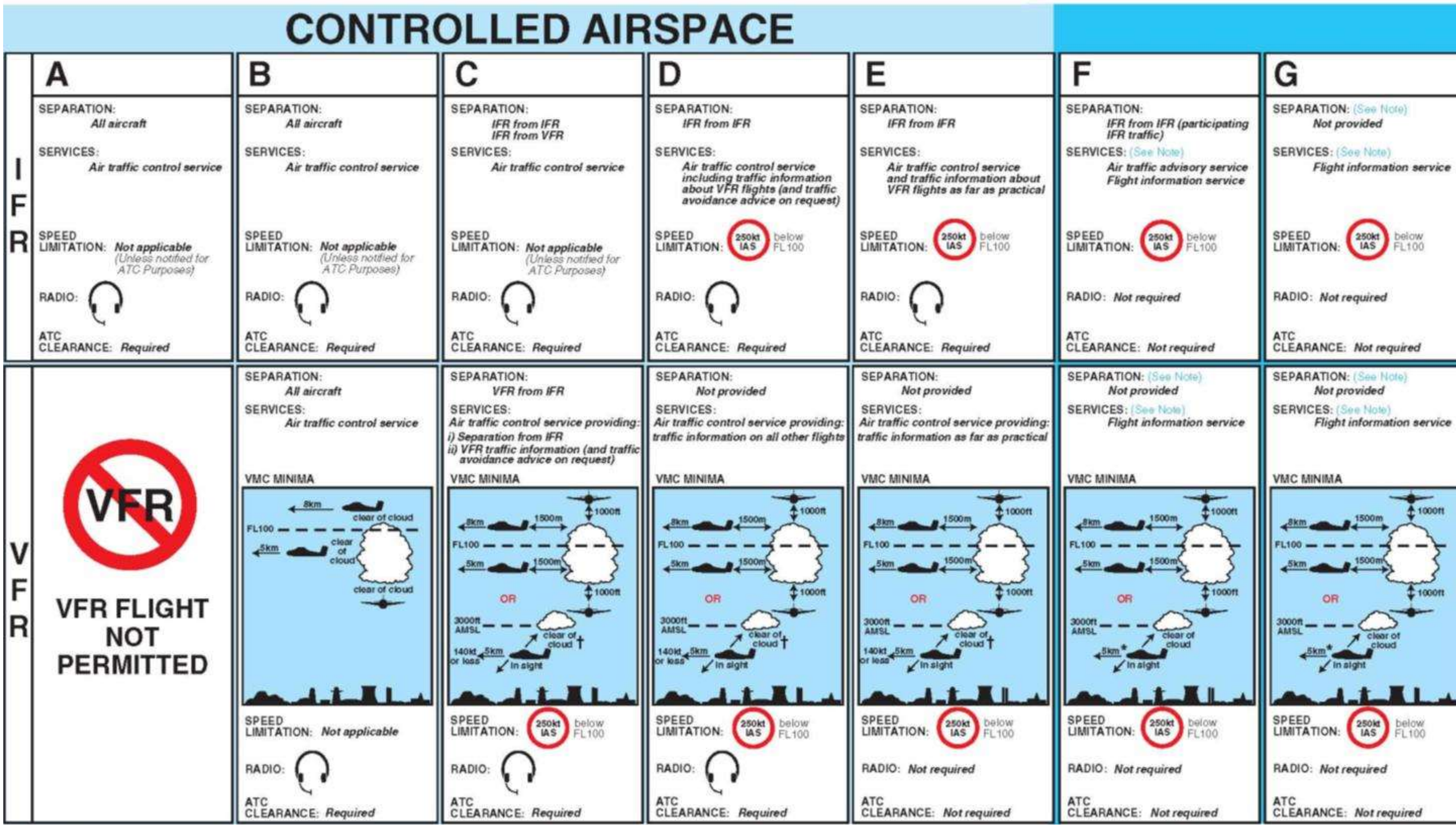
All I can see is white!



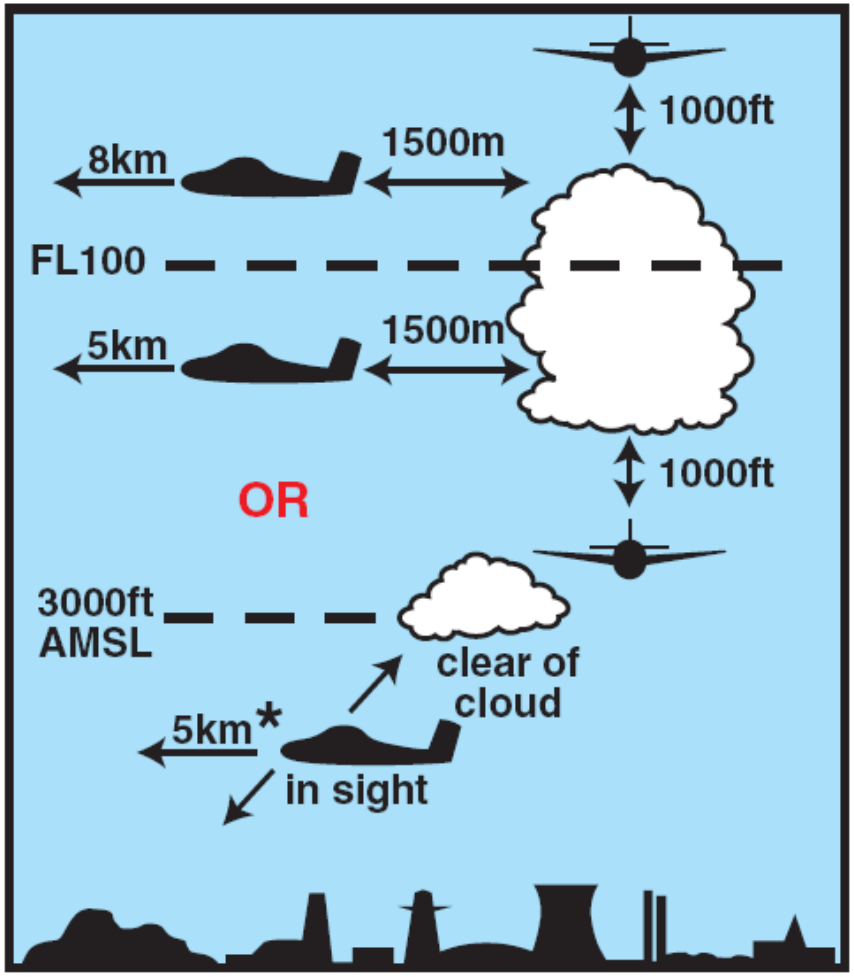
VMC/VFR and IMC/IFR

- Aircraft shall always be flown in accordance with either
  - VFR (Visual Flight Rules)
  - IFR (Instrument Flight Rules)
- When you are in Visual Meteorological Conditions (VMC) you can fly under VFR
  - See and avoid
- If you are not flying in VMC you are flying in Instrument Meteorological Conditions (IMC) under IFR
  - Rules are applied to ensure separation
- Note the different types of visibility that are needed in different types of airspace.

UK ATS Airspace Classifications



VMC - Classes F and G



- *At speeds of 140kt IAS or less flight is permitted in flight visibilities to 1500m

Night Flying

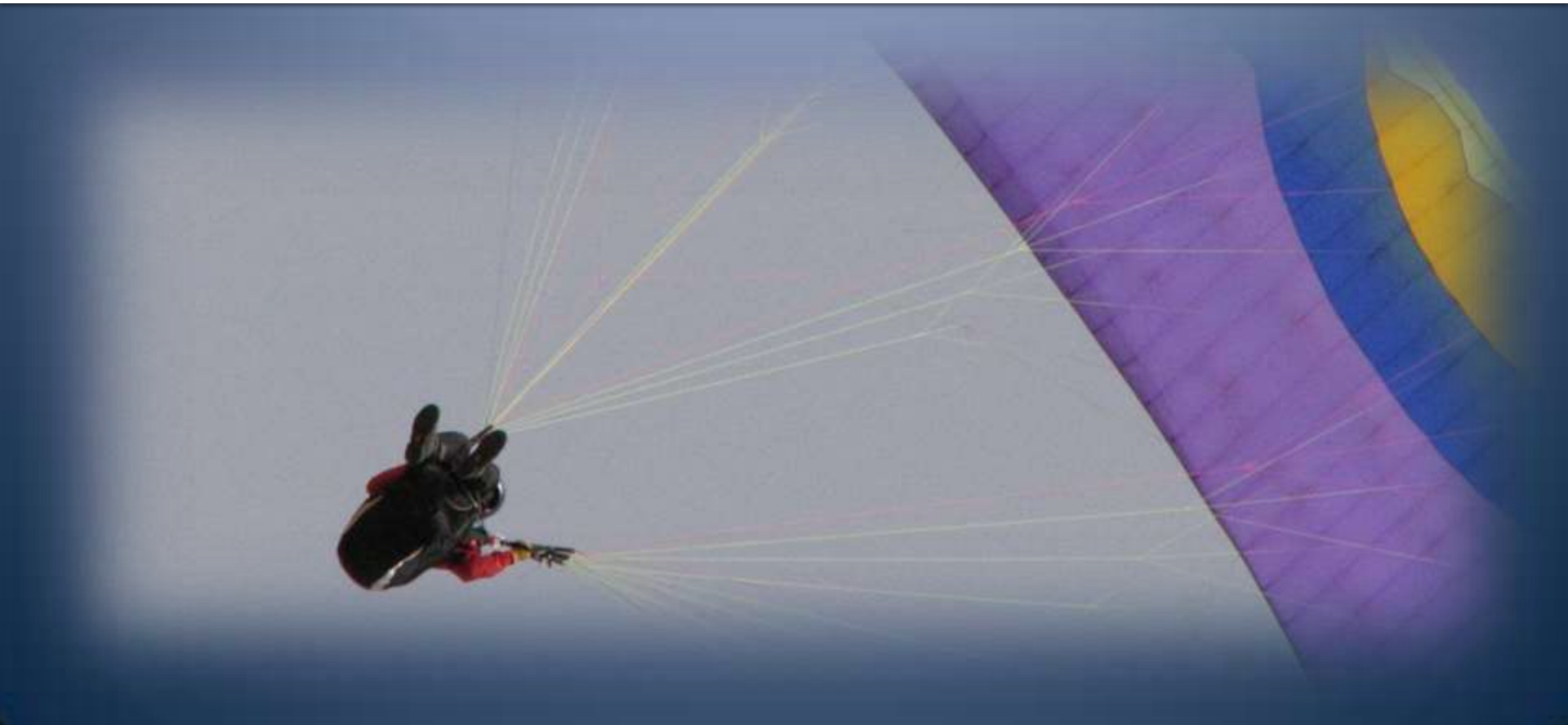
- Instrument Flight Rules - IFR

- 1/2 hour after sunset
- 1/2 hour before sunrise

- At night, aircraft must display lights as are specified for the particular category of aircraft

Reading Airmaps

Stay out of the red bits!



Flight Information Regions

- Scottish FIR
- London FIR
- UIR - Upper Information Region
- FL245 to FL660

UK Topographical Air chart

- Scale is 1:250,000 or about 1" for 4 miles
- This covers the UK in about 18 sheets.

- Only show airspace that has a lower limit below 5,000ft amsl or Flight level 50
- Of limited use if your flight goes above that altitude.

- Make sure you know the symbols and the airspace markings on this map

ICAO Aeronautical Charts

- Scale is 1:500,000 or about 1" for 8 miles

- Sometimes called the half million map
- Covers the UK in about 3 sheets

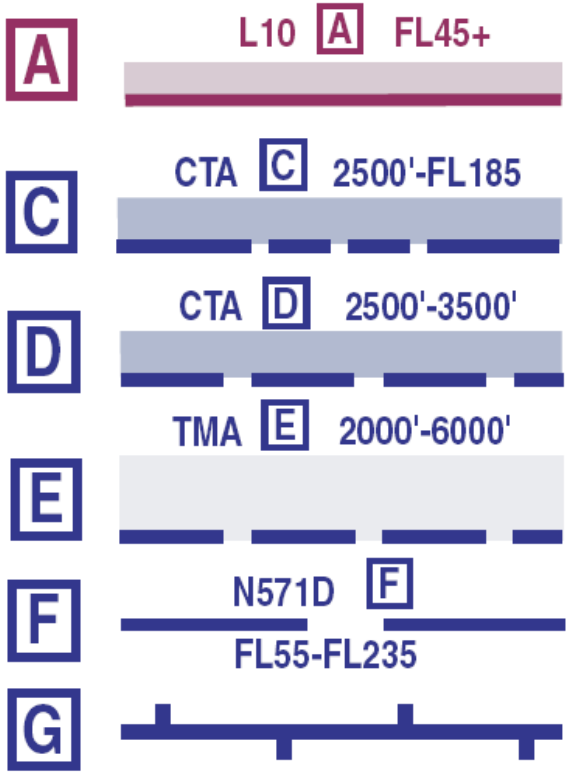
- Show all airspace and are the standard map to use.
- Make sure you know the symbols and the airspace markings on this map

Airspace Classifications

ANNOTATION OF VERTICAL LIMITS FOR CONTROLLED AIRSPACE WHICH HAVE AN UPPER LIMIT OF FL245 ARE SHOWN WITH A PLUS (+) AFTER THEIR BASE LEVEL/ALTITUDE, eg 3000'-FL245 IS SHOWN AS 3000'+. WHERE THE UPPER LIMIT IS BELOW FL245 BOTH BASE AND UPPER LIMITS ARE SHOWN.
AIRSPACE VERTICAL LIMITS ARE DEFINED BY ALTITUDE/FLIGHT LEVEL UNLESS OTHERWISE NOTED.
TINT BANDING DENOTES THE EXTREMITY OF CONTROLLED AIRSPACE. LINES WITHOUT TINT BANDING DENOTE LEVEL CHANGES WITHIN AREA.

FOR CHART CLARITY ONLY CENTRE LINE OF ADR's ARE SHOWN.....

ALL AIRSPACE NOT COVERED BY CLASSES A-F.....



Airmaps – Airfields 1

AERODROME - Civil.....

AERODROME - Civil, limited or no facilities.....

HELIPORT - Civil.....

AERODROME - Government, available for Civil use. See UK AIP AD 1-1-1.....

AERODROME - Government.....

HELIPORT - Government.....

MICROLIGHT FLYING SITES - Intense Activity also takes place at certain Licensed and Unlicensed Aerodromes. See UK AIP ENR 1-1-5.....

DISUSED or ABANDONED Aerodrome. Shown for navigational landmark purposes only. See AIC 56/02 (Pink 34) .....

ELEVATIONS of Active Aeronautical Sites are shown adjacent to the symbol. Shown in feet above Mean Sea Level..... 250 250

Airmaps – Airfields 2

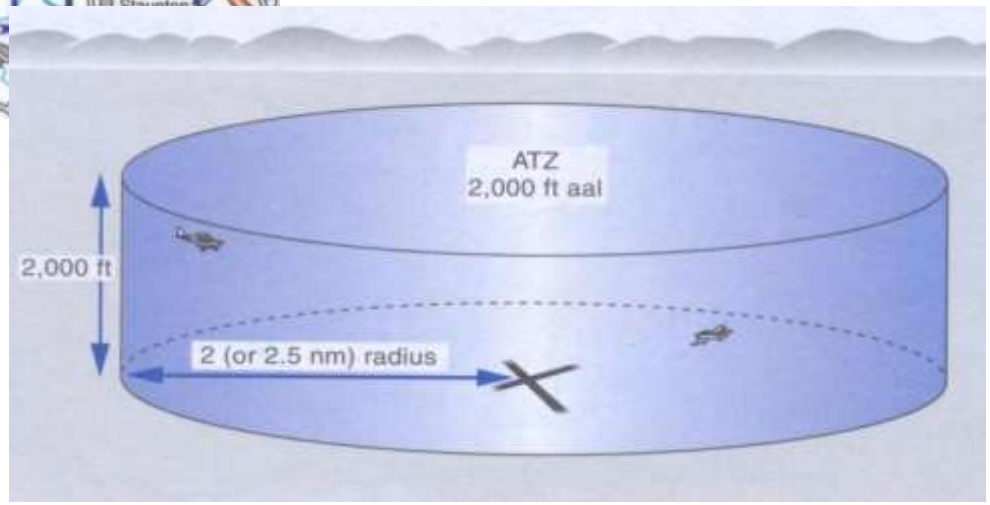
UNLICENSED AERODROME WITHOUT PERMISSION.
GLIDER LAUNCHING SITES. UK AIP ENR 1-1-5.

a. Primary activity at locations showing Maximum Altitude of winch launch. AMSL..... G/2.5

b. Additional activity at locations showing Maximum Altitude of winch launch. AMSL... O G/2.5

c. Additional activity without cables..... O G

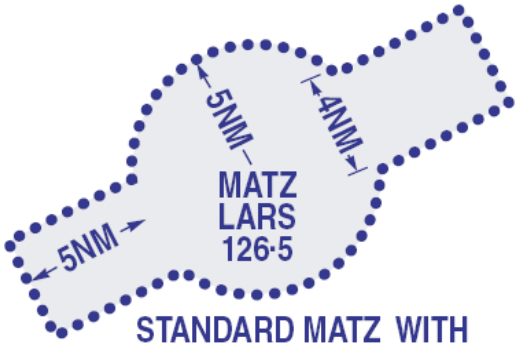
Aerodrome Traffic Zone - ATZ



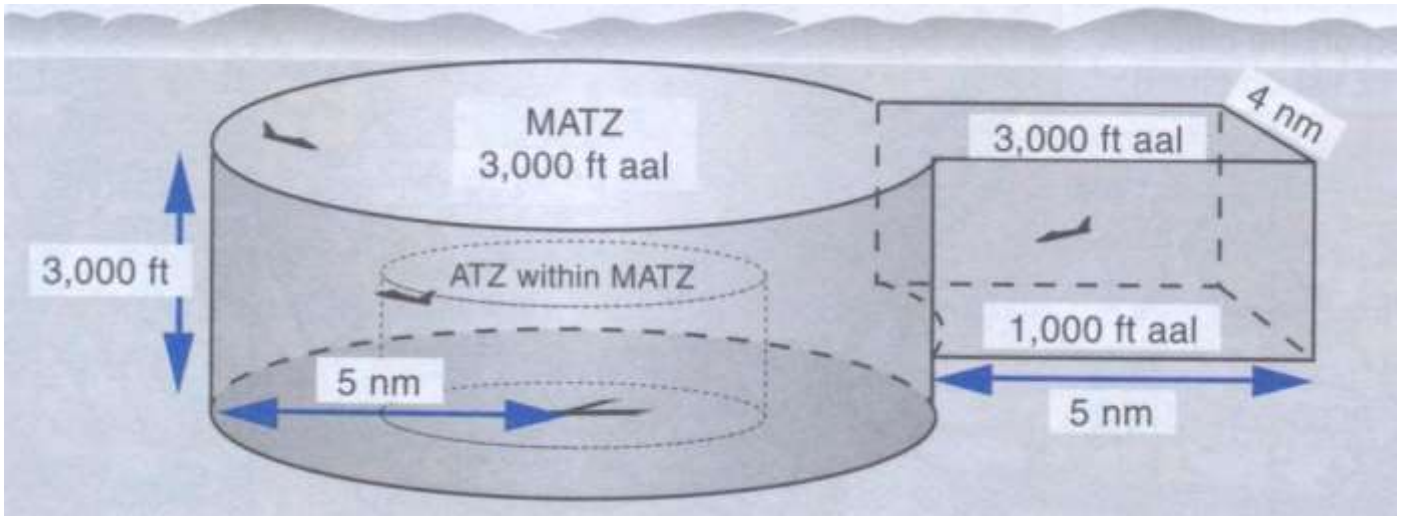
Military Aerodrome Traffic Zone - MATZ

MILITARY AERODROME TRAFFIC ZONES (MATZs)
have the following vertical limits: SFC to 3000ft AAL within the circle and 1000ft AAL to 3000ft AAL within the stub.

Zone configuration may vary, often two or more MATZs are amalgamated to produce a Combined Zone (CMATZ). Controlling Aerodromes show the MATZ penetration frequency to be used. See UK AIP ENR 2-2.



STANDARD MATZ WITH TWO STUBS AND LARS



Restricted/Prohibited/Danger Areas

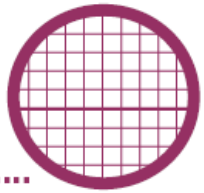
Prohibited 'P', Restricted 'R' and Danger Areas 'D' are shown with identification number/ effective altitude (in thousands of feet AMSL) except D129 where upper limit is expressed as a flight level.
Areas activated by Notam are shown with a broken boundary line.

For those Scheduled Danger Areas whose Upper Limit changes at specified times during its period of activity, only the higher of the Upper Limits is shown. Areas which may be active up to levels below the indicated Upper Limit are depicted by ↑. Areas whose identification numbers are prefixed with an asterisk (*) contain airspace subject to byelaws which prohibit entry during the period of activity.

Other Areas

AIAA AND ATA AREAS.....
Areas are shown with name, vertical limits and where applicable contact frequency. Pilots of aircraft who transit these areas are strongly advised to make use of the Radar Service.

HIGH INTENSITY RADIO TRANSMISSION AREA (HIRTA).
Areas with a radius of 0·5NM or more are shown with name/effective altitude (in thousands of feet AMSL).....



BIRD SANCTUARIES
are shown with name/effective altitude (in thousands of feet AMSL).....

GAS VENTING OPERATIONS
Pilots are advised to avoid flying over Gas Venting Sites (GVSs) below specified altitudes. A warning circle is shown on the chart to identify a GVS and the hazard altitude is shown in thousands of feet AMSL. See UK AIP ENR 1-1-5.....GVS/3·1

LASER SITES are locations where laser sources are located permanently. These are notified sites that intentionally emit laser beams into airspace and may be cause for distraction. See UK AIP ENR 5-3.....LASER SITE/UNL

SMALL ARMS RANGES in the UK with a vertical hazard height of 500ft AGL do not attract UK Danger Area status. However, firing at some ranges may constitute a hazard to aircraft below 500ft AGL. Details of the Ranges are listed in the UK AIP at ENR 5-3. Pictorial depiction can be found on the CHART OF UK AIRSPACE RESTRICTIONS. ENR 6-5-1-1.

HG, PG and Parachuting Sites

HANG/PARA GLIDING - Winch Launch Sites showing Maximum Altitude of winch launch. AMSL. See UK AIP ENR 1-1-5 ..... /2.5

WINCH LAUNCHED ACTIVITIES. Maximum Altitude of cables is represented in thousands and hundreds of feet above mean sea level calculated using a minimum cable height of 2000ft AGL plus site elevation. At some sites the cable may extend above 2000ft AGL. Due to the ground-based cable, aircraft should avoid over-flying these sites below the indicated altitude.

Symbols depicting Non Winch Launch Hang/Para Gliding sites have been removed as they were not an accurate representation of the activity on any given day. Airspace users should be aware that single or groups of soaring or motorised Hang/Para Gliders can be found flying anywhere in the open FIR up to 15,000ft, but concentrated around windward slopes and cliffs.

FREE-FALL PARACHUTING DROP ZONE. UK AIP ENR 1-1-5.
Parachutists may be expected within the airspace contained in a circle radius 1.5NM or 2NM of the DZ up to FL150. Night parachuting may take place at any of the sites shown on this chart.....

Ground Obstacles

AIR NAVIGATION OBSTACLES

Exceptionally High Obstacle (Lighted) 1000ft or more AGL..... *1978* (1031)

Single Obstacle (Unlighted)..... *825* (350)

Multiple Obstacle (Lighted)..... *1614* (505)

Cable joining Obstacles..... cables

Numerals in italics indicate elevation of top of obstacle above Mean Sea Level. Numerals in brackets indicate height of top of obstacle above local Ground Level. Obstacles annotated 'flarestack' burn off high pressure gas. The flame, which may not be visible in bright sunlight, can extend up to 600ft above the installation.

KNOWN LAND SITED OBSTACLES ABOVE 300ft AGL ARE SHOWN ON THIS CHART. A SMALL NUMBER OF OBSTACLES BELOW 300ft AGL ARE SHOWN FOR LANDMARK PURPOSES. PERMANENT OFF-SHORE OBSTACLES ARE SHOWN REGARDLESS OF HEIGHT CATEGORY.

See UK AIP ENR 1-1.

WARNING: INFORMATION IS TAKEN FROM BEST AVAILABLE SOURCES BUT IS NOT GUARANTEED COMPLETE.

Navigation Beacons

RADIO NAVIGATION AIDS

VHF Omnidirectional Radio Range.....VOR

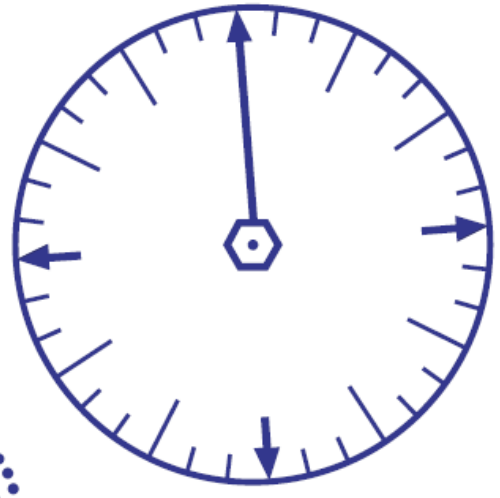
Distance Measuring Equipment.....DME
(Prefix 'T' indicates DME associated and freq-paired with ILS or associated with NDB/NDB(L) procedure. UK AIP GEN 3-4-3.)

Collocated, freq-paired VOR/DME.....

UHF Tactical Air Navigation Aid.....TACAN

Non-Directional Radio Beacon.....NDB and NDB(L)

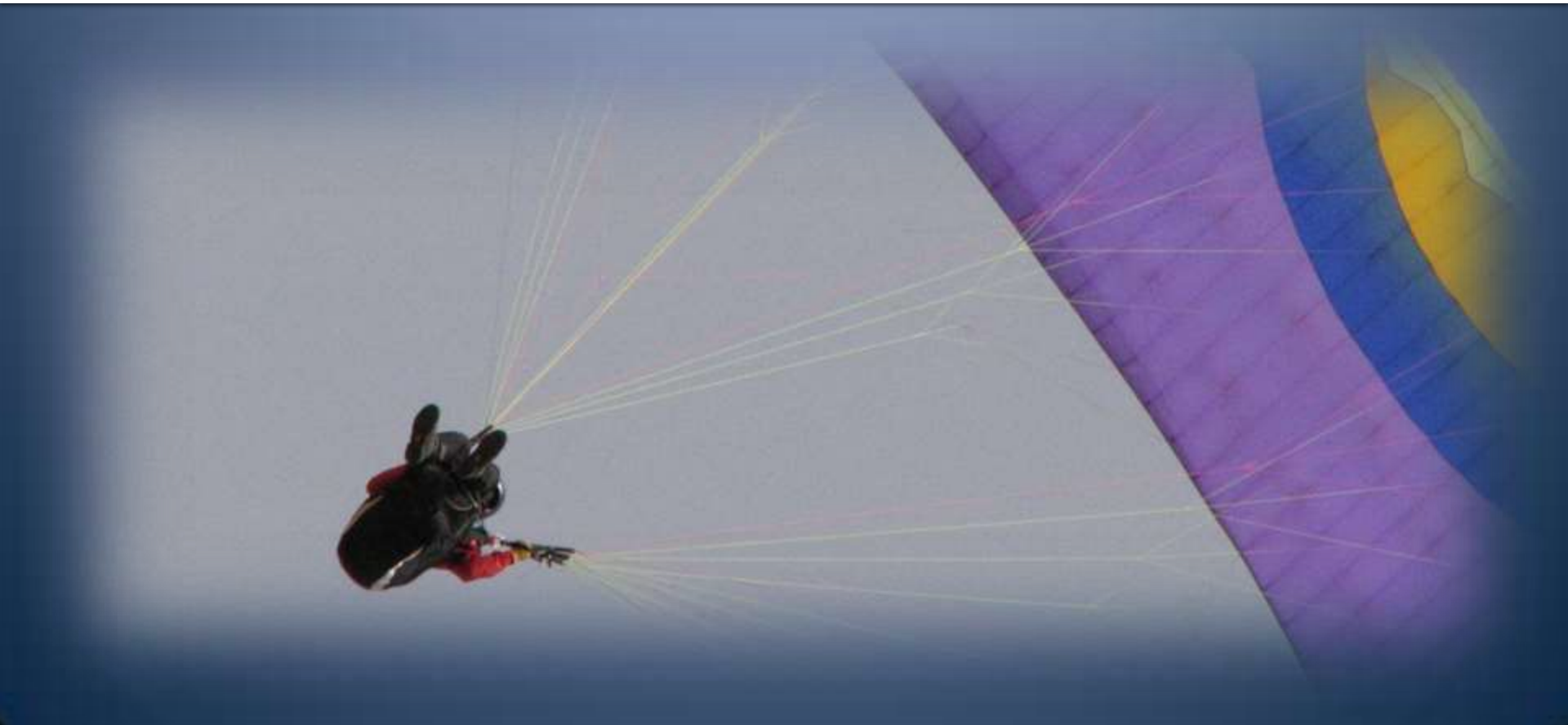
Other Navigational Aids.....



VOR COMPASS ROSE
Oriented on
Magnetic North

Rules of the Air

Which way to turn

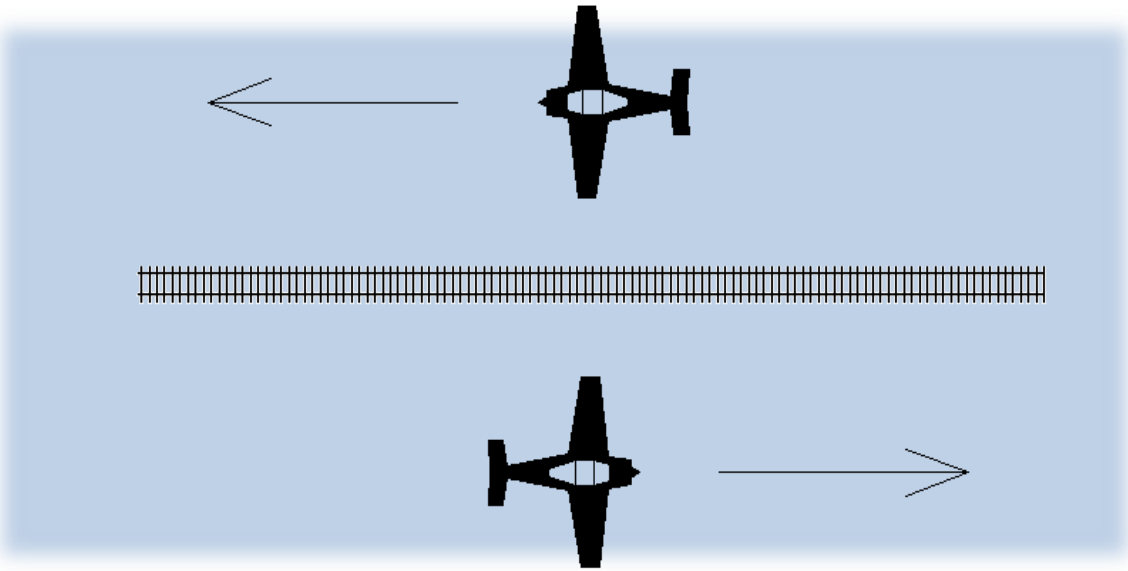


Collision Avoidance Rules

- It is the duty of the commander of an aircraft to take all possible measures to see that he does not collide with any other aircraft.
- A constant relative bearing means a collision risk exists
- An aircraft must not fly so close to another aircraft as to create a danger of collision.

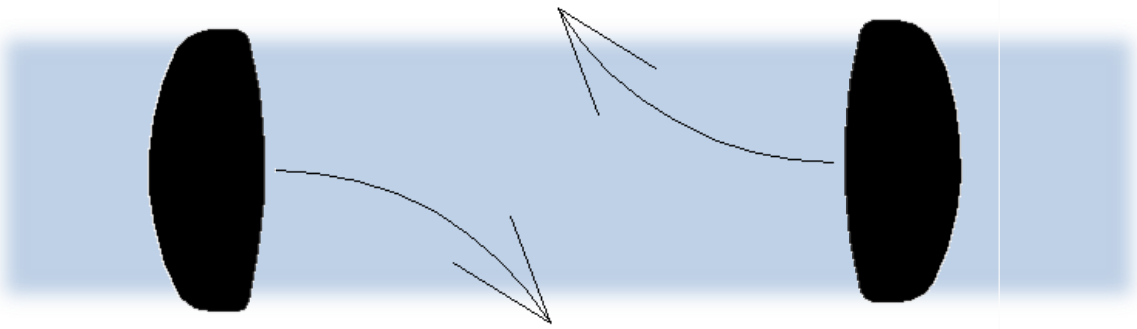
Following a Feature

- An aircraft flying in sight of the ground and following a road, railway, canal, coast or other line feature shall keep the line feature on its…



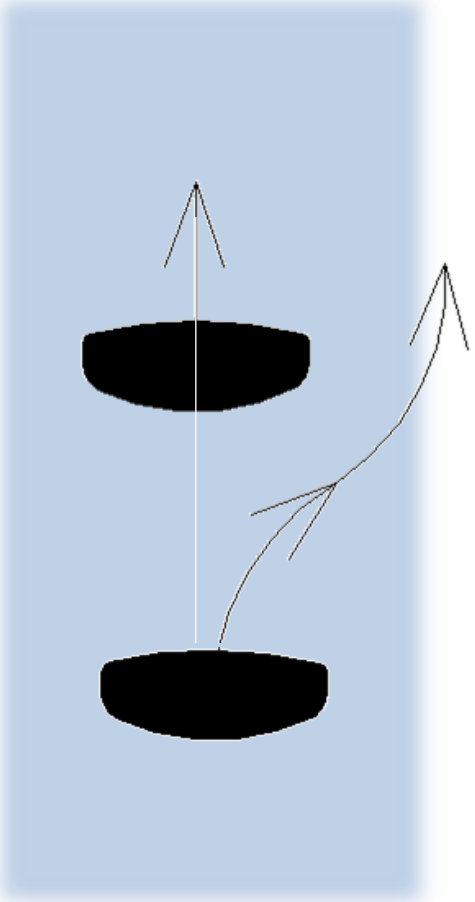
Head-on

- When two aircraft are approaching head on or nearly so and there is a danger of collision, each must turn…



Overtaking

- An aircraft which is being overtaken in the air has right of way and the overtaking aircraft must keep out of the way by turning…



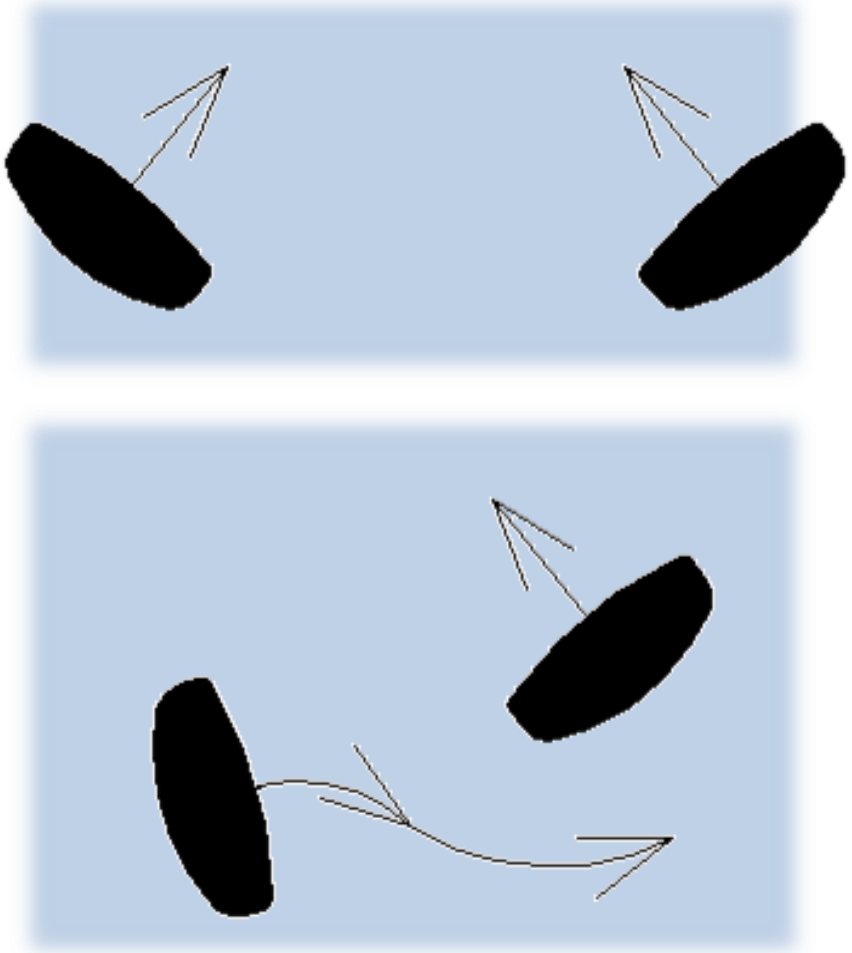
Collision Avoidance - Converging

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

Converging Aircraft

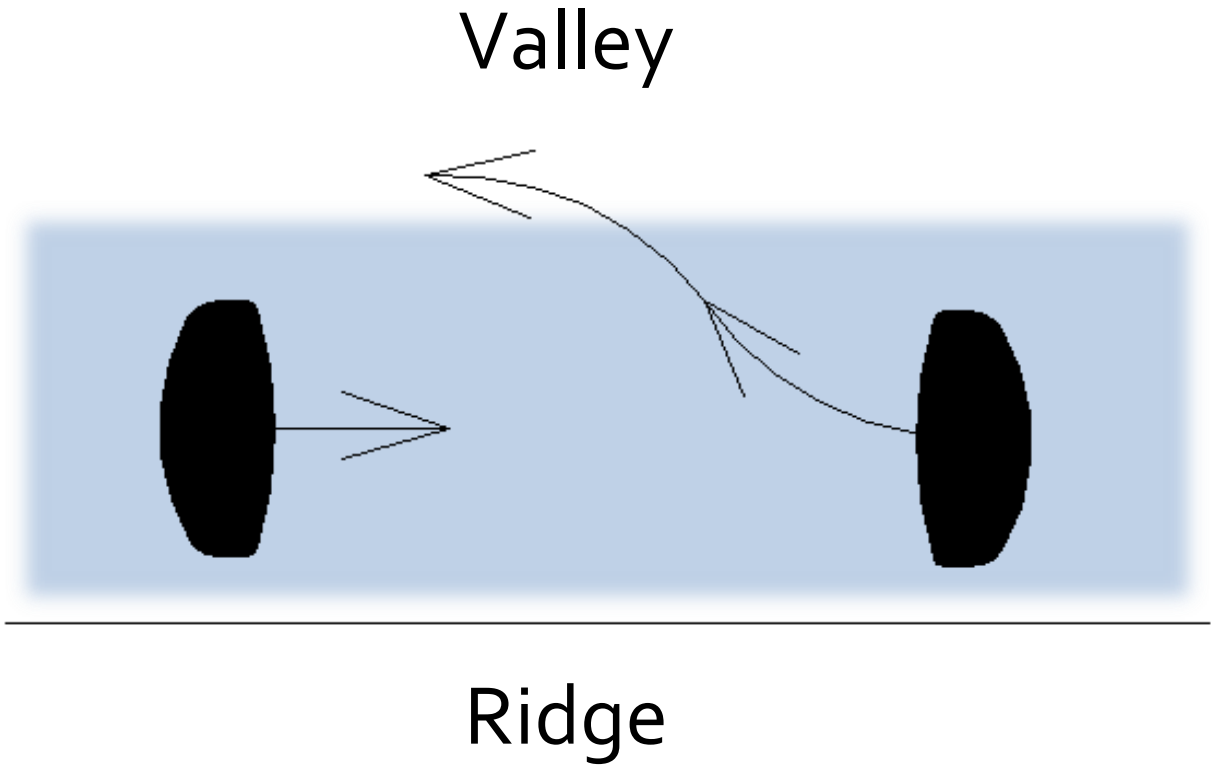
- When two aircraft are converging at about the same altitude..

  the aircraft which has the other on its right must give way



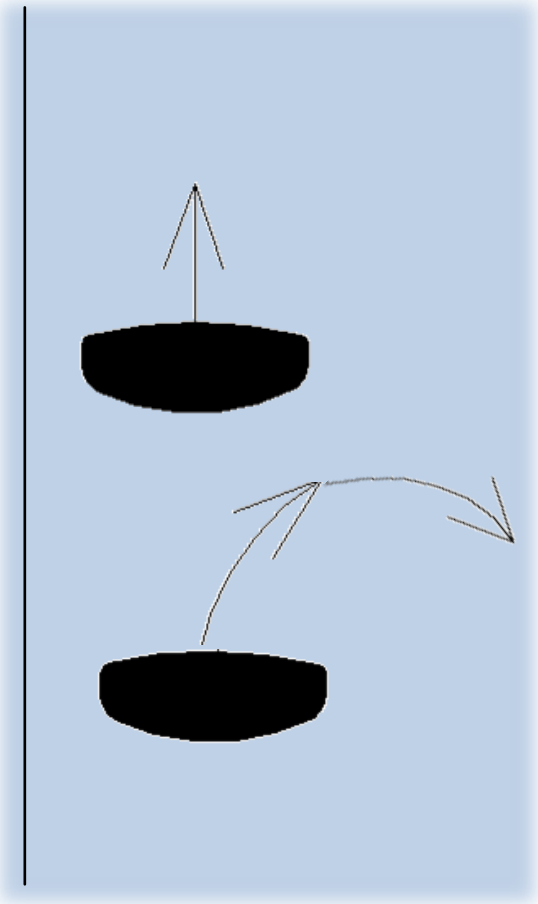
Ridge Etiquette

- Implied from airlaw



Overtaking whilst Ridge Soaring

- Old advice withdrawn
  - (Overtake on ridge side)
- New advice is to turn back if possible
- If overtaking, bear in mind that:
  - You may get boxed in
  - Glider may turn out from ridge



Formation Flying

- Aircraft must not fly in formation unless all the commanders have agreed to do so.
- An aircraft which is obliged to give way must avoid passing over, under or ahead of another aircraft unless well clear.
- An aircraft with right of way should maintain heading and speed.

Display Flying

- Pilots must have a CAA display authorisation.
- Each display and display item must be vetted by the CAA.

Valuable Consideration

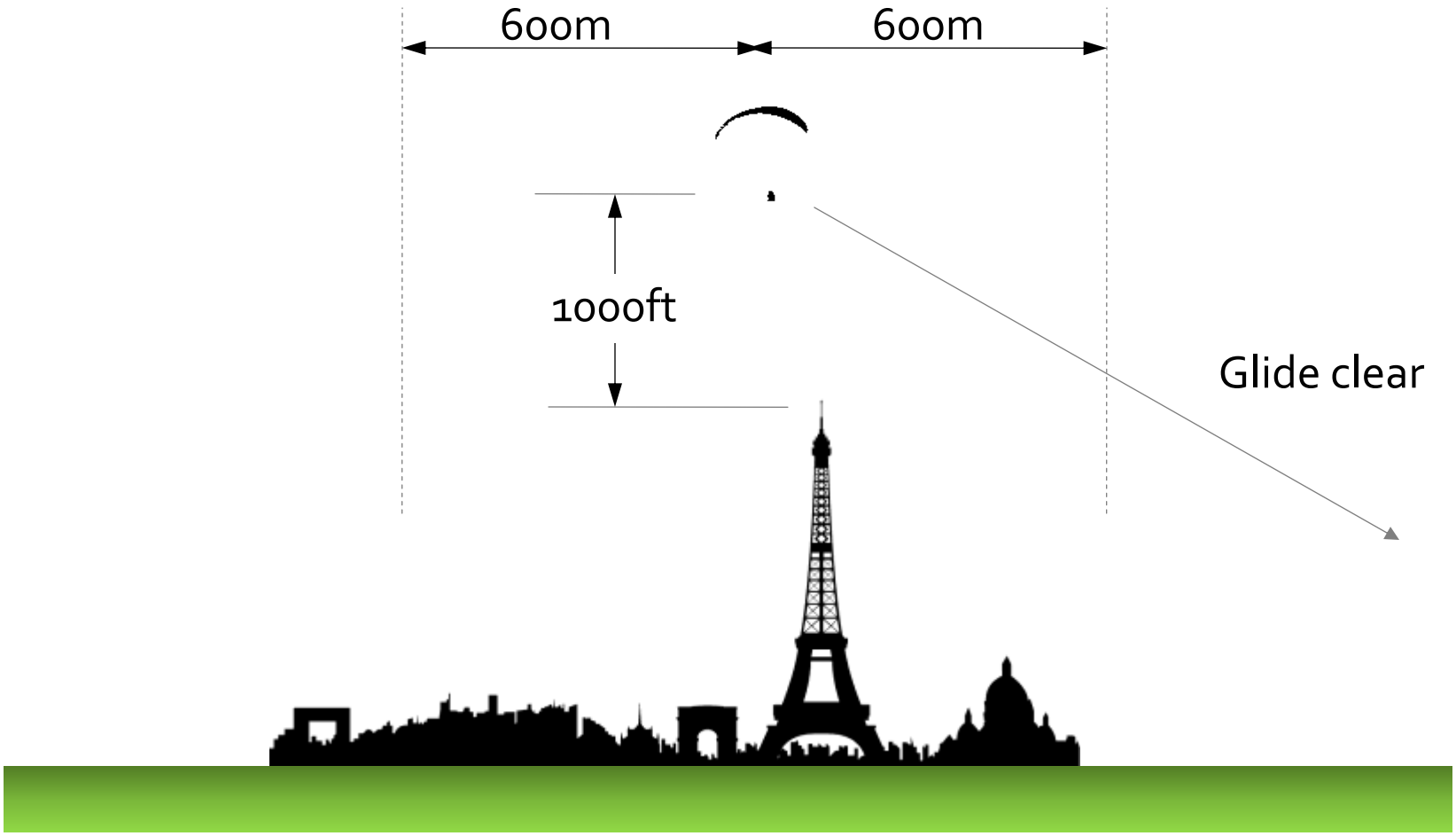
- Any flying for which a valuable consideration is paid is considered to be commercial flying and comes under commercial aviation rules.

- Exceptions
  - Competition costs and prize up to £500 per contest.
  - Direct display costs.
  - Direct costs on behalf of the pilot's employer.
  - Dual flying qualified instructors when flying dual.

Low Flying - Congested Areas

- An aircraft shall not fly over a congested area below a height which would enable it to land clear of the area, or below 1000 feet above the highest fixed object within 600 metres horizontal radius, whichever is the higher

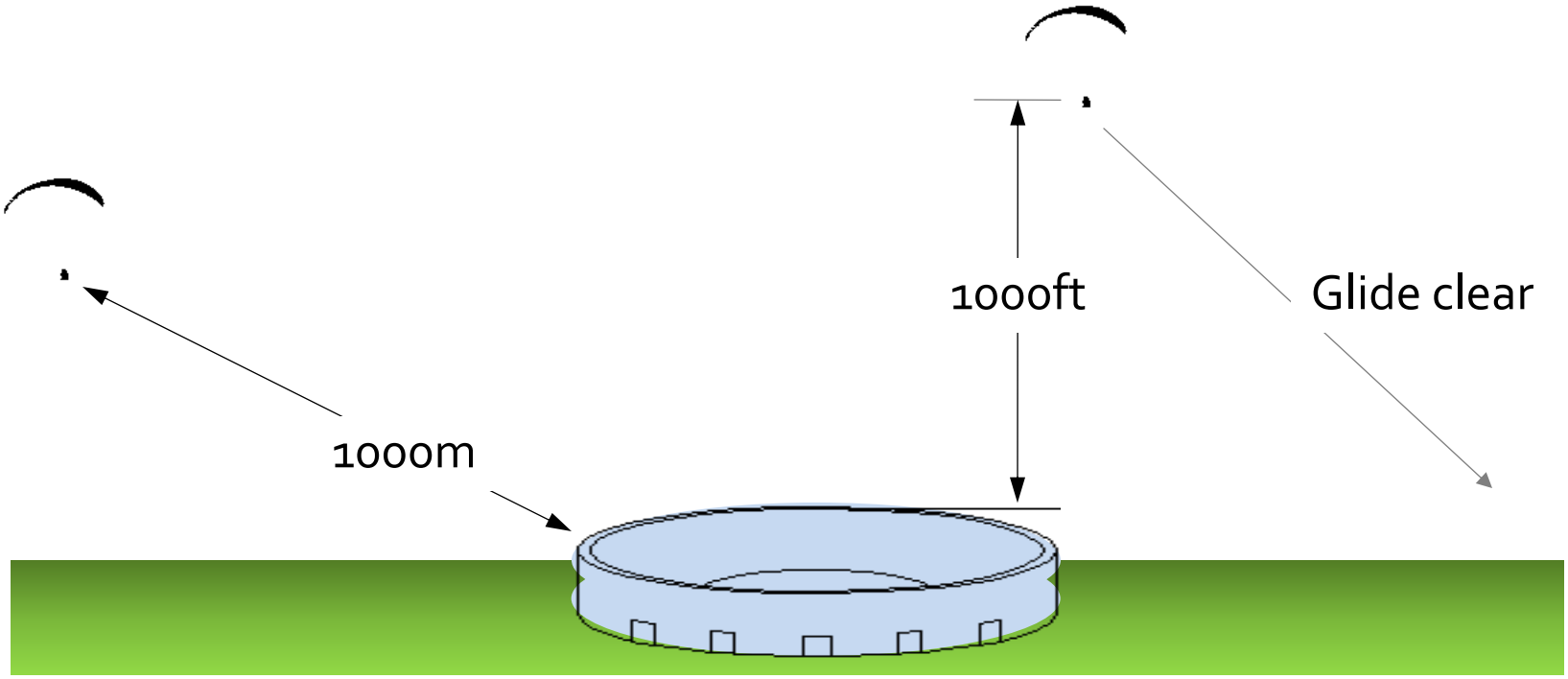
Congested Areas



Low Flying - Open Air Gatherings

- An aeroplane shall not fly over an organised outdoor assembly of more than 1000 persons
  - Below a height of 1000 feet
  - Or within 1000m
  - Or a height from which it can glide clear

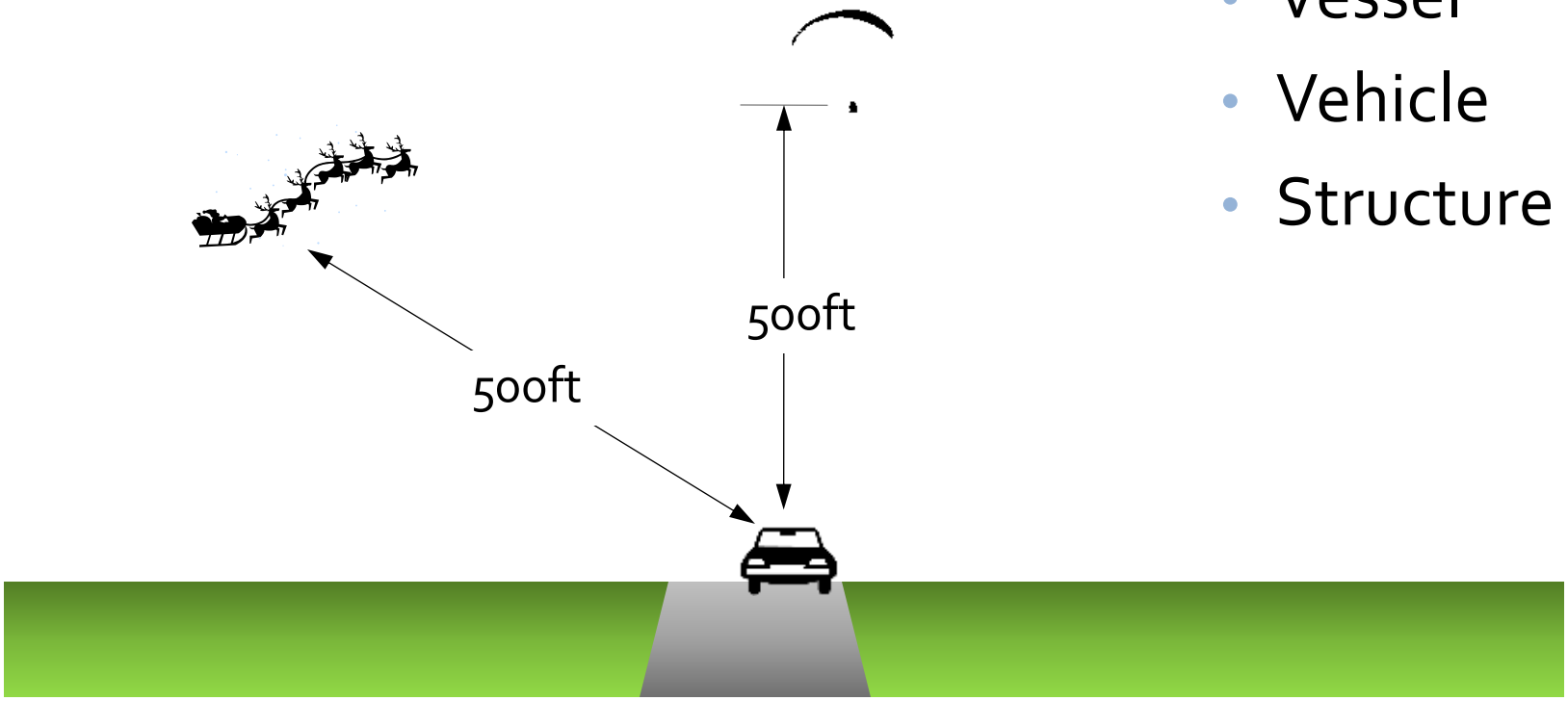
Open Air Gatherings



Low Flying

- "The 500 Foot Rule"
- A glider may not fly closer to any person, vessel, vehicle or structure than 500 feet except for hill soaring, normal take-off and landing and life saving

500’ Rule



- Person
- Vessel
- Vehicle
- Structure

Winch Launching

- A glider shall not be launched by winch or cable or by ground tow to a height of more than 60m above ground level and not at all within an ATZ without the permission of the Civil Aviation Authority.

- A winch launched glider may carry the cable to 2,000ft. At a few sites this is exceeded.

Don't Drop Things!

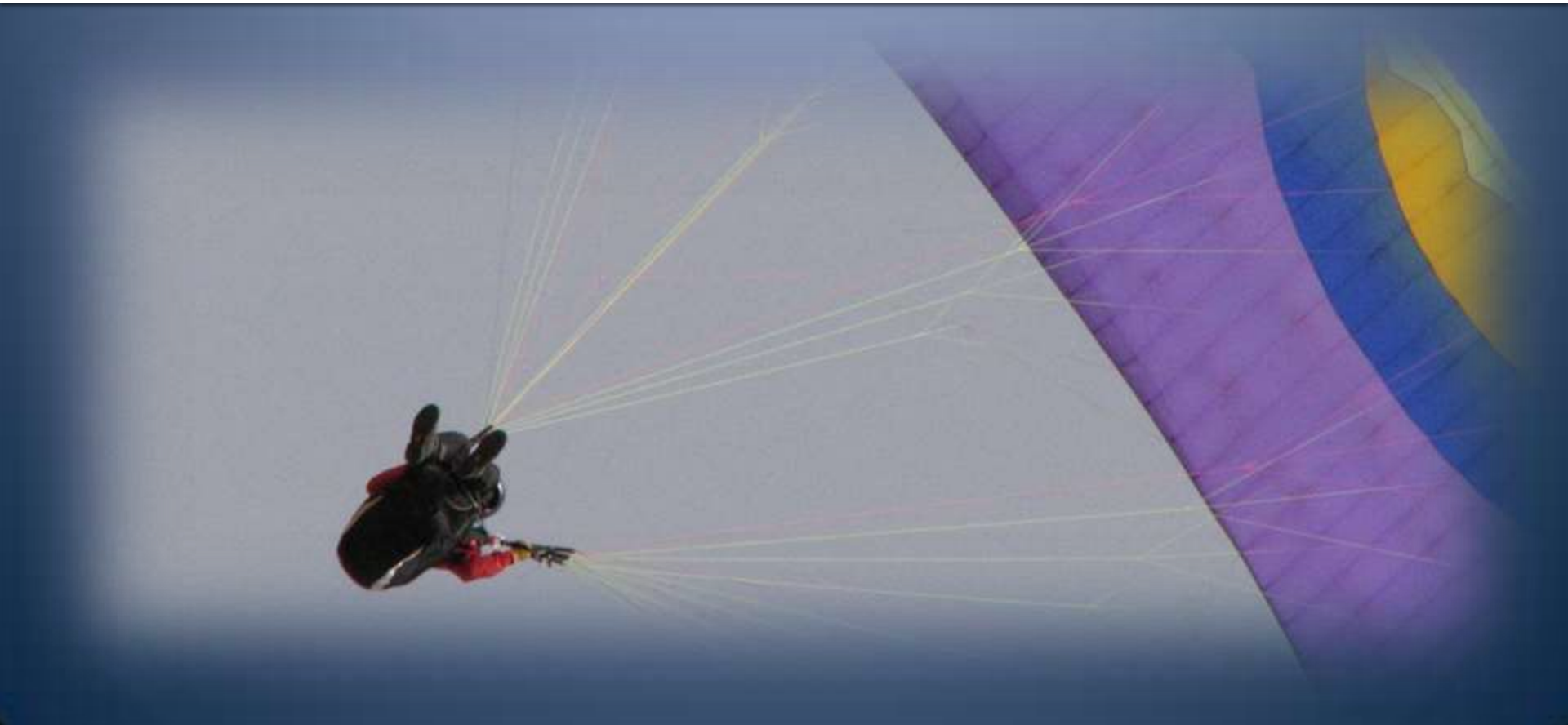
- Nothing shall be dropped from an aircraft, other than persons by parachute in an emergency, articles for the purpose of saving life, ballast in the form of fine sand or water, or tow ropes at an aerodrome.

Other Common Sense Stuff

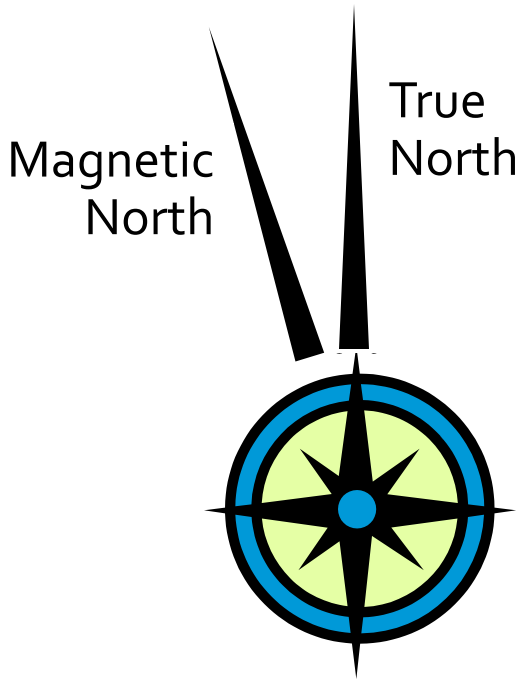
- A person under the age of 14 may not act as pilot in command of a glider (amended 2012)
- Persons must not fly while under the influence of drugs or alcohol.
- Persons must not endanger the safety of an aircraft or cause an aircraft to endanger any persons or property.

Compasses & Radios

Which way is up?

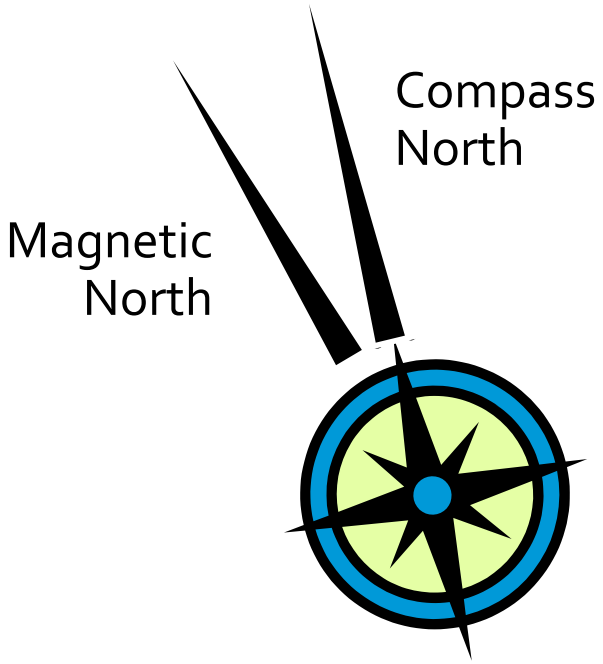


Magnetic Variation



- Difference between true north and magnetic north
- Varies according to location
- Changes slowly
- Isogonals - Lines on map joining points of equal magnetic variation

Magnetic Deviation



- Deviation is the effect that the airframe has on the compass.
- Difference between magnetic heading and compass reading
- Varies depending on magnetic heading
- Deviation chart attached to aircraft compass

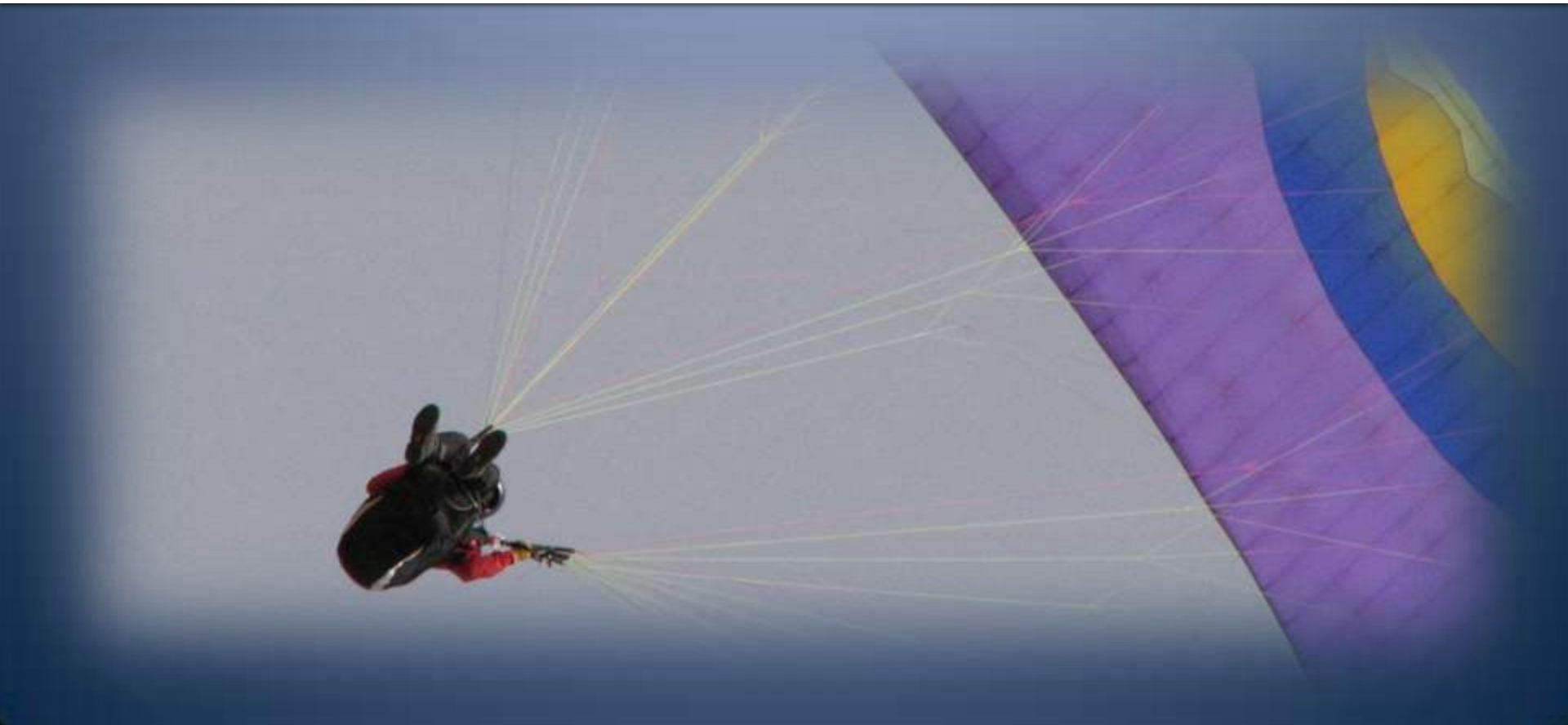
Radios

- Radio must be of an approved type
- You must either have a Flight Radiotelephony Operators Licence

  or
- Operate only on specified frequencies
- Gliders are allocated 5 channels
  - 129.9, 129.975, 130.1, 130.125, 130.4
  - International Distress frequency of 121.5

Abbreviations

F IN TLAs

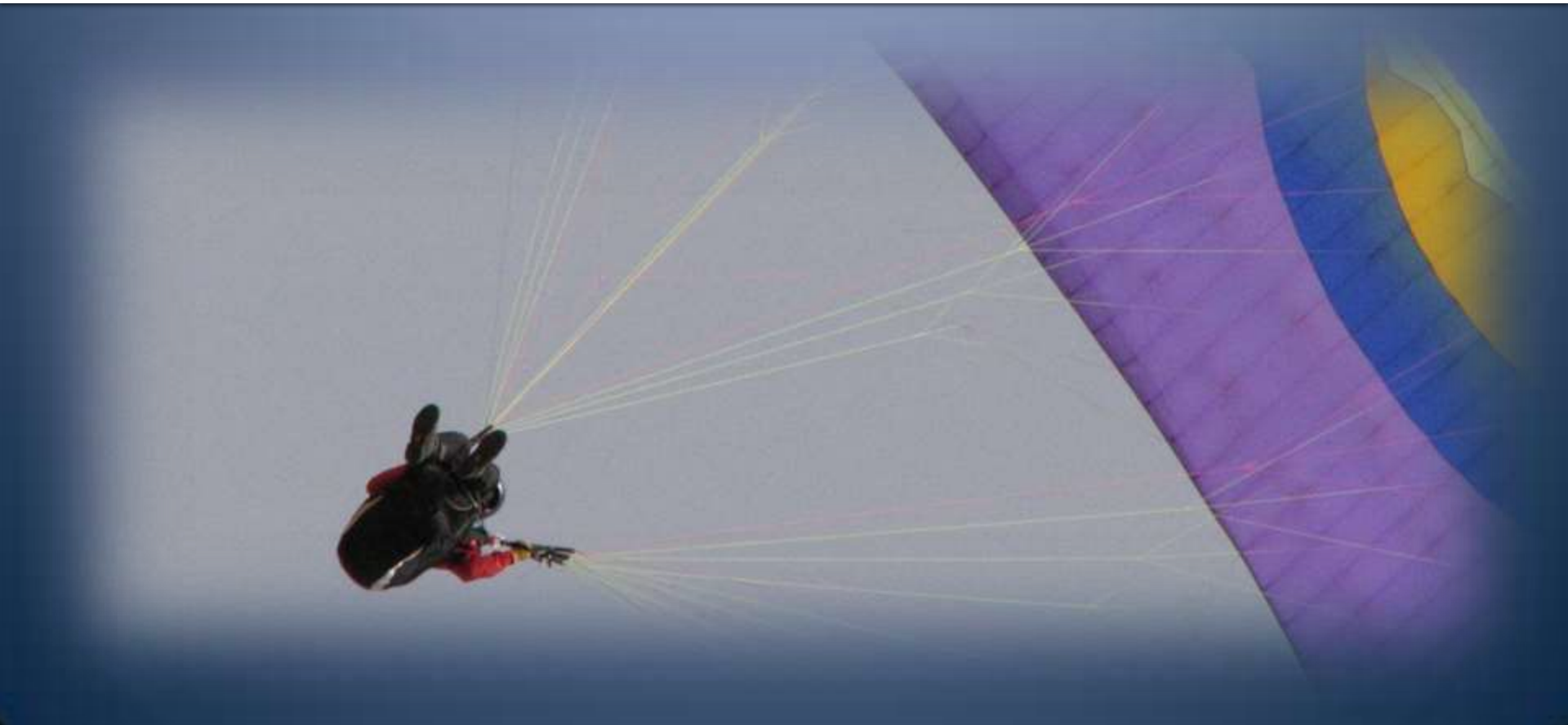


What do they stand for?

- AIAA
- ATC
- ATZ
- CTA
- CTR
- CAVOK
- FIR
- FL
- IFR
- IMC
- MATZ
- NOTAM
- TMA
- VFR
- VMC

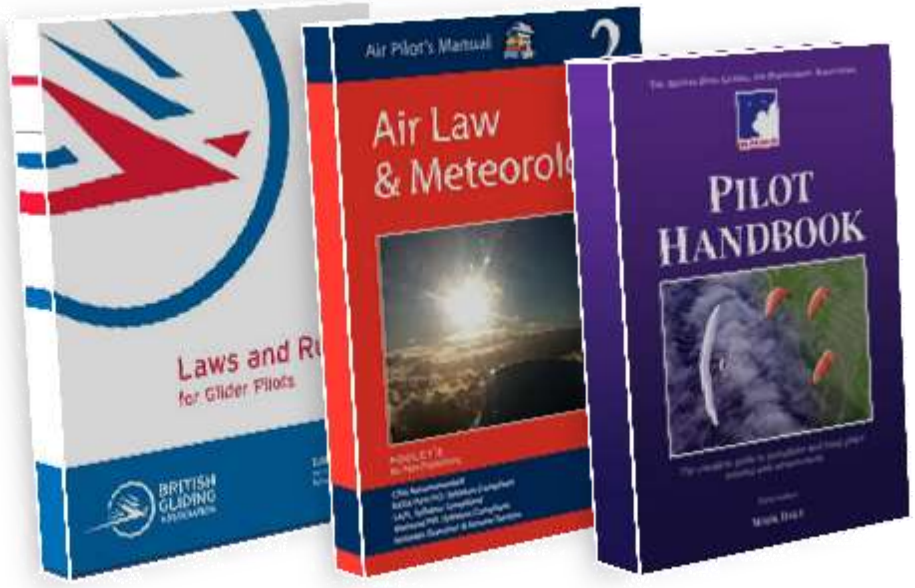
More Information

Further reading. Yeah, *reading*! Scary eh!



Resources

- The Rules of the Air Regulations 2015
- Airmaps
- CAA web site
- Graham Taylor's Notes (now old)



Good luck & thanks for listening!